

THE SPORTS - THE RULES - THE TACTICS - THE TECHNIQUES

ESPORTS

BOOK





ESPORTS BOOK

THE SPORTS • THE RULES • THE TACTICS • THE TECHNIQUES



Penguin Random House

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FIFTH EDITION

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KEY Featured alongside each sport in this book is a series of icons. These either place the sport in a sports category (corresponding to the chapter in which they are featured) or provide at-a-glance information about the way the sport is contested and won; how long it lasts; and whether it is contested by individuals, groups, or teams.

SPORTS CATEGORIES







OMBATSPORTS













Sports that are contested and decided on the basis of





DISTANCE EVENT Sports that are contested and decided on the basis of the farthest distance gained.



SCORING EVENT Sports for which the number of points or goals scored decides the outcome.





Sports in which the performances of competitors are marked by judges.



over a set period.

TIME PERIOD Provided for sports, such as team games, that take place



TEAM AND INDIVIDUAL SPORTS These icons indicate whether the sport featured is primarily played individually or in teams.

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INTRODUCTION

The sports of "running," "jumping," and "throwing" have developed significantly since the Ancient Greeks first established their Games at Olympia. Back then, there was only one event: the Stadion race. Now, there are literally hundreds of sports to choose from. So it's not surprising that you might not know all the rules to all the sports you come across.

The Sports Book is the answer. Whichever page you land on—basketball or badminton, karate or korfball (look it up)—you'll find all the information you need to be completely up-to-date on the rules, the statistics, the gear, and what's legal and what's not.

There are more than 200 sports in the book—team sports, racket sports, combat sports, water sports, winter sports, target sports, sports on wheels, motor sports, animal sports, extreme sports—and more than enough information to make you the instant expert on almost any competition you're likely to encounter.

For each and every sport in the book, there are "Need2know" panels for quick, essential facts and info. Player profiles give an overview of the necessary physical characteristics and skills. Game play panels contain information on key aspects of the game, players, rules, and techniques. Stat central has tables featuring the latest sports statistics, including player records, and results from major championships and the Olympic Games. Sidelines present amusing and fascinating facts and numbers. Background information panels outline the story behind each sport, including news on the sport's stars and competitions, plus insights and anecdotes. It's all there.

Whether you're channel surfing on your high-def on digital TV, have sports-crazy kids who ask you questions you can't answer, or are training hard and thinking of turning pro, *The Sports Book* will show you how to play, how to enjoy, and how to win.





THE OLYMPICS

ANCIENT GAMES

By roughly 500 BCE, athletic festivals were being held throughout Greece. The most famous of these was the Olympic Games, which were held every four years at Olympia in honor of Zeus. Events in these early games included short-, middle-, and long-distance races, pentathlon, boxing, and wrestling. Most events required athletes—who were male—to compete in the nude.

THE MODERN OLYMPICS

Rome conquered Greece in the 2nd century BCE, and eventually abolished the Olympic Games. But in 1892, Frenchman Pierre de Coubertin, building on the ideas of others, started to campaign for the resurrection of the event. He gave a talk to the Union des Sports Athlétiques in Paris, urging them to support his vision and emphasizing the potential of the Olympic Games to unite nations around the world under a common cause. He continued his championing of the Olympics at the Congress of Paris—a conference on international sport—in 1894. The result was an emphatic vote in favor of the revival of the Games. The organization of the event was placed in the hands of the International Olympic Committee (IOC). The first president of the IOC was the Greek Demetrius Vikelas, one of de Coubertin's most vocal supporters.

ATHENS





APRIL 6-15, 1896 GAMES OF THE I OLYMPIAD

It was initially intended that the Games be staged in Paris in 1900, in association with the World's Fair. However, it was decided that the first Olympics should be an event in its own right. It was brought forward to 1896 and moved to Athens. The revival of the ancient Games attracted athletes from 14 nations, including Greece, Germany, France, and Great Britain.

SPORTS HIGHLIGHTS

- American James Connolly won the triple jump to become the first Olympic champion in more than 1,500 years.
- Having already won three gymnastics titles, German athlete Carl Schumann added a fourth by taking the wrestling championship title.
- There was no event that the Greek hosts wanted to win more than the marathon race because of its historical significance, and they got their wish. Spyridon Louis won the race by more than seven minutes.

14 Number of nations **241** Number of athletes **9** Number of sports **43** Number of events

STAR PROFILE ALFRED HAJOS

Alfred Hajos was 13 years old when he felt compelled to become a good swimmer after his father drowned in the River Danube. The first Olympic swimming contests, at the 1896 Athens Games, were held in the Bay of Zea in water with a temperature of only 55°F (13°C). Hajos won the 100 m and the 1,200 m freestyle on the same day. For the longer race, the nine entrants were transported by boat to the open water and left alone to swim back to shore.

PARIS







MAY 15-OCTOBER 28, 1900 GAMES OF THE II OLYMPIAD

28 Number of nations 997 Number of athletes 19 Number of sports 95 Number of events

STAR PROFILE **ALVIN KRAENZLEIN**

At the 1900 Games, American Alvin Kraenzlein won the 60 m dash, 110 m hurdles, 200 m hurdles, and the long jump. His four individual gold medals remain the record for a track-and-field athlete at one Games, and he accomplished the feat over a period of only three days. Although a qualified dentist, Kraenzlein never practiced, preferring to become a track coach.

The 1900 Games were held in Paris as part of the World's Fair. The exhibition organizers spread the events over five months, the length of the Fair, and played down their Olympic status. Women took part in the Games for the first time, although only in a limited number of events, including golf and tennis.

- American Ray Ewry won three gold medals in one day, yet he is almost unknown today because his unprecedented feats were performed in events that are no longer held: the standing high jump, standing long jump, and standing triple jump.
- → Charlotte Cooper of Great Britain was the first female Olympic champion when she won the singles tennis event. She also won the mixed doubles tournament.

LOUIS AND PARK AND PA

JULY 1-NOVEMBER 23, 1904 GAMES OF THE III OLYMPIAD

12 Number of nations 651 Number of athletes 17 Number of sports 95 Number of events

STAR PROFILE MARTIN SHERIDAN

Irish-American Martin Sheridan was the world's finest all-around athlete of his time. As well as winning the discus at the 1904 and 1908 Games, he won the Greek-style discus and took bronze for the standing long jump in 1908. He was at his best before world records were officially recognized, but between 1902–1911, he set 15 "world bests" in the discus.

The 1904 St. Louis Olympics organizers repeated all of the mistakes of 1900. The Olympic competitions, spread out over four and a half months, were lost in the chaos of a World's Fair. The general lack of interest was increased by the fact that out of the 95 Olympic events, only 42 included athletes from outside the US.

SPORTS HIGHLIGHTS

- One of the most remarkable athletes was the American gymnast George Eyser, who won six medals even though his left leg was made of wood.
- irishman Thomas Kiely won an early version of the decathlon, completing all 10 events—100 m; 120 m hurdles; 800 m walk; 1,600 m; high jump; long jump; pole vault; shot put; hammer; and 56 lb weight throw—in a single day.







Above (clockwise from left): Champion swimmer Alfred Hajos; Alvin Kraenzlein, winner of four individual gold medals in one Games; shooter Oscar Swahn, who was 60 years old at the time of his first gold medal; and all-around Olympian Martin Sheridan.

LONDON







APRIL 27-OCTOBER 31, 1908 GAMES OF THE IV OLYMPIAD

22 Number of nations 2,008 Number of athletes22 Number of sports 110 Number of events

STAR PROFILE OSCAR SWAHN

In 1908, Swedish shooter Oscar Swahn was already 60 years old when he won his first Olympic gold medal. He won the running deer single-shot event and took a second gold the next day in the team event. Swahn also earned a bronze medal in the running deer double-shot contest. After World War I, Swahn returned to compete in the Olympics at the age of 72 and won a silver medal.

The 1908 London Games were held in the White City Stadium, which had been constructed for the Franco-British exhibition earlier that year. The stadium was equipped with a running track and a velodrome and also had a large swimming pool with an adjustable diving board. Women took part in a limited but increased number of sports.

SPORTS HIGHLIGHTS

- When Italian Dorando Pietri entered the stadium at the end of the marathon, he went in the wrong direction and collapsed. Officials helped him reach the finish line, so he was disqualified, but his plucky effort made him famous.
- American standing jump specialist Ray Ewry added two more gold medals to take his total Olympic tally to eight, the most individual golds ever won.

STOCKHOLM







MAY 5-JULY 27, 1912

GAMES OF THE V OLYMPIAD

28 Number of nations 2,407 Number of athletes 14 Number of sports 102 Number of events

STAR PROFILE JIM THORPE

Jim Thorpe is often considered the greatest all-around athlete in history. But Thorpe's Olympic medals were taken back after it was revealed he had earlier been paid for playing minor league baseball—only amateur athletes were eligible for the Olympics. It was not until 1982 that the IOC reversed its decision and returned the medals posthumously to Thorpe's family.

The organization and sports facilities in Stockholm were both impeccable, making the V Games a model for future Olympic Games. Trailblazing technological innovations at the Stockholm Games included the photo finish for track events and the electronic timer to back up the conventional stopwatch.

SPORTS HIGHLIGHTS

- American Jim Thorpe, of Native American and Irish descent, won the pentathlon and decathlon by huge margins. At the awards ceremony, the King of Sweden told Thorpe, "Sir, you are the greatest athlete in the world."
- Hannes Kolehmainen of Finland won the 5,000 m; 10,000 m; and the individual cross-country race. He also won a silver medal in the team cross-country race.









Above (clockwise from left): Prolific all-arounder Jim Thorpe; tennis great Suzanne Lenglen; medal-winning speed skater Julius Skutnabb; long-distance champion Paavo Nurmi; and Johnny Weissmuller, Olympic swimmer and film star.

ANTWERP







APRIL 20-SEPTEMBER 12, 1920

GAMES OF THE VII OLYMPIAD

29 Number of nations 2,626 Number of athletes22 Number of sports 156 Number of events

STAR PROFILE SUZANNE LENGLEN

Suzanne Lenglen of France was one of the greatest women tennis players of all time. Between 1919 and 1926, she lost only one match. In the 10 sets it took her to win the 1920 Olympic title, she lost only 4 games. Lenglen teamed with Max Decugis to win another gold medal in mixed doubles and with Elisabeth d'Ayen to win a bronze in the women's doubles.

After much debate about whether or not athletes should be admitted from those countries held responsible for World War I, the IOC excluded delegates from the Central Powers. Spectators witnessed the last tug-of-war, along with a number of other events that were also discontinued, including weight throwing; the 3,000 m walk; and the 400 m breaststroke.

- Hawaii's Duke Kahanamoku won his second consecutive swimming title in the 100 m freestyle and broke his own world record.
- Halian fencer Nedo Nadi won the individual foil and saber titles and led the Italians to victory in all three team events, collecting a record five fencing gold medals at the same Games.

CHAMONIX





JANUARY 25-FEBRUARY 5, 1924 1ST OLYMPIC WINTER GAMES

16 Number of nations **258** Number of athletes **6** Number of sports **16** Number of events

STAR PROFILE JULIUS SKUTNABB

Finnish speed skater Julius Skutnabb competed in his first world championship in 1914. At the first Winter Games, aged 34, he took part in every speed skating event. He won a silver medal in the 5,000 m race and a gold in the 10,000 m, finishing 3 seconds ahead of fellow Finn, Clas Thunberg. Based on his results in the individual races, Skutnabb took a bronze in the combined.

In 1922, a meeting of the French Olympic Committee decided to organize an International Winter Sports Week in Chamonix in 1924. (The IOC did not sanction Winter Games until 1926.) Sadly, the well-organized competitions were beset by poor weather conditions. The Nordic countries demonstrated their dominance in all five disciplines, including ice hockey and bobsled.

SPORTS HIGHLIGHTS

- American Charles Jewtraw was the first Winter Olympic champion. He won the gold medal in the first event, which was 500 m speed skating.
- Finnish speed skater Clas Thunberg won three gold medals, a silver, and a bronze. Norway's Thorleif Haug won the 18 km and 50 km cross-country skiing races and the Nordic combined event.

PARIS







MAY 4-JULY 27, 1924 GAMES OF THE VIII OLYMPIAD

At the 1924 Paris Games, the Olympic motto, "Citius, Altius, Fortius," ("Swifter, Higher, Stronger") was introduced, as was the closing ceremony ritual of raising three flags: the flag of the IOC, the flag of the host nation, and the flag of the next host nation. The number of competing nations leapt from 29 to 44, signaling widespread acceptance of the Olympic Games.

SPORTS HIGHLIGHTS

- American Johnny Weissmuller won two gold medals in swimming and a bronze in water polo all on the same day.
- Finnish athlete Ville Ritola won the 10,000 m, breaking his own world record. He also won gold in the 3,000 m steeplechase, along with two silver medals in the 5,000 m and 10,000 m cross-country races, finishing behind Nurmi.

44 Number of nations **3,089** Number of athletes **17** Number of sports **126** Number of events

STAR PROFILE PAAVO NURMI

At the Paris Games, Finnish athlete Paavo Nurmi performed one of the greatest feats in Olympic history. First, he won the 1,500 m; then, with just a two-hour break, he won the 5,000 m as well. Two days later, Nurmi won the 10,000 m cross-country, earning a team gold at the same time. The next day, he won another gold in the 3,000 m team race, bringing his total haul to five gold medals.

AMSTERDAM





MAY 17-AUGUST 12, 1928 GAMES OF THE IX OLYMPIAD

46 Number of nations **2,883** Number of athletes **14** Number of sports **109** Number of events

STAR PROFILE JOHNNY WEISSMULLER

At the Amsterdam Games, American swimmer Johnny Weissmuller won the 100 m freestyle, as well as being a member of the winning 200 m relay team. He is rated by many pundits as the greatest swimmer of all time. Later in life, Weissmuller transferred his sports success to the silver screen, portraying Tarzan in 12 films between 1932 and 1948.

In 1928, female athletes were allowed to compete in the gymnastics and athletics events, resulting in more than double the number of female Olympians than in previous years. The Olympic flame was lit for the first time and was housed in a tower in the stadium. Athletes from a record 28 different nationalities won gold medals during the Games.

SPORTS HIGHLIGHTS

- Australian rower Henry Pearce stopped midway through a quarterfinal race to allow a line of ducks to cross in front of his boat. He went on to win the race and eventually the gold medal.
- Percy Williams of Canada sprinted to victory in both the men's 100 m and 200 m races.

ST. MORITZ





FEBRUARY 11-19, 1928 II OLYMPIC WINTER GAMES

25 Number of nations 464 Number of athletes4 Number of sports 14 Number of events

STAR PROFILE GILLIS GRAFSTRÖM

Gillis Grafström was one of figure skating's greatest innovators. Among his inventions were the spiral, change sit spin, and flying sit spin. He also won more Olympic medals than any figure skater in history. In 1920, the six judges gave Grafström a unanimous victory. In 1924, he edged Willy Böckl for a second gold medal, and in 1928, another narrow victory over Böckl secured his third.

At St. Moritz, the organizers were fortunate enough to be able to use existing sports facilities in a well-established ski resort. Athletes from 25 nations were full of praise for the organization of the Games. For the first time since World War I, German athletes were allowed to compete. As in Chamonix, Norway were the most successful team, winning six gold medals.

SPORTS HIGHLIGHTS

- Norwegian Sonja Henie caused a sensation by winning the women's figure skating at the age of 15. Her record as the youngest winner of an individual event stood for 70 years.
- Canada dominated the ice hockey tournament, winning their three matches 11−0, 14−0, and 13−0.

 MILION MILION

LAKE PLACID









FEBRUARY 4-15, 1932 III OLYMPIC WINTER GAMES

Despite the worldwide Great Depression, the third Winter Olympics went ahead. Unfortunately, they turned out to be a financial disaster for the organizers, who faced a huge loss. Only 252 athletes from 17 nations competed for medals, and the credibility of the competitions was further undermined by the fact that more than half of these athletes were from the US or Canada.

SPORTS HIGHLIGHTS

- The French husband and wife team of Pierre and Andrée Brunet retained the pairs figure skating gold they had captured in 1928.
- Norwegian skier Johan Gröttumsbraaten became Olympic champion in the Nordic combined and successfully defended his 1928 St. Moritz title.
- Only four teams competed in the ice hockey competition, so the teams played each other twice to decide the winner. Canada beat the US team 2–1 and then drew 2–2 to secure overall victory.

17 Number of nations 252 Number of athletes4 Number of sports 14 Number of events

STAR PROFILE **EDDIE EAGAN**

American Eddie Eagan holds a special place in Olympic history: he is the only person to win gold medals in both summer and winter sports. In 1920, Eagan defeated Sverre Sörsdal of Norway to win the light heavyweight boxing at the Antwerp Olympics. Twelve years after his victory at the Summer Games, Eagan reappeared at the 1932 Lake Placid Winter Olympics as a member of the victorious four-man bobsled team.

LOS ANGELES







JULY 30-AUGUST 14, 1932 GAMES OF THE X OLYMPIAD

37 Number of nations **1,332** Number of athletes **14** Number of sports **117** Number of events

STAR PROFILE BOB VAN OSDEL

Duncan McNaughton and Bob Van Osdel were good friends and fellow high jumpers. At the 1932 Los Angeles Olympics, Van Osdel represented the US and McNaughton represented Canada. In the Olympic final, the battle for gold came down to a duel between the two friends. McNaughton cleared the bar at 6 ft 5% in (1.97 m) to take gold, while Van Osdel missed, taking the silver medal.

Because the 1932 Olympics were held in the middle of the Great Depression and in the comparatively remote city of Los Angeles, half as many athletes took part as had in 1928. Nevertheless, the level of competition was extremely high, and 18 world records were either broken or equaled. The 1932 Olympics were the first to last 16 days.

- American athlete "Babe" Didrikson won the javelin throw and the 80 m hurdles and took silver in the high jump. She could have won more medals, but women were allowed to compete in only three individual track and field events.
- American swimmer Helene Madison won the 100 m and 400 m freestyle and helped smash the world record in the 4x100 m freestyle team relay.

GARMISCH-PARTENKIRCHEN



FEBRUARY 6-16, 1936 IV OLYMPIC WINTER GAMES

28 Number of nations 646 Number of athletes 4 Number of sports 17 Number of events

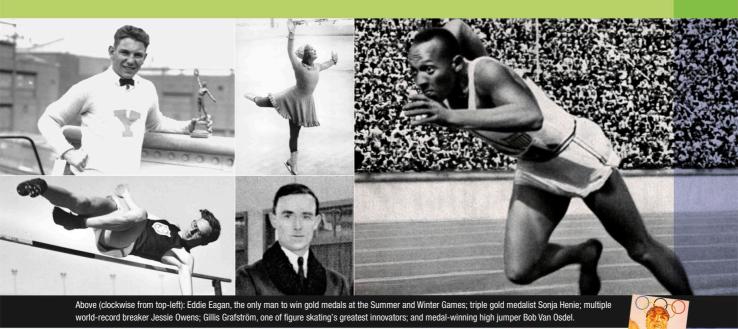
STAR PROFILE SONJA HENIE

Figure skater Sonja Henie made her Olympic debut at the first Olympic Winter Games in Chamonix in 1924 at the age of 11. Henie won gold medals at both the 1928 and 1932 Olympics. At the 1936 Winter Games, aged 23, she won her third gold medal. A week later, she won her tenth straight world championship, setting a record that still has not been broken.

The 1936 Winter Games were held in the twin Bavarian towns of Garmisch and Partenkirchen. Alpine skiing events were included for the first time, and this led to a major controversy. The IOC declared that ski instructors could not take part in the Olympics because they were professionals. Incensed, the Austrian and Swiss skiers boycotted the events.

SPORTS HIGHLIGHTS

- Norwegian ski jumper Birger Ruud attempted an unusual double, competing in both the Alpine and ski jumping events. After missing a gate in the slalom, he ended up in fourth place, but a week later, he won his second consecutive gold medal in the large hill event.
- Norwegian speed skater Ivar Ballangrud won three gold medals and one silver. This was his seventh medal in three Olympics.



BERLIN



AUGUST 1-16, 1936 GAMES OF THE XI OLYMPIAD

49 Number of nations **3,963** Number of athletes **19** Number of sports **129** Number of events

STAR PROFILE JESSE OWENS

Jesse Owens assured himself a place in sports history on May 25, 1935, when he set three world records and tied a fourth in the space of 45 minutes. One of these world records, 26 ft 8¼ in (8.13 m) in the long jump, would last for 25 years. His four gold medals at the 1936 Olympics—in 100 m, long jump, 200 m, and 4x100 m relay—set a world record that would last for 20 years.

The 1936 Berlin Olympics are best remembered for Adolf Hitler's failed attempt to prove his theories of Aryan racial superiority. The most popular hero of the Games was the African-American sprinter and long jumper Jesse Owens, who won four gold medals. The torch relay was introduced, in which a lighted torch is carried from Olympia to the site of the Games.

- Nower Jack Beresford of Great Britain set a record by winning his fifth Olympic medal.
- Thirteen-year-old American diver Marjorie Gestring took gold in the springboard event, becoming the youngest female gold medalist in the history of the Summer Olympics.

ST. MORITZ





JANUARY 30-FEBRUARY 8, 1948 V OLYMPIC WINTER GAMES

28 Number of nations

669 Number of athletes (592 men/77 women)

4 Number of sports 22 Number of events

STAR PROFILE BARBARA ANN SCOT

Barbara Ann Scott was only 11 years old when she won her first national junior title. From 1945–1948, she won the North American Figure Skating Championships each year. In 1948, at the Winter Games, she became the first Canadian to win the figure skating gold medal and was inducted into the Canadian Olympic Hall of Fame. She was awarded the Lou Marsh Trophy as Canada's top athlete of the year in 1945, 1947, and 1948, and was made an Officer of the Order of Canada in 1991.

Did you know that... After a 12-year break, these Winter Games were named the "Games of Renewal." >>> Alpine skiing made its Olympic debut. A few combined events had taken place in 1936, but now there were three events for men, as well as women.

The 1940 Winter Olympics were scheduled for Sapporo, Japan, but war with China forced the Japanese to announce, in July 1938, that they would be unable to host the Games. Organizational disagreements led the Swiss to withdraw as well, so the Germans volunteered Garmisch-Partenkirchen in July 1939, but four months later, the outbreak of World War II forced the cancellation of the Olympics. The first postwar Games were held in St. Moritz in 1948, but Germany and Japan were barred from competing. As Switzerland had been neutral during the war, its facilities and infrastructure remained undamaged. However, a shortage of hard currency, combined with restrictions on foreign travel for some nations, meant that many visitors stayed away.

SPORTS HIGHLIGHTS

- Competing in the slalom, American skier Gretchen Fraser recorded the fastest time in the first round. Despite a 17-minute delay, she skied fast enough to win the gold medal—the first ever by an American skier.
- Henri Oreiller won two Olympic skiing titles—the Downhill and the Combined—becoming the first Frenchman to win a Winter Olympic title.
- Canadian figure skater Barbara Ann Scott, 19, succeeded Norway's Sonja Henie, winner at the previous three Winter Games, as the women's figure skating gold medalist.

LONDON









JULY 29-AUGUST 14, 1948 GAMES OF THE XIV OLYMPIAD

London was a likely option for the first postwar Summer Olympics because its existing facilities had remained largely intact through the war. In front of King George VI and more than 80,000 spectators, the XIV Games were opened at the Empire Stadium in Wembley, northwest London. Before the Games, the organizers dropped the idea of building an Olympic village because of the anticipated costs. Britain was, after all, almost bankrupt in the years following World War II. Instead, the athletes stayed in military barracks and colleges around the capital, while rationing meant that many teams had to bring their own food along with them.

Not surprisingly, the Games took place without teams from Germany and Japan, while athletes from the Soviet Union did not participate either, since the USSR was not affiliated with the IOC.

SPORTS HIGHLIGHTS

- The 17-year-old American Bob Mathias won the decathlon, becoming the youngest athlete in Olympic history to win a men's athletics event.
- Fanny Blankers-Koen of the Netherlands, who made her Olympic debut in 1936, was a 30-year-old mother and world record holder in six events when she became the star of the London Games.
- Hungarian Karoly Takacs' right hand—his pistol hand—was shattered by a grenade. After learning to shoot with his left hand, he won an Olympic gold medal in the rapid-fire pistol event.

59 Number of nations

4,104 Number of athletes (3,714 men/390 women)

17 Number of sports 136 Number of events

STAR PROFILE **Fanny Blankers-Koen**

Francina "Fanny" Blankers-Koen was an outstanding all-around athlete. At the 1948 London Games, she won four gold medals, including the 80 m hurdles, 100 m sprint, and 4x100 m relay. She was deprived of more medals by a rule limiting women to three

individual events, at a time when she also held worlds in the high jump and long jump. In her career, Blankers-Koen set 16 world records

at eight different events and won five European titles from 1946–1950.

Did you know that... The 1948 London Games saw the introduction of blocks to facilitate the start for athletes in sprint races (100 m to 400 m). >>> This was the first Games to be shown on television.

OSLO





O TITLE GAMES

FEBRUARY 14-25, 1952 VI OLYMPIC WINTER GAMES

30 Number of nations

694 Number of athletes (585 men/109 women)

4 Number of sports 22 Number of events

STAR PROFILE HJALMAR ANDERSEN

Hjalmar Andersen of Norway was the first man to win three speed skating gold medals at one Olympic Winter Games when, in 1952, he won the three long races (1,500 m; 5,000 m; and 10,000 m) in his native Oslo. His winning margin in the 5,000 m was an astounding 11 seconds. He retired after the 1952 Games but returned to competition in 1954 to win his fourth Norwegian title, having already won the World, European, and Norwegian all-around titles in 1950–1952.

Did you know that... The Olympic flame was lit for the first time at the Olympic Winter Games. >>> American Richard "Dick" Button became the first figure skater to perform a triple jump and double Axel jump.

For the first time, the Winter Olympics were held in a Scandinavian country. The Norwegians received the event with great enthusiasm, and a record number of spectators attended the Games. Before theses Games began, the organizers were concerned about Oslo's ability to stage the event; the city did not really have sports facilities that met Olympic

standards. However, existing facilities were refurbished and new ones were built well before the opening ceremony. The facilities, as well as the courses, met the high expectations of athletes and officials alike. For the first time since the end of World War II, the German and Japanese teams were allowed to compete. Attracting 150,000 spectators, the ski jump event drew a record crowd attendance that remains unbeaten.

SPORTS HIGHLIGHTS

- In the men's figure skating, American Dick Button chose to attempt a triple loop, even though no skater had ever performed it in competition. He landed his innovative jump perfectly, and the judges were unanimous in voting him the winner.
- Norwegian Stein Eriksen became the first skier from outside the Alps to win an Olympic men's alpine gold medal.
- Despite being the oldest competitor, 31-year-old Lydia Wideman of Finland won the 10k cross-country pursuit.

HELSINKI







JULY 19-AUGUST 3, 1952 GAMES OF THE XV OLYMPIAD

There was a wonderful atmosphere at the XV Olympics where, to the delight of the crowd, the final torchbearers were heroes Paavo Nrmi and Hannes Kolehmainen. For the first time since 1912, athletes from Russia, who were now representing a communist Soviet Union, took part in an Olympic Games. However, problems arose before the Games when the Soviet team refused to be accommodated alongside athletes from capitalist countries in the Olympic village at Kapyla. Unfortunately, Helsinki was overshadowed by the polarization of the two systems; team officials considered every win achieved by "their" athletes as proof of the superiority of their own social system. This was also the first time since World War II that a German Olympic team participated in a Summer Games. However, Germany failed to assemble a united team due to disagreements over selection criteria.

SPORTS HIGHLIGHTS

- The great Czech athlete Emil Zatopek won the 5,000 m; successfully defended his 10,000 m title; and then took his third gold medal in his first-ever marathon.
- One of the first women allowed to compete against men in the equestrian competition was Lis Hartel of Denmark. Despite being paralyzed below the knees after an attack of polio, Hartel won a silver medal.
- American athlete Bob Mathias was the first person to win two successive Olympic decathlon titles.

- **69** Number of competing nations
- **4,955** Number of athletes (4,436 men/519 women)
- 17 Number of sports 149 Number of events

STAR PROFILE KAROLY TAKACS

Karoly Takacs was a member of the Hungarian pistol shooting team in 1938 when, while serving in the army, a faulty grenade exploded in his right hand. Takacs taught himself to shoot with his left hand and returned to the competition, with great success. In 1952, Takacs defended his Olympic title to become the first repeat winner of the rapid-fire pistol event.

Did you know that... Israel came to the Olympic Games for the first time. >>> The first commemorative coin of the modern Olympic Games was made in 1951–1952. >>> Mixed events took place in the equestrian competitions for the first time.

CORTINA D'AMPEZZO





JANUARY 26-FEBRUARY 5, 1956 VII OLYMPIC WINTER GAMES

32 Number of nations

821 Number of athletes (687 men/134 women

4 Number of sports 24 Number of events

STAR PROFILE **Toni sali e**r

Toni Sailer of Austria was the first Alpine skier to win three gold medals at a single Winter Games. He began by winning the giant slalom by 6.2 seconds, which is still the largest margin of victory in the history of Olympic Alpine skiing. Days later, he won the slalom by 4 seconds. The last Alpine race was the downhill. Less than 15 minutes before the start, Sailer tightened the straps between his boots and skis—and one of the straps broke. Fortunately, the trainer of the Italian team removed his own strap and lent it to the Austrian. Sailer went on to win the race by 3.5 seconds.

Did you know that... The Cortina Games were the last Games where the figure skating competitions took place outdoors. >>> For the first time in the history of the Games, the Olympic Oath was sworn by a female athlete—skier Giuliana Chenal Minuzzo.

The northern Italian town of Cortina d'Amprezzo had been earmarked for the 1944 Winter Games, but World War II forced this plan to be abandoned. It was finally given the chance to host the Games in 1956, but a lack of snow cast a shadow over the competition. Such was the concern that a few days before the start, snow had to be transported down the valley from higher snow fields. However, heavy snow fell on the day of the opening ceremony, and much of the imported snow had to be removed. The Games saw the Olympic debut of a pan-German team of 75 athletes. The Soviet team also made their Winter Olympics debut, winning 16 medals and becoming the most successful nation. Live television coverage allowed audiences to follow the Games.

SPORTS HIGHLIGHTS

- American figure skater Teenley Albright took a fall just before the Games, suffering a major injury. Her left skate cut through her right boot, slashed a vein, and severely scraped the bone. However, she still skated well enough at the Games to earn first-place votes from most of the judges.
- The Soviet speed skater Yevgeny Grishin was Olympic champion over 500 m and tied for first-place in the 1,500 m, sharing gold with his compatriot Yuri Mikhailov.
- → Toni Sailer was the first Alpine skier to win all three gold medals.

Below: Soviet gymnast Larisa Latynina was the first female athlete to win nine gold medals (four at Melbourne) and still holds the record for winning the most Olympic medals (18).

MELBOURNE







NOVEMBER 22-DECEMBER 8, 1956 GAMES OF THE XVI OLYMPIAD

72 Number of nations

3,314 Number of athletes (2,938 men/376 women) **17** Number of sports **151** Number of events

STAR PROFILE DAWN FRASER

Swimmer Dawn Fraser is an iconic figure in Australian sports history. An exceptional sportswoman, she won eight Olympic and eight Commonwealth medals. Aged 19, she entered the 1956 Olympic Games and won a gold medal in the 100 m freestyle, setting a new World and Olympic Games record.



Did you know that... The IOC brought together the two Germanys (East and West) in a combined team. >>> To avoid the problem of quarantine for horses entering Australia, the equestrian competitions of the Games took place in Stockholm, Sweden.

The first Olympic Games to be held south of the equator posed a particular set of problems. Many athletes from the northern hemisphere did not have sufficient funds to spend a period of time acclimatizing before the Games, and the later timing of the competition meant that athletes had to retain their peak fitness over a longer period than usual. Because of the high cost of traveling, fewer athletes participated in the Games. The already low number was decreased further when China pulled out (because of Taiwan's participation), and Egypt and Lebanon did not attend because of the Suez crisis. Liechtenstein, the Netherlands, Spain, and Switzerland also withdrew to protest the Soviet invasion of Hungary. The competitions themselves also suffered from the effects of political crises. A water polo match between the USSR and Hungary was abandoned due to the misconduct of some players.

SPORTS HIGHLIGHTS

- → With four gold, one silver, and one bronze medal, the Soviet gymnast Larisa Latynina was the Games' most successful competitor.
- Dick McTaggart. Not only did he return with the lightweight gold medal, he also won the Val Barker Cup for the Games' most stylish boxer.
- Soviet long-distance runner Vladimir Kuts became a double champion over 5,000 m and 10,000 m, setting a new Olympic record in the latter event.

SQUAW VALLEY







FEBRUARY 18-28, 1960 VIII OLYMPIC WINTER GAMES

When the decision was made in 1955 on the venue for the 1960 Games, the area around Lake Tahoe was completely undeveloped as a winter sports center. Within four years, however, Squaw Valley was ready with sports facilities and accommodation for participants, as well as infrastructure for more than 2 million visitors. This came about thanks to the organizing committee and financial backing from the states of California and Nevada, together with subsidies from the federal government. Despite the financial backing the Games received, they still did not have enough time to build a bobsled run, with the result that the International Olympic Committee (IOC) had to call off all the bobsled competitions. This was the first and last time that this has happened. The opening and closing ceremonies were stage-managed by Walt Disney.

SPORTS HIGHLIGHTS

- Four years after earning two gold medals, Soviet speed skater Yevgeny Grishin again won gold over 500 m and again matched his own world record. Then, in the 1,500 m, he finished in another tie for first place with Norwegian Roald Aas.
- → Veikko Hakulinen, a Finnish cross-country skier, had already won two gold medals, but his greatest Olympic moment was yet to come. As the anchor of the Finnish relay team, he took off 20 seconds after Norway's Håkon Brusveen; 328 ft (100 m) from the finish line, he took over the lead to win by 0.8 seconds.

- **30** Number of competing nations
- 665 Number of athletes (521 men/144 women)
- 4 Number of sports 27 Number of events

STAR PROFILE YEVGENY GRISHIN

At the 1956 Winter Games, Yevgeny Grishin won the gold medal in 500 m speed skating, equaling his own world record. Two days later, in the 1,500 m, he set another joint world record, tying for first place with Yuri Mikhailov. At the Squaw Valley Olympics, Grishin again won the gold medal in the 500 m and finished in a tie in the 1,500 m. In 1964, he returned to the Olympics, winning silver, and made a final Olympic appearance in 1968.

Did you know that... France's Jean Vuarnet wore metal rather than wooden skis. It was the first Olympic medal to be won on metal skis. >>> When Alexander Cushing put forward Squaw Valley's bid to the IOC in 1955, he was the Valley's only inhabitant.

ROME





AUGUST 25-SEPTEMBER 11, 1960 GAMES OF THE XVII OLYMPIAD

022

83 Number of nations **5,338** Number of athletes (4,727 men/611 women) **17** Number of sports **150** Number of events

STAR PROFILE ALADAR GEREVICH

Aladar Gerevich is
the only person to win
the same Olympic event six
times. In fact, he is the only
athlete to earn gold medals at six
different Olympics. A specialist in
saber fencing, Gerevich's record
might have been even more
amazing if World War II had not
forced two Olympics to be
cancelled. At the age of
50, he made his final
Olympic appearance in Rome.

Did you know that... These were the last Games in which South Africa was allowed to participate until 1992, because of international outrage at their apartheid policy (racial segregation). >>> The Games were broadcast by more than 100 television stations.

Rome had been chosen to stage the 1908 Games, but the eruption of Mount Vesuvius in southern Italy had intervened. It was about 52 years later that the Games finally arrived in the Italian capital. The Rome games were broadcast live on television to all European countries and were watched by millions. Sadly, the competitions themselves were overshadowed by the rivalry between the US and the USSR. On the final medal table, the USSR, with a total of 43 gold medals, finished ahead of the US, which won 34.

SPORTS HIGHLIGHTS

- Running barefoot, Ethiopian athlete Abebe Bikila did not go unnoticed when he entered the marathon. He refused to be daunted by the condescending remarks and left all his opponents behind to cross the finish line victorious, near Constantine's triumphal arch.
- Aged 20, Wilma Rudolph became the first American woman to win three gold medals at a single Games: in the 100 m, 200 m, and 4x100 m relay. She achieved this extraordinary feat after recovering from several major illnesses during her childhood.
- Cassius Marcellus Clay, later known as Muhammad Ali, first gained international prominence by winning the light-heavyweight gold medal. He went on to become the most famous boxer in history.

INNSBRUCK





JANUARY 29-FEBRUARY 9, 1964 IX OLYMPIC WINTER GAMES

Although the organizers had made all the preparations for the Games that they could, they were unable to influence the weather. Innsbruck's mildest February in 58 years meant that Austrian troops had to transport more than 25,000 tons of snow from higher snow fields to the River Inn Valley so the slopes would be ready for the Alpine skiing competitions. The cross-country skiers, competing farther down the valley, found conditions ideal. The schedule included luge tobogganing, where competitors descended an ice run lying face upward on the toboggan—in 1928 and 1948, there had been skeleton sledding competitions, in which the athletes lay face down—and the bobsled competitions returned after their enforced break in Squaw Valley. Meanwhile, in the ski jump competition, new rules were put in place.

SPORTS HIGHLIGHTS

- Russian speed skater Lidiya Skoblikova became the first woman to win all four speed-skating events in the same Games.
- France's Christine Goitschel won gold in the slalom ahead of her 18-year-old sister Marielle.
- Eugenio Monti, from the Italian bobsled team, helped Tony Nash and Robin Dixon (GBR) win gold medals when he lent them an axle bolt to replace one that was broken. Monti was given the first De Coubertin Medal for sportsmanship.

36 Number of nations

1,091 Number of athletes (892 men/199 women) **6** Number of sports **34** Number of events

STAR PROFILE KNUT JOHANNESEN

Long-distance skater Knut Johannesen first competed in the 1956 Olympics, winning a

silver medal in the 10,000 m.
At the 1964 Games, fellow Norwegian Per Ivar Moe recorded an excellent time of 7:38.6 for the 5,000 m.
Johannesen fell 3 seconds behind Moe but gradually closed the gap. When he crossed the finish line, the clock read

"7:38.7," but it was wrong. His official time of 7:38.4 earned him a gold medal.

Did you know that... For the first time in the Winter Games, the flame was lit in Olympia. Since then, it has always been lit there. >>> Britain won its first Winter Olympics (check) gold medal for 12 years by winning the two-man bobsled event.



TOKYO





OCTOBER 10-24, 1964 GAMES OF THE XVIII OLYMPIAD

For the first time, the Olympic Games went to Asia. The hosts invested heavily in the most modern sports facilities, as well as in improving the infrastructure of a city containing over 10 million people. The extraordinary architectural design of the swimming stadium led to it being described as a "cathedral of sports." Other outstanding new buildings included the judo hall, which was modeled on the style of traditional Japanese temples. The opening ceremony offered a glimpse into how record-breaking the competition would be, when teams from 93 nations (10 more than had participated in Rome in 1960) paraded into the Meiji Stadium. However, the high standards set by athletes at the Tokyo Games led some critics to warn about exaggerated expectations for the future development of the Olympic disciplines.

SPORTS HIGHLIGHTS

- Australian swimmer Dawn Fraser won her third successive gold medal in the 100 m freestyle. She was the first woman swimmer to win a total of eight medals (four gold and four silver) in three Olympics.
- Soviet gymnast Larisa Latynina added six new medals to her Olympic haul.

 Over three Olympics, she won nine gold, five silver, and four bronze medals.
- Deszo Gyarmati won gold with the Hungarian water polo team, becoming the first person to win medals at five successive Olympic Games.

93 Number of nations

5,151 Number of athletes (4,473 men/678 women) **19** Number of sports **163** Number of events

STAR PROFILE ABEBE BIKILA

Ethiopian Abebe Bikila's first Olympic marathon was at the 1960 Games in Rome, where he won a gold medal running barefoot. Bikila returned to the Games in 1964, and this time he ran with shoes and socks. Despite having had an appendectomy 40 days before the race, Bikila took a clear lead by the halfway mark and steadily pulled away to win by more than four minutes. His time—2 hours 12 minutes 11.2 seconds—was a world best for the marathon.

Did you know that... Judo and volleyball were introduced for the first time. >>> American Al Oerter won the discus for the third time despite having to wear a neck harness. >>> Larysa Latynina became one of only four athletes to win nine gold medals.



GRENOBLE







FEBRUARY 6-18, 1968 X OLYMPIC WINTER GAMES

Before the industrial city of Grenoble was able to become a suitable venue for the Winter Games, large amounts of money needed to be invested in the construction of new sports facilities and an improved infrastructure. Even though this money was spent, Grenoble itself still did not have sufficient sports facilities, so competitions took place in the surrounding region, and athletes were accommodated in seven Olympic villages. French hero Jean-Claude Killy swept the men's Alpine events, equaling Toni Sailer's achievement, but only after the greatest controversy in the history of the Winter Olympics. This was the first time at a Winter Games that two separate German teams paraded into the stadium. Although united by one flag and a joint anthem, relationships between the two teams soured during the course of the competition.

SPORTS HIGHLIGHTS

- There was controversy in the women's luge when the three East German entrants—who had finished first, second, and fourth—were disqualified for heating their runners.
- American Peggy Fleming won gold by a wide margin in the figure skating competition. She was the only American winner at the Games.
- Swedish cross-country skier Toini Gustafsson won both the 5 km and 10 km races along with a silver medal in the relay.

- 37 Number of nations
- 1,158 Number of athletes (947 men/211 women)
- 6 Number of sports 35 Number of events

STAR PROFILE **JEAN-CLAUDE KILLY**

French fans hoped that Jean-Claude Killy would sweep all three Alpine skiing events at Grenoble. He began by winning the downhill and giant slalom. Next came the slalom. Killy's rival, Austrian Karl Schranz, claimed that a mysterious man in black crossed his path during this race, causing him to

crossed his path during this race, causing him to skid to a halt. Given a restart, Schranz beat Killy's time, but a Jury of Appeal later awarded the victory to Killy.



Did you know that... The IOC's Medical Commission introduced sex tests for women—where female athletes were tested for excess quantities of testosterone (a male hormone). >>> Grenoble was the first Winter Olympics to be broadcast in color.

MEXICO CITY







OCTOBER 12-27, 1968 GAMES OF THE XIX OLYMPIAD

112 Number of nations:

5,516 Number of athletes (4,735 men/781 women) **18** Number of sports **172** Number of events

STAR PROFILE DICK FOSBURY

The 1968 Mexico
City Olympics
marked the
international debut of

Dick Fosbury and his celebrated "Fosbury flop." At the time, jumpers took off from their inside foot and swung their outside foot up and over the bar. Fosbury's technique began by racing up to the bar at great speed and taking off from his right (outside) foot. Then he twisted his body so that he went over the bar head first, with his back to the bar. Fosbury achieved a personal record of 7 ft 4¼ in (2.24 m) to win the gold medal.

Did you know that... It was the first Games to use the synthetic Tartan track surface in athletics. >>> Electronic rather than manual timing was used for athletics, cycling, rowing, canoe, swimming, and equestrian competitions. Mexico City's high altitude—almost 7,350 ft (2,240 m) above sea level—had dominated much of the pre-Games discussion, the consensus being that athletes from lowland countries would be at a disadvantage. However, several weeks of high-altitude training for many of these athletes increased

oxygen supply to their muscles and enhanced performances. Before the Games, complaints about the exorbitant amounts of money being invested in facilities in contrast to Mexico's own social problems culminated in violent riots. Controversy also arose over South Africa's participation at these Games—the IOC eventually gave in to the pressure and withdrew its invitation. The IOC introduced doping controls for the first time and disqualified a Swedish athlete for having too much alcohol in his bloodstream.

SPORTS HIGHLIGHTS

- American Bob Beamon was a favorite in the long jump, but he exceeded expectations. His jump of 29 ft 2½ in (8.9 m) beat the world record by 21¾ in (0.55 m).
- Czech gymnast Vera Caslavska won four gold and two silver medals. These victories were given added spice by beating the Soviet gymnasts shortly after Soviet tanks had invaded her homeland.
- American swimmer Debbie Meyer became the first female swimmer to win three individual gold medals at one Olympic Games.

SAPPORO



In 1968, Ard Schenk won

FEBRUARY 3-13, 1972 XI OLYMPIC WINTER GAMES

The 1972 Sapporo Games in Japan were the first Winter Games to be held outside Europe or the US. The Japanese government regarded these Games as a prestigious event and invested enormous sums of money in the construction of new sports facilities. As a result, the Games turned out to be the most extravagant and expensive so far, but this was offset by selling the television rights. The subject of amateurism stirred controversy when skier Karl Schranz was banned for receiving payment from ski product manufacturers, but full-time ice hockey players from communist nations were allowed to compete.

SPORTS HIGHLIGHTS

- In front of his home crowd, Yukio Kasaya produced the best jump of each of the two rounds to earn the gold medal in the normal hill ski-jumping event. His teammates Konno and Aochi completed the Japanese sweep with silver and bronze.
- The biggest surprise of the Games was the victory of 21-year-old "Paquito" Fernandez Ochoa of Spain, who won the slalom by a full second. His gold medal was the first ever won by a Spanish athlete at the Winter Olympics.
- Galina Kulakova of the Soviet Union entered all three cross-country races and finished first in all of them, winning the 5 km and 10 km individual events and anchoring the relay team to victory.

35 Number of nations

1,006 Number of athletes (801 men/205 women)

6 Number of sports 35 Number of events

STAR PROFILE ARD SCHENK

a silver medal in the
1,500 m speed skating
event. By the 1972
Sapporo Games, Schenk
held the world record for
three of the four Olympic distances.
Racing during a snowstorm, Schenk won
the 5,000 m by 4.57 seconds. In the 500 m,
he fell after four steps and finished 34th.
Schenk came back to win the 1,500 m and
the 10,000 m. Weeks later, he became the
first skater in 60 years to win all four events
at the world championships.

Did you know that... Canada did not send a team to Sapporo in protest against the covert professionalism rife in the USSR and Eastern Europe. >>> The Japanese Olympic team won their first Winter Olympic Games gold medal.

MUNICH





AUGUST 26-SEPTEMBER 11, 1972 GAMES OF THE XX OLYMPIAD

121 Number of nations

7,134 Number of athletes (1,059 women/6,075 men) **21** Number of sports **195** Number of events

STAR PROFILE MARK SPITZ

American swimmer Mark Spitz predicted he would win six gold medals at the 1968 Olympics, but actually only won two. At the 1972 Munich Olympics, Spitz tried again! Over a period of eight days, he entered seven events, won all seven, and set a world record in every one. Spitz is one of only four athletes to earn nine career golds.

Did you know that... Archery was reintroduced to the Olympic program after a 52-year absence and handball after a 36-year absence. >>> The officials took the Olympic Oath for the first time. The 1972 Munich Games were the largest yet, setting records in all categories, with 195 events and 7,134 athletes from 121 nations. They were supposed to celebrate peace and, for the first 10 days, all did indeed go well. But in the early morning of September 5, eight Palestinian terrorists broke into the Olympic village, killed two members of the Israeli team, and took nine more hostage. In an ensuing battle, all nine Israeli hostages were killed, as were five of the terrorists and one policeman. The Olympics were suspended and a memorial service was held in the main stadium. In defiance of the terrorists, the International Olympic Committee ordered the competitions to resume after a pause of 34 hours. All other details about the Munich Games paled in significance, but it did have its highlights.

SPORTS HIGHLIGHTS

- Distance runner Lasse Viren of Finland fell halfway through the 10,000 m final but still set a world record to win the first of his four career gold medals.
- The media star of the Munich Games was the tiny Soviet gymnast Olga Korbut, whose three gold medals helped establish Soviet dominance in the female gymnastics events and captured the attention of fans worldwide.
- West German Liselott Linsenhoff, competing in the dressage event, became the first female equestrian to win a gold medal in an individual event.

INNSBRUCK





FEBRUARY 4-15, 1976 XII OLYMPIC WINTER GAMES

The 1976 Winter Olympics were awarded to the city of Denver, but the people of the state of Colorado voted to prohibit public funds from being used to support the Games. Innsbruck stepped in and hosted the Games only 12 years after it had hosted its last Olympics. The organizers decided to conduct the medal ceremonies in the ice rink at the end of each evening rather than after the competition, as the spectators preferred to see the medal ceremonies held "on the spot." Arguably the most memorable image of the Games was skier Franz Klammer flying wildly down the downhill course, barely keeping control, on his way to a gold medal.

SPORTS HIGHLIGHTS

- The first major downhill competition that Rosi Mittermaier of Germany won resulted in a gold medal. Three days later, she won the slalom event. She almost achieved success in all three Alpine events but missed the gold by 12-hundredths of a second in the giant slalom.
- Certain judges did not approve of the style used by Britain's John Curry in figure skating. He emphasized grace and artistic expression over athleticism. In the course of the Games, he supplemented his natural elegance with dynamic jumps. The judges awarded him the highest points total in the history of men's figure skating.
- The East German luge team won every medal at these Games, and competitors from other countries had to be content with silver or bronze medals.

37 Number of nations

1,123 Number of athletes (231 women/892 men)

6 Number of sports 37 Number of events

STAR PROFILE FRANZ KLAMMER

In 1975, Franz Klammer won eight of nine

World Cup downhill races. When the
Olympics came to Innsbruck in 1976, there
was great pressure on Klammer as an
Austrian competing in Austria.
Defending champion Bernhard Russi
exerted further pressure by speeding
down the Olympic hill in 1:46.06.
Klammer fell one-fifth of a second
off Russi's pace but fought back
wildly over the last 1,000 m of
the course and won by
one-third of a second.

Did you know that... This was the second time the Games had taken place at Innsbruck, so two Olympic flames were lit. >>> For the first time in the history of figure skating, a skater (Terry Kubicka of the US) successfully attempted a dangerous backflip.







JULY 17-AUGUST 1, 1976 GAMES OF THE XXI OLYMPIAD

92 Number of nations

6,084 Number of athletes (1,260 women/4,824 men) **21** Number of sports **198** Number of events

STAR PROFILE NADIA COMANECI

In 1976, Romania's
Nadia Comaneci became
the first gymnast in Olympic
history to be awarded the perfect
score of 10.0. Comaneci first came
to prominence at the 1975 European
Championships, where she won four
gold medals. In the 1976 and 1980
Games, she won a total of nine
Olympic medals. Following the 1980
Games, natural physical development
began to inhibit her performance, and
after a victory at the 1981 World
Student Games, she retired.

Did you know that... Hockey was played on an artificial field for the first time at the Montreal Games. >>> The city of Montreal is still repaying debts that were accrued during the 1976 Olympic Games.

The 1976 Montreal Games were marred by the boycott of 22 African nations protesting the fact that the national rugby team of New Zealand had toured South Africa, and New Zealand was scheduled to compete in the Olympics. To further compound the situation, the host nation suffered an unusually long winter, industrial disputes, and a lack of funds, which made it impossible to finish work on the Olympic facilities in time for the opening ceremony. The difficulties were overcome, however, and the performances of the athletes did not suffer from the political and national disputes. Despite the problems, the Games were perfectly organized and, in light of the 1972 terrorist attack in Munich, security was tight.

SPORTS HIGHLIGHTS

- → Nadia Comaneci was the star of the Games. She achieved her first perfect 10 on the uneven parallel bars, and the judges awarded her the maximum mark seven times.
- With his victory in platform diving, Italian Klaus Dibiasi became the first Olympic diver to win three successive gold medals and to be awarded medals in four Olympic Games.
- The US and East Germany dominated the swimming events. Only Great Britain's David Wilkie and the Soviet Union's Marina Koshevaya (both winning their 200 m finals in record time) upset the monopoly.

Below: American athlete Edwin Moses burst onto the scene in 1976, winning the 400 m hurdles by a record 8 meters. Twelve years later in Seoul, he won bronze.



LAKE PLACID





FEBRUARY 13-24, 1980 XIII OLYMPIC WINTER GAMES

37 Number of nations

1,072 Number of athletes (232 women/840 men)

6 Number of sports 38 Number of events

STAR PROFILE ERIC HEIDEN

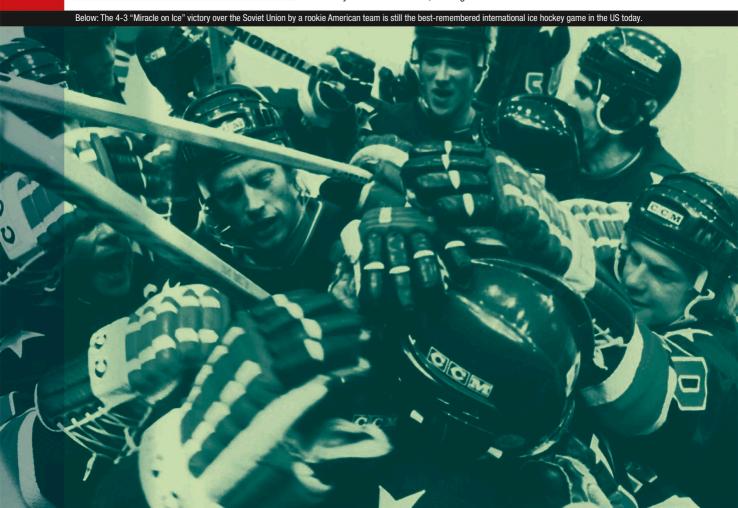
As a 17-year-old, American speed skater Eric Heiden competed in the 1976 Winter Games, finishing 7th in the 1,500 m and 19th in the 5,000 m. He rapidly improved, winning the main title at the World Championships three years running, before achieving a clean sweep of all five speed-skating events—from 500 m to 10,000 m—at the 1980 Games, setting Olympic records in every one. In the 1,500 m, he hit a rut in the ice and almost fell, but recovered to win by 0.37 seconds.

Did you know that... President Jimmy Carter threatened a United States boycott of the Summer Olympics due to be held in Moscow later that year. In 1974, the IOC awarded the XIII Winter Games to Lake Placid for the second time. Lake Placid first hosted the Games back in 1932. The organizers had to cope with a lack of snow and with moving enormous crowds to and from a small town of 3,000 inhabitants. People were

sometimes forced to wait hours for shuttle buses to take them to venues. Many athletes considered the Olympic village too confined; after the Games, it would actually be used as a prison for young offenders. The sports facilities, on the other hand, received high praise despite being some distance apart. Artificial snow was used for the first time,

at a cost of \$5 million. This was extremely demanding on the athletes, especially when mixed with the newly fallen snow.

- Hanni Wenzel won the giant slalom and the slalom; her nation, Liechtenstein, became the smallest country to produce an Olympic champion.
- In the biathlon relay, Soviet athlete Aleksandr Tikhonov earned his fourth straight gold medal. His compatriot Nikolay Zimyatov earned three gold medals in cross-country skiing.
- The US ice hockey team beat the Soviet team, which had previously won gold at every Games since 1964, in the gold-medal match.







OLYMPICS

JULY 19-AUGUST 3, 1980 GAMES OF THE XXII OLYMPIAD

Only 80 countries were represented at the Moscow Games. Notable absentees included Japan, West Germany, and the team from the US. Western countries have frequently referred to the Moscow Games as being of a low standard and have raised doubts about the sports value of the results and medals. Nonetheless, although not of the highest caliber, the Moscow Games were hardly substandard: 36 world records, 39 European records, and 73 Olympic records were testimony to the high level of talent and competition on display.

SPORTS HIGHLIGHTS

- → Vladimir Salnikov of the USSR won three gold medals, in the 400 m freestyle, 4x200 m relay, and 1,500 m. This was the first time any swimmer had swum the 1,500 m in fewer than 15 minutes.
- British runners Steve Ovett and Sebastian Coe faced each other in two memorable duels. In the 800 m, Ovett won the gold medal ahead of his compatriot. Six days later, a determined Coe redeemed himself in the 1,500 m. He took the gold, while Ovett managed only a bronze.
- By winning the decathlon, Britain's Daley Thompson became "king of the athletes" and disappointed the home crowd by beating Soviet athlete Yuri Kutsenko into second place.

80 Number of nations

5,179 Number of athletes (1,115 women/4,064 men) **21** Number of sports **203** Number of events

STAR PROFILE **ALEKSANDR DITYATIN**

Aleksandr Dityatin first appeared at the Olympics in 1976, winning a silver medal in the gymnastics team event. Competing before a home crowd in Moscow, he led the Soviet Union to the team championship and then won the individual all-around title. He also qualified for all six apparatus finals. Dityatin won six medals in one day and is the only athlete in Olympic history to win eight medals at one Games. He was also the first male gymnast to be awarded a perfect score of 10 in an Olympic competition.

Did you know that... The United States-led boycott was largely in protest to the Soviet invasion of Afghanistan. >>> In the men's coxless pairs rowing event, both the gold and silver medal-winning teams were identical twins.

SARAJEVO





FEBRUARY 8-19, 1984 XIV OLYMPIC WINTER GAMES

In 1984, the Winter Games was held in the Balkans for the first time and in a socialist country for the first and only time. The people of Sarajevo gained high marks for their hospitality, and there was no indication of the tragic war that would engulf the city only a few years later. For the first time, the International Olympic Committee agreed to pay the expenses of one male and one female member of each team. The number of participating nations was up—from the 37 at Lake Placid to 49—although Egypt, the Virgin Islands, Mexico, Monaco, Puerto Rico, and Senegal were represented by only one competitor each.

SPORTS HIGHLIGHTS

- Cross-country skier Marja-Liisa Kirvesmiemi-Hämäläinen of Finland, the only woman to have competed in six Winter Olympics (1976–1994), won all three events for women. She also added a bronze medal in the 4x7.5 km relay.
- in the giant slalom, Jure Franko of Yugoslavia won the only medal for the organizing country.
- Canadian speed skater Gaétan Boucher earned a bronze medal in the 500 m and then beat Sergei Khlebnikov in the 1,000 m to gain his first gold medal. Two days later, he won again in the 1,500 m.
- East Germany's Katarina Witt won her first Olympic figure skating gold medal.

49 Number of competing nations

1,272 Number of athletes (274 women/998 men)

6 Number of sports 39 Number of events

STAR PROFILE JAYNE TORVILL AND CHRISTOPHER DEAN

The 1984, Sarajevo Winter Games was one of the few times that the Olympic ice dancing competition was not won by a

Soviet or Russian couple.
Jayne Torvill and Christopher
Dean of Great Britain
mesmerized the audience with
their interpretation of Ravel's
"Bolero." The judges awarded
them 12 scores of 6.0, including
across-the-board perfect
scores for artistic impression,
to take the gold medal.

Did you know that... These were the first Games under the presidency of Juan Antonio Samaranch. >>> The amount charged for television rights was increased greatly to help pay for the Games. >>> The 20 km race was added to the women's Nordic skiing.

LOS ANGELES





JULY 28-AUGUST 12, 1984 GAMES OF THE XXIII OLYMPIAD

140 Number of nations

6,829 Number of athletes (1,566 women/5,263 men) **21** Number of sports **221** Number of events

STAR PROFILE CARL LEWIS

American Carl Lewis is one of only four Olympic athletes to win nine gold medals and one of only three to win the same individual event four times. In 1984, Lewis matched Jesse Owens' feat of winning four gold medals with victories in the 100 m, the 200 m, the long jump, and the 4x100 m relay. At the Atlanta Games, 12 years after his triumphs in Los Angeles (or, as Lewis put it, "14 hairstyles" later), Carl Lewis was still the Olympic long jump champion.

Did you know that... Only 14 nations boycotted the Games, but they accounted for 58 percent of the gold medals at the 1976 Olympics! >>> Rhythmic gymnastics and synchronized swimming made their first appearance at the Games.

Although a revenge boycott led by the Soviet Union depleted the field in certain sports, a record 140 nations took part in the first privately funded Games in Olympic history. More than 30 sponsors together contributed more than \$500 million, while other companies funded the building of new sports facilities, in a

deal that allowed them to advertise on the admission tickets. The ABC television network paid \$225 million for the exclusive television rights, thereby ensuring that most events started in the evenings during primetime television in the US. With these vast amounts of money

involved, many critics held the view that what had once been a festival of amateur sport was now a purely commercial spectacle.

SPORTS HIGHLIGHTS

- In diving, American diver Greg Louganis won both the 3 m springboard and 10 m platform events.
- Sebastian Coe became the first repeat winner of the men's 1,500 m.
- In the women's 400 m hurdles final, Nawal El Moutawakel ran the race of her life, leading from start to finish. She was the first woman from an Islamic nation to win an Olympic medal and the first Moroccan athlete to win a gold medal.

CALGARY







FEBRUARY 13-28. 1988 XV OLYMPIC WINTER GAMES

Funds for the Calgary Games originated from three sources. Half of the budget was put up by the Canadian government; sponsors, official suppliers, and licensees contributed another \$90 million; and the American television network ABC paid \$309 million for the broadcasting rights. ABC benefited from the decision to extend the Games to 16 days, including three weekends. The consequence for the competitors was that start times for many events were chosen not for sports reasons, but to meet the demands of television advertisers in the US. Although the spectators enjoyed the Calgary Games, many saw them more as a well-rehearsed show than a series of competitive sports competitions.

SPORTS HIGHLIGHTS

- German figure skater Katarina Witt won a second consecutive Olympic title.
- Dutch speed skater Yvonne van Gennip's chances for Olympic victory seemed ruined when she was hospitalized two months before the Games, but she went on to win three gold medals and set two world records.
- Cross-country skier Gunde Svan of Sweden took his career gold medal total to four

57 Number of nations

1,423 Number of athletes (301 women/1,122 men) **6** Number of sports **46** Number of events

STAR PROFILE MATTI NYKÄNEN

At the 1988 Calgary Games, Matti Nykänen of Finland won the normal hill event by a decisive 17 points, then won the large hill by 16.5 points. This earned him a place in the record books as the

first ski jumper to win two gold medals at the same Olympics. For the first time, a third jumping event—the large hill team event—was added to the program. Nykänen led the Finnish team to victory and brought his

career total to four gold medals and one silver medal.

Did you know that... The speed skating events were held on a covered rink for the first time. >>> Calgary was the first "smoke-free" Olympic Games. >>> Curling appeared on the program as a demonstration sport.



Above: American diver Greg Louganis was arguably one of the greatest ever; he won two golds in 1988 despite cracking his head open on the springboard.

SEOUL







Happily, the large-scale boycotts of Moscow and Los Angeles did not recur at Seoul. For the first time in 12 years, all leading Olympic nations except Cuba and Ethiopia took part in the Olympic Games. Although the drug disqualification of sprinter Ben Johnson became the biggest story of the 1988 Olympics, the Seoul Games were highlighted by numerous exceptional performances and 27 new world records. Once again, the Soviet Union (55 gold medals) and East Germany (37) demonstrated their superiority over the Western nations by finishing first and second on the medal table.

SPORTS HIGHLIGHTS

- American swimmer Matt Biondi won seven medals, including five gold. His gold medals came in the 50 m freestyle, 100 m freestyle, and all three relays.
- Soviet record holder and world champion Sergey Bubka dreamed of an Olympic title. He won the gold medal, but only just, vaulting 5.90 m at the third attempt. This was his last time on an Olympic podium.
- East German cyclist and speed skater Christa Luding-Rothenburger made Olympic history after becoming the first person to win Summer and Winter Olympic medals in the same year. After winning gold and silver in the speed skating at Calgary, she won silver in the 1,000 m sprint cycling.

159 Number of nations

8,391 Number of athletes (2,194 women/6,197 men) **23** Number of sports **237** Number of events

STAR PROFILE "FLO JO"

American Florence Griffith Joyner ("Flo Jo") ran the 100 m in a stunning 10.49 seconds, beating the previous world record by more than a quarter of a second. Her time was faster than the men's record in many countries. Her records for the 100 m and 200 m look set to last for many years. At the Seoul Games, she ran in both relays, winning a third gold medal, as well as a silver. In 1998, at the age of 38, she died in her sleep from an epileptic seizure.

At the 1988 Olympic trials,

Did you know that... Fencer Kerstin Palm (SWE) became the first woman to take part in seven Olympics. >>> For the first time, all three medalists in equestrian dressage were women. >>> Tennis returned as a medal sport after a break of 64 years.

ALBERTVILLE





FEBRUARY 8-23, 1992 XVI OLYMPIC WINTER GAMES

Albertville's successful bid to stage the Winter Olympics had been inspired by Jean-Claude Killy, the French triple Olympic skiing champion of 1968, who was chairman of the organizing committee. Killy wanted to stimulate the economic development of the Savoy region, an area where the winter sports and tourism had been largely untapped. The results of political change in Eastern and Central Europe were clearly noticeable during the nations' parade. Lithuania competed under its own flag for the first time since 1928; likewise, Estonia and Latvia for the first time since 1936. In addition, competitors from other parts of the former Soviet Union formed the Unified Team. For the first time in 28 years, athletes from all over Germany were reunited in one team for the Winter Olympics.

SPORTS HIGHLIGHTS

- Freestyle skiing made its debut at the Olympics. The winner of the moguls event was the popular French freestyle skier Edgar Grospiron, who recorded the fastest time and the second best scores for turns and air.
- Half of her home village in Italy (population 160) traveled to support Stefania Belmondo. She struck gold in the 18.6 mile (30 km), the final women's cross-country event.
- Yegard Ulvang of Norway took gold in the men's 18.6 mile (30 km). In the 6.2 mile (10 km) race, for the first time in his career, he competed without wax on his skis. He won again.

64 Number of nations

1,801 Number of athletes (488 women/1,313 men) **6** Number of sports **57** Number of events

STAR PROFILE ALBERTO TOMBA

At the 1992 Albertville Games, charismatic Alberto "la Bomba" Tomba finished first in the giant slalom to become the first Alpine skier in Olympic history to win the same event twice. He also gained the silver medal in the slalom. Tomba was the first Alpine skier to win medals in three different Olympics, and he is the first male Alpine skier to earn five career Olympic medals. In April 2000, Alberto Tomba received the Olympic Order.

Did you know that... Speed skiing, curling, ballet, and freestyle aerial skiing were demonstration sports at these Games. >>> Croatia and Slovenia participated for the first time as independent nations definitively from the 1996 Atlanta Games onward.

BARCELONA







JULY 25-AUGUST 9, 1992 GAMES OF THE XXIII OLYMPIAD

169 Number of nations **9,356** Number of athletes (2,704 women/6,652 men) **25** Number of sports **257** Number of events

STAR PROFILE VITALY SHCHERBO

At the 1992 Games, 20-year-old gymnast
Vitaly Shcherbo of Minsk made history
by winning six gold medals in one
Olympics. He began by leading the
ex-Soviet Union squad to victory
in the team event. Next, he put
together a superb performance
to win the individual all-around
competition title. Then, on August
2, Shcherbo took part in the
individual apparatus finals and
became the first person in
Olympic history to win four
gold medals in one day.

Did you know that... Yugoslavia was banned from team sports, but individual athletes were allowed to compete independently. >>> In the women's 100 m sprint, Merlene Ottey finished only six-hundredths of a second behind the winner yet ended up in 5th place. These turned out to be the Olympic Games of the Spanish OOC president, Juan Antonio Samaranch, who had managed to bring the Games to his home region of Catalonia. Being an advocate of the commercialization of sports, he expressed his gratitude to the Games' sponsors at the end of the Barcelona celebration. The IOC registered millions of dollars in revenue from these Olympics, partly through the sale of television broadcasting rights. However, many athletes complained that the start times of several events were arranged to suit the TV and advertising industries. The 1992 Games marked the emergence, or reemergence, of a number of teams onto the world sports stage; South Africa was welcomed back, and a pan-German team was represented.

- Men's basketball was open to professionals for the first time, allowing the creation of the US "Dream Team," which included Magic Johnson, Michael Jordan, Larry Bird, and Charles Barkley.
- Spaniard Fermin Cacho Ruiz was not one of the favorites in the 1,500 m. However, the final was run at an unusually slow pace. Cacho took advantage of this and, with the crowd screaming his name, won the race over the final sprint.
- Britain's Linford Christie won the men's 100 m final ahead of Namibia's Frankie Fredericks and the American Dennis Mitchell. The oldest man to win this sprint title, Christie added the world championship to his collection the following year.

FEBRUARY 12-27, 1994 XVII OLYMPIC WINTER GAMES

In 1986, the IOC voted to change the schedule of the Olympic Games so that the Summer and Winter Games would be held in different years. This was partly because the television companies could not attract the amount of advertising needed in order to pay for Olympic television broadcasting rights twice a year. From now on, the Winter Games would fall in the same year as soccer's World Cup finals. To adjust to this new schedule, the Lillehammer Games were held in 1994, the only time that two Games have been staged two years apart.

Lillehammer was a town of 21,000 inhabitants, but within four years, the organizers turned it into a first-rate Olympic site.

1,737 Number of athletes (1,215 men/522 women)6 Number of sports 61 Number of events

67 Number of nations

STAR PROFILE BJÖRN DÆHLIE

Cross-country skier Björn Dæhlie holds several all-time Winter Olympics records. Competing in the 1990s, he is still the only winter athlete to win eight gold medals, the only one to win 12 medals in total, and the only one to earn nine medals in individual events. He is also the only man to win six gold medals in individual events. At the 1994 Lillehammer Olympics, Dæhlie earned the gold medal in the 10 km and took silver in the 30 km.

Did you know that... The Bosnia and Herzegovina four-man bobsled team was made up of two Bosnians, a Croatian, and a Serbian—a great example of the Olympic spirit. >>> Due to respect for the environment, Lillehammer was named the "White-Green Games."

SPORTS HIGHLIGHTS

- Norwegian speed skater Johan Olav Koss won three gold medals and broke the world record each time, in front of a home crowd.
- At her fourth Olympics, Bonnie Blair of the US made history by becoming the first woman speed skater to win three consecutive titles in the 500 m.
- After the first run of the slalom, Switzerland's Vreni Schneider was in fifth place. She then achieved such a fantastic second run that she won the gold medal. Schneider went on to earn a silver medal in the combined event and a bronze in the giant slalom.

ATLANTA







JULY 19-AUGUST 4, 1996 GAMES OF THE XXVI OLYMPIAD

197 Number of nations

10,318 Number of athletes (3,512 women/6,806 men)

26 Number of sports 271 Number of events

STAR PROFILE MICHAEL JOHNSON

Michael Johnson was the first man to be ranked number one in the world at both 200 m and 400 m, and he began dominating both events in 1990. By the 1996 Olympics, he had won 54 straight finals at 400 m and had not been beaten at that distance in 7 years. Johnson won the Olympic final by 33 ft (10 m), the largest margin of victory in the event in 100 years. He also ran a phenomenal 19.32 to win the gold for the 200 m.

Did you know that... Each team that qualified for the soccer tournament was allowed to include three professionals, regardless of age or experience. >>> For the first time, all 197 recognized National Olympic Committees were represented at the Games. The 1996 Games were given a dramatic start when the cauldron was lit by Muhammad Ali. On July 27, during a concert held in the Centennial Olympic Park, a terrorist bomb killed one person and injured another 110 people, but the Atlanta Games are best remembered for their sports

achievements. A record-setting 79 nations won medals and 53 won gold. Initially, there were murmurs of discontent when the IOC decided to alter the sequence of events on the track so that the US's Michael Johnson could attempt a 200 m and 400 m double, something no man had ever successfully achieved before.

- French runner Marie-José Pérec won the 200 m and then broke the 400 m Olympic record, thus achieving the best performance for 10 years. She became the most successful French female athlete of all time.
- Russian swimmer Aleksandr Popov won two gold and two silver medals. A very experienced competitor and a magnificent glider, he created the impression that swimming required no effort.
- Naim Suleymanoglu of Turkey became the first weightlifter in history to win three consecutive Olympic titles.
- → Michael Johnson's double success over 200 m and 400 m was the first for a man in Olympic history.

NAGANO





FEBRUARY 7-22, 1998 XVIII OLYMPIC WINTER GAMES

72 Number of nations

2,176 Number of athletes (787 women/1,389 men) **7** Number of sports **68** Number of events

STAR PROFILE HERMANN MAIER

Hermann Maier of
Austria lost control
during the downhill
at Nagano
and took a
frightening fall,
flying through
the air to crash
through two
fences. Incredibly,
three days later, he won
gold in the super-G, and three
days after that, he earned a second
gold in the giant slalom.

Did you know that... For the first time, professional players from the US National Hockey League participated. >>> A 50 percent discount on Olympic tickets was offered to schoolchildren. >>> Official staff uniforms were made from recyclable materials.

The Japanese city of Nagano, 90 minutes by train from Tokyo, was host to the final Winter Olympics of the 20th century, with 68 events in seven winter sports being held over period of 16 days. A criticism of past Winter Games was that the competition sites were too far from central areas. The Nagano organizers ensured this was not the case in 1998. The competition sites were divided into six areas, all of them within a 25-mile radius of Nagano City. As host nation, Japan rode on the wave of enthusiasm from faithful fans to win more gold medals at Nagano than it had won in the previous 70 years of Winter Games. At the Games (the biggest yet), Germany topped the medal table, followed by Norway and then Russia.

SPORTS HIGHLIGHTS

- Norwegian cross-country skier Björn Daehlie, the most successful male Nordic skier in Olympic history, won the 10 km classical and the 50 km races, anchored the Norwegian team to victory in the relay, and won silver in the combined pursuit event.
 - Japanese ski jumper Kazuyoshi Funaki won the silver medal in the normal hill event. On the large hill, he obtained perfect style points from all five judges and won the gold medal.
- Italian Deborah Compagnoni repeated her 1994 giant slalom victory and just missed out on gold in the slalom by 0.06 seconds, becoming the first alpine skier to win gold medals at three different Olympics.

SYDNEY





SEPTEMBER 15-OCTOBER 1, 2000 GAMES OF THE XXVII OLYMPIAD

The Sydney Games were the largest yet, with 10,651 athletes competing in 300 events. Despite their size, the Games were well organized, renewing faith in the Olympic Movement. Athletes from North and South Korea marched together under the same flag, while four athletes from East Timor (it only became a sovereign state in 2002) were allowed to participate under the Olympic flag as individual athletes. Cathy Freeman, an indigenous Australian, was given the honor of lighting the Olympic flame in the opening ceremony and repaid the compliment by winning the 400 m final in front of an ecstatic home crowd.

SPORTS HIGHLIGHTS

- After being kept away from competitions for over a year by serious shoulder and back problems, French judo champion David Douillet won his second consecutive Olympic gold by beating Shinichi Shinohara of Japan in an exciting final.
- 17-year-old Australian swimming sensation lan Thorpe won his first gold medal in the 400 m freestyle by breaking his own world record. He then swam the anchor leg in the 4x100 m freestyle to win again. A third gold came from the 4x20 m freestyle, and he added a silver medal in the 200 m freestyle.
- German canoeist Birgit Fischer won two golds in the K-2 and K-4 500 m to become the first female Olympian to win medals 20 years apart.

199 Number of nations

10,651 Number of athletes (6,582 men/4,069 women) **28** Number of sports **300** Number of events

STAR PROFILE STEVEN REDGRAVE

Steven Redgrave of Great Britain is the only rower to win five consecutive Olympic gold medals. In the Atlanta Games, Redgrave and partner Matthew Pinsent successfully defended their title to win the coxless pairs in their 100th race together. Redgrave won his fifth gold medal in the Sydney Games at the age of 38 as a member of the

coxless fours.

Did you know that... The first Sri Lankan woman to win a medal, Susanthika Jayasinghe, won bronze in the 200 m. >>> Vietnam won its first medal since it first began competing in 1952. Tran Hieu Ngan took silver in women's tae kwon do.

SALT LAKE CITY





FEBRUARY 8-24, 2002 XIX OLYMPIC WINTER GAMES

The Salt Lake City Games saw the expansion of the winter program to 80 events, including the skeleton (for the first time since 1948) and women's bobsled. A record 18 nations won gold medals, including China and Australia for the first time. Highlights included Norwegian Ole Einar Bjørndalen winning quadruple gold across all biathlon events, Finn Samppa Lajunen winning triple gold across all Nordic combined events, and the 20-year-old Swiss Simon Ammann winning both ski jump events. Canada won the men's and women's ice hockey tournaments, with the men's victory over the US being their first gold for 50 years. By winning silver in the single luge, German Georg Hackl became the first Olympian to win a medal in the same event in five consecutive games.

SPORTS HIGHLIGHTS

- After knee surgery and a long rehabilitation, Alpine skier Janica Kostelic of Croatia made Olympic history. She started by taking the combined title, followed by golds in the slalom and giant slalom, as well as silver in the super-G.
- → With a gold medal in the combined, Kjetil André Aamodt of Norway became the most decorated Alpine skiing Olympian in history.
- Ompeting in the women's bobsled, Vonetta Flowers became the first black athlete to win a gold medal at a Winter Games.

77 Number of nations

2,399 Number of athletes (886 women/1,513 men) **7** Number of sports **80** Number of events

STAR PROFILE **KJETIL ANDRÉ AAMODT**

At the Salt Lake City Games in 2002, Kjetil André Aamodt won two gold medals. He became the first Alpine skier in Olympic history to win seven career medals. In Turin in 2006, he won the gold medal in the super G event. With eight medals, he has the most Olympic titles in Alpine skiing.

Did you know that... These games saw the introduction of instant video replay in figure skating. >>> Two golds were awarded in pairs figure skating instead of gold and silver. >>> China and Australia won their first gold medals in Winter Games history.

ATHENS





AUGUST 13-29, 2004 GAMES OF THE XXVIII OLYMPIAD

In 2004, the Olympic Games returned to Greece, the home of both the ancient Olympics and the first modern Olympics. For the first time ever, a record 201 National Olympic Committees (NOCs) participated in the Olympic Games. The overall tally for events in the games was 301 (one more than in Sydney 2000). The popularity of the Games soared to new heights, as 3.9 billion people had access to the television coverage compared to 3.6 billion for Sydney 2000.

SPORTS HIGHLIGHTS

- Moroccan Hicham El Guerrouj became the first runner since Paavo Nurmi in 1924 to win both the 1,500 m and the 5,000 m. In the 1,500 m, he was passed by Bernard Lagat in the home stretch but came back to win. In the 5,000 m, he came from behind to defeat 10,000 m champion Kenenisa Bekele.
- Turkish weightlifter Nurcan Taylan won the gold medal in the women's 48 kg category. She was the first Turkish woman in any sport to win an Olympic gold medal.
- Argentina's men's basketball team put an end to the domination of the US's professionals, defeating them 89–81 in the semifinals. The Argentinians went on to beat Italy 84–69 in the final.
- German canoeist Birgit Fischer became both the youngest and oldest Olympic canoeing gold medalist, winning her gold medals—in K-1 and K-4 500 m— 24 years apart, and the first female athlete to win gold at six different Olympics.

201 Number of nations

10,625 Number of athletes (6,296 men/4,329 women) **28** Number of sports **301** Number of events

STAR PROFILE MICHAEL PHELPS



US Swimmer Michael Phelps
won six gold and two bronze
medals at Athens. He went on
to top that achievement in
Beijing, winning a record
eight events. Phelps has
the perfect physique for a
swimmer, with a long torso
and arms, short legs, and
large, flexible feet. During
his training regime, he eats
up to 10,000 calories a
day—five times a normal
adult's intake of food.

Did you know that... Kenya's runners swept the medals in the 3,000 m steeplechase, taking gold, silver, and bronze. >>> The marathon races followed the same route as in 1896, beginning in Marathon and ending in Athens' Panathenaic Stadium.

TURIN







FEBRUARY 10-26, 2006 XX OLYMPIC WINTER GAMES

80 Number of nations

2,508 Number of athletes (960 women/1,548 men) **7** Number of sports **84** Number of events

STAR PROFILE KATERINA NEUMANNOVA

Cross-country skier Katerina Neumannova first competed in the Games in 1992, but it was not until her third Winter Games that she finally won her first medals. Because she also competed in the mountain bike event at the 1996 Summer Games, the Turin Games were the sixth in which she participated. On February 12, she earned a silver medal in the pursuit. On February 24, Neumannova skied in the 30 km race and, at the age of 33, won her first gold medal.

Did you know that... For the first time, live video coverage of the Olympic Games was available on mobile phones. >>> With a population of more than 900,000, Turin became the largest city ever to host the Winter Olympic Games at that time.

A record 2,508 athletes from 80 nations competed at the Turin Winter Games with a record 26 countries taking home medals. The Austrians dominated the Alpine skiing, winning 14 of the 30 medals. South Korea displayed similar success in the short track speed skating, winning 10

of the 24 medals. During the cross-country team sprint, Canadian Sara Renner broke one of her poles. Seeing her struggle, the Norwegian head coach Bjørnar Håkensmoen gave her one of his, which allowed Renner to help her team win silver and dropped Norway out of the medals.

SPORTS HIGHLIGHTS

- Philipp Schoch was the favorite to defend his Olympic championship in the snowboarding parallel giant slalom event, but he faced a tough challenger: his older brother, Simon. They both qualified for the two-man final, with Philipp getting the victory.
- The men's ice hockey tournament saw the first all-Scandinavian final: Finland against Sweden. In the final, Nicklas Lidstrom scored 10 seconds into the final period to give Sweden the lead, and they held on to seal the victory.
- → Local favorite Enrico Fabris won bronze in the 5,000 m speed-skating event, becoming the first Italian to win a medal in this event.

BEIJING







AUGUST 8-24, 2008 GAMES OF THE XXIX OLYMPIAD

The 29th Olympiad officially started at eight minutes past 8:00 in the evening on August 8, 2008. Eight is a lucky number in China, and luck certainly held with the weather, as the heavily polluted Chinese capital enjoyed its cleanest air for 10 years. The huge building program for the Olympics included the construction of 12 new venues and a doubling of the capacity of the Beijing underground. The centerpiece was the spectacular 90,000-seat National Stadium, dubbed the "Bird's Nest." Nine new events were held, including BMX cycling, marathon openwater swimming, and the women's 3,000 m steeplechase. The medals table was topped by the host country, which won 51 gold medals.

SPORTS HIGHLIGHTS

- Usain Bolt's outstretched arms as he turned to the crowd in the final stages of the 100 m final provide the abiding image of the games. Bolt (21) destroyed the field in both the 100 m and 200 m (see box).
- Michael Phelps won all eight of the swimming events he entered, breaking Mark Spitz's 36-year-old record for the most gold medals in a single games. He broke the world record in four of his five individual events.
- Chris Hoy led the way in the velodrome as a dominant British team took seven of the 10 indoor cycling gold medals. Hoy, also a seven-time world champion, bagged three golds, the first British athlete to do so since 1908.

204 Number of nations

10,942 Number of athletes (6,305 men/4,637 women) **28** Number of sports **302** Number of events

STAR PROFILE USAIN BOLT

Jamaican sprinter Usain Bolt broke the world record in two events at Beijing. He won the 100 m with a time of 9.69 seconds and could have run even faster had he not begun celebrating victory 15 m from the finish line. Four days later, he took the 200 m in 19.30 seconds, breaking Michael Johnson's record.

His 4x100 m relay team had to return their gold, with a team member facing doping allegations. Bolt was the first man since fellow-Jamaican Don Quarrie to hold the world record for both the 100 m and 200 m.

A team of 70,000 helped keep the Beijing Games running smoothly. >>> Cuba's Angel Valodia Matos saved his best move until after his tae kwon do boout had ended. Angry at his disqualification, Valodia Matos landed a kick right in the referee's face.







FEBRUARY 12-28, 2010 XXI OLYMPIC WINTER GAMES

The Winter Games continued to grow at Vancouver 2010, with a record number of athletes, events, and nations—including first-timers the Cayman Islands, Colombia, Ghana, Montenegro, Pakistan, and Peru. The opening ceremony was dedicated to 21-year-old Georgian luger Nodar Kumaritashvili, who had died just hours earlier following a crash during training. Chastened by tragedy, the public and competitors alike made Vancouver 2010 an explosive, joyous celebration in his memory. Canada put its failure to win a single gold medal in two previous Games as host well and truly behind it, setting a record for a host nation by topping the medals table with 14 golds. Meanwhile. Slovakia and Belarus also won their first golds at a Winter Games.

SPORTS HIGHLIGHTS

- Norwegian Marit Bjorgen confirmed her status as the most successful female cross-country skier of the modern era. She topped the medals table with three golds, a silver, and a bronze, taking her overall Olympic medal tally to seven.
- Team Canada capped a record-breaking Winter Games for a host nation by beating neighbors the US in the men's ice hockey. The final gold medal of the Games was won in overtime with a goal from star player Sidney Crosby.
- Slovenian Petra Majdic won bronze in the cross-country sprint despite breaking five ribs and damaging a lung after falling into a gully. She said of her medal, "Today, this is not a bronze. This is a gold with little diamonds on it."

82 Number of nations

2,566 Number of athletes (1,522 men/1,044 women) **7** Number of sports **86** Number of events

STAR PROFILE KIM YU-NA

19-year-old South Korean figure skater Kim Yu-Na won her gold medal in breathtaking fashion, scoring a world-record 150.86 points for her free skate. Her combined total of 228.56 points was also a new record, beating silver-medal winner Mao Asada of Japan by a massive 23 points. Her routine was acclaimed as "destined to be remembered for as long as Torvill and Dean's famous Bolero in 1984."

Did you know that... With a total of 2.3 million inhabitants, Vancouver became the largest city to host the Winter Games. >>> Environmental measures included real-time tracking and the publication of the energy consumption of each Olympic venue.

LONDON







JULY 27-AUGUST 12, 2012 GAMES OF THE XXX OLYMPIAD

204 Number of nations

games.

10,568 Number of athletes (5,892 men/4,676 women) **26** Number of sports **302** Number of events

STAR PROFILE SHIWEN YE

The 16-year-old Chinese swimmer Shiwen Ye announced herself to the world in sensational fashion, winning gold in both the 200 m and 400 m individual medley. More impressive than the medals themselves were her winning times; she set an Olympic record for the 200 m and a world record for the 400 m, knocking one second off the previous record. Ye's improved performances were attributed to a 4½ in (11 cm) growth spurt she experienced in the two years before the

Did you know that... 8,000 people took turns to carry the Olympic torch around Britain, covering an average distance of 328 yd (300 m) each. >>> London has now hosted three Olympic Games, more than any other city in the world.

The 2012 London Games saw two breakthroughs in equality for competitors: female athletes participated in every sport on the calendar for the first time and the South African sprinter Oscar Pistorius became the first amputee runner to appear in an Olympics. However, there was also controversy. In the opening round of the badminton women's doubles, four pairs—two from South Korea and one each from China and Indonesia—attempted to secure a favorable draw by playing badly and were disqualified. Perhaps the most memorable aspect of the Games was the opening ceremony, a spectacular history of Britain created by the Oscar-winning film director Danny Boyle.

SPORTS HIGHLIGHTS

- American swimmer Michael Phelps won four gold medals, taking his tally of Olympic golds to 18. He retired at the end of the Games as the most successful athlete in Olympic history.
- For the host nation, the highlight of the Games was undoubtedly Saturday, August 4, also known as "Super Saturday," the day on which Great Britain secured six gold medals and one silver medal.
- → Usain Bolt won gold in the 100 m, 200 m, and the 4x100 m relay. Thrilled with his achievement, he described himself as "the greatest athlete of all time" and "a living legend."
- Ben Ainslie from Great Britain won his fourth gold medal to become the most decorated sailor in Olympic history.

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SOCHI







FEBRUARY 7-23, 2014 XXII OLYMPIC WINTER GAMES

The 22nd Winter Games were held in the Russian city of Sochi, the first Olympic competition to take place in Russia since the break-up of the Soviet Union in 1991. The city is located on the coast of the Black Sea near the Russian-Georgian border and is best known among Russians as a summer beach resort. All ice-based events were held in Sochi itself in purpose-built venues such as the Bolshoy Ice Dome, a 12,000-capacity ice rink with a design based on the shape of a frozen water droplet. Mountain sports were held 25 miles inland at the Rosa Khutor ski resort in the Western Caucasus mountains.

88 Number of nations **2,780** Number of athletes **7** Number of sports **98** Number of events

STAR PROFILE VOLOSOZHAR AND TRANKOV

Tatiana Volosozhar and Maxim Trankov joined forces in 2010, establishing themselves as serious contenders. They won gold at the 2012 and 2013 European Figure Skating Championships, and in 2013, they were crowned world champions, bettering their consecutive runner-up finishes at the 2010–2011 and 2011–2012 championships. They won the gold in the pairs event at the Winter Games in Sochi.

Russian pair figure skaters

Did you know that... The Sochi Winter Games is the most commercially profitable Olympic competition in history, attracting more than \$1 billion of sponsorship. >>> The city of Sochi sits at the same latitude as the famously balmy city of Nice in France.

SPORTS HIGHLIGHTS

- Nineteen-year-old Yuzuru Hanyu became the first male figure skater to win gold for Japan when he set a world record by earning 101.45 points.
- For the first time in Olympic Alpine skiing, there was a tie for gold as Switzerland's Dominique Gisin and Slovenia's Tina Maze completed the women's downhill competition in 1 minute 41.57 seconds.
- In an Olympic first, digital coverage of the Sochi games overtook television broadcasts—60,000 hours to 42,000 hours.
- Sisters Justine and Chloé Dufour-Lapointe of Canada won gold and silver, respectively, in the moguls race in women's freestyle skiing.

RIO DE JANEIRO







AUGUST 5-21, 2016 GAMES OF THE XXXI OLYMPIAD

207 Number of nations 11,238 Number of athletes28 Number of sports 306 Number of events

STAR PROFILE WAYDE VAN NIEKERK

In the 2016 Olympics, South
Africa's Wayde van Niekerk broke
Michael Johnson's 17-year-old
world record to win the Olympic
400 m in 43.03 seconds. In 2017,
he recorded the best 300 m
time ever—30.81 seconds—
at the Golden Spike Meet in
Ostrava, Czech Republic. Dubbed
the Cape Town rocket, van Niekerk
dabbled in rugby and high
jump before finding his feet
in track and field sprinting.

Did you know that... The Maracana Stadium has a record high-attendance of 199,854 (before conversion to seated-only) for a World Cup match in 1950. >>> Brazil is the first Portuguese-speaking country to host the Olympic Games.

The 31st Games in Rio de Janeiro were the first Olympics to take place in South America and the first to be held during the host city's winter.

Two new sports were admitted—rugby sevens and golf. Golf had not featured in an Olympic program since 1904, and several of the sport's top professional players competed for medals. Barra da Tijuca, a prosperous area located in the southwest of Rio, was home to most of the Olympic venues, as well as the athletes' village. Other Rio landmarks featured in the Games: the iconic Maracana Stadium, with a capacity of nearly 80,000, hosted the football tournament and the opening and closing ceremonies.

SPORTS HIGHLIGHTS

- Ethiopia's Almaz Ayana improved on the women's 10,000 m record by more than 14 seconds to win gold and set the first world record at the 2016 games.
- Fiji won its first-ever Olympic medal—a gold—in rugby sevens after beating Great Britain 43–7.
- American gymnast Simone Biles dominated the Olympic games, winning four gold medals and a bronze.
- Sir Bradley Wiggins won the men's cycling team pursuit to become the first Briton to win eight Olympic medals.

PYEONCHANG







FEBRUARY 9-25, 2018 XXIII OLYMPIC WINTER GAMES

92 Number of nations **2,833** Number of athletes **14** Number of sports **102** Number of events

STAR PROFILE MARITE BJØRGEN

In 2018, Norway's Marite Bjørgen claimed the record for the most number of medals won by an individual at the Winter Olympics. She announced her retirement soon after, bringing to an end a glittering cross-country skiing career that included 114 individual World Cup wins, 184 World Cup podiums, 18 gold medals, and 26 medals in total at the International Ski Federation's (FIS) Nordic World Ski Championships.

Did you know that... Russia was banned from the 2018 Winter Olympics due to a doping scandal. Instead, the Olympic committee allowed a set of Russian athletes to participate under the generic Olympic flag as Olympic Athletes from Russia (OAR). The 2018 Winter Olympics in Pyeonchang was breaking records before the Games even began. With 92 teams competing, these games bested Sochi's record attendance of 88 teams. Six countries—Singapore, Malaysia, Kosovo, Ecuador, Eritrea, and Nigeria—competed in the Winter Olympics for the very first time. In a show of diplomacy, the host country of South Korea had its athletes march with those of their neighbor North Korea under the Korean Unification flag at the opening ceremony. Norway dazzled at the Games, winning 14 gold, 14 silver, and 11 bronze medals to bring their overall medal count to a whopping 368. Germany and the United States also impressed, winning 31 and 23 medals respectively.

SPORTS HIGHLIGHTS

- Norwegian Marite Bjørgen surpassed all other athletes with a five-medal haul of two golds, a silver, and two bronze medals.
- Czech Republic's Ester Ledecká became the first woman to win gold in two different events at the same Winter Games when she won gold in alpine skiing's Super G and in snowboarding's parallel giant slalom.
- The Dutch speed-skating team won seven golds in the 14 events they competed in.
- The youngest winner at the games was 15-year-old Russian Alina Zagitova, who achieved the highest score in the women's figure skating short program with 82.92 points.

TOKYO







JULY 24-AUGUST 9, 2020 GAMES OF THE XXXII OLYMPIAD

STAR PROFILE SIMONE BILES

American gymnast Simone Biles burst onto the international platform of competitive gymnastics in 2013 and went on to win three world all-around titles in a row, becoming the first gymnast to do so. Biles was already being hailed as the best gymnast in the world when she swept four gold medals at the 2016 Olympics in vault, uneven bars, balance beam, and floor exercise. She even has a floor routine move named after her-"The Biles." Great things are expected of her in the 2020 Olympics, including the possibility of taking home six gold medals.

Did you know that... The old national stadium was torn down to make way for the new one. While construction is underway, it is running late with the initially selected design being rejected because it was going to be too expensive to build.

Tokyo will host the Summer Olympics for the second time in 2020, the previous one in 1964. The 2020 Games' proposed line-up includes 339 events being held in 33 sports over 17 days. The five new sports that have been admitted since the last Olympics are baseball/softball, karate, skateboard, sports climbing, and surfing. These inclusions are part of the International Olympic Committee's (IOC) initiative to make sports more accessible to young people by incorporating more youth-centric events in their program. A newly constructed national stadium is the venue for the opening and closing ceremonies, as well as athletics and football events.

LOOKING AHEAD

- Tokyo plans to incorporate cutting-edge technology such as advanced facial recognition systems, robotics, and drones in providing "the most futuristic" Olympic experience.
- The 2020 Olympic Games mascot is called Miraitowa, a name comprising the Japanese words for future and eternity.
- The 2020 Olympics will see returning champions such as Simone Biles, Adam Peaty, and Majlinda Kelmendi defend their titles in gymnastics, swimming, and judo, respectively.

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THE PARALYMPICS

The Paralympic Games is an Olympiad for athletes with disabilities. Initially conceived as a sports event for World War II veterans with spinal cord injuries, the first major version of the competition was held in Rome in 1960 and featured approximately 400 competitors from 23 nations. Three athletes competed in each event, meaning all of them were quaranteed a medal. At first, the Paralympics was restricted to athletes in a wheelchair, but the 1976 Paralympics in Toronto, Canada, was opened up to athletes with a range of disabilities, resulting in competitor numbers rising from approximately 1,000 to 1,600. The first Winter Paralympics was held in Sweden in the same year. Both the Summer and Winter Paralympics now take place in the same year and in the same city as their Olympic equivalents. The Winter Paralympics is a smaller spectacle consisting of six core events alpine skiing, ice sledge hockey, Nordic skiing, biathlon (skiing and shooting), cross-country skiing, and wheelchair curling.

SPORTS HIGHLIGHTS

- The 2016 Summer Paralympics in Rio included 22 sports, many of which also feature on the core Olympic program—for example, judo, rowing, swimming, and table tennis.
- Sports appearing only in the Summer Paralympic program include several disability-specific events such as boccia, a sport similar to bocce, and petanque, contested by wheelchair-bound athletes.
- The United States is the most successful nation in the history of the Summer Paralympics with a total of 2,165 medals, 772 of them gold, while Germany tops the Winter Paralympic medal table having won a total of 364 medals, including 137 golds.
- With 55 medals (41 gold, 9 silver, and 5 bronze), the American swimmer Trischa Zorn is the most successful individual in Paralympic history.

Did you know that... "The Paralympics" is short for "the Parallel Games," reflecting founder Sir Ludwig Guttmann's ambition for an elite equivalent to the Olympics for disabled athletes. >>> The youngest Paralympian ever, swimmer Joanne Round, was just 12 when she competed in the 1988 Games in Seoul, South Korea. She won two golds and a silver.





Above: Grzegorz Pluta of Poland attacks Panagiotis Triantafyllou of Greece in the men's saber wheelchair fencing at the 2012 Paralympics. Above right: Jonnie Peacock of the UK outstrips Richard Browne of the US and Arnu Fourie of South Africa in the 100 m T44 sprint at London 2012.

HOW CLASSIFICATION WORKS

To ensure fair competition, Paralympians are separated into four broad categories: amputee, cerebral palsy, visual impairment or blindness, and spinal injuries or other physical disabilities. Once the athletes have been grouped in this way, a more rigorous process of classification takes place. Prior to the Games, an expert panel observes every athlete performing a series of sports-specific tasks, enabling them to assess the competitor's ability.

AN EVEN PLAYING FIELD

The focus of these assessments depends on the sport in which the athlete is competing; in equestrian events, for example, there is an emphasis on understanding how the rider's disability affects control of their trunk. A letter-andnumber code is used as shorthand to express the nature of the event and the disabilities of the athletes competing in it. For example, F31-38 designates a field event (F) for Paralympians with conditions that affect the trunk and limbs (31–38), such as cerebral palsy. Certain sports, such as seated volleyball (see below), allow athletes from different categories to compete against each other.

THE CRITERIA

Every sport places different physical demands on the competitors, meaning classification criteria must be tailored to the event in question. The table below outlines how track and field athletes are classified.

TRACK AND FIELD CLASSIFICATION	
CLASS	CRITERIA
11-13	Athletes with visual impairments, with 11 signifying the greatest impairment and 13 the least.
20	Athletes with intellectual impairments.
31–38	Athletes with conditions which affect control of the trunk and limbs; a lower number indicates a more severe impairment. Athletes classed 31–34 compete in a seated position.
40	Athletes with short stature—for example, dwarfism.
42–46	Athletes with limb deficiencies, such as amputations. Numbers 42–44 indicate that the legs are affected, while 45–46 involve impairments to the arms.
51–58	Athletes competing in a wheelchair. Athletes in classes 51–54 have no trunk or leg function and varying function of the upper limbs. Athletes in classes 55–58 have increased trunk and leg function.

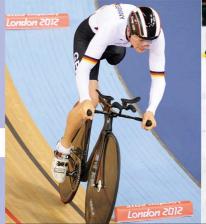


Below: Competitors at the 2008 and 2012 Paralympics in Beijing and London. Seated volleyball (below left) uses a net roughly 3 ft (1 m) high; visually impaired athletes run with a guide (below center); while in swimming (below right), most of the rules are the same as for able-bodied competitions.











Above left: Tobias Graf of Germany competes in the C123 cycling time trial. Above center: Japanese ice sledge-hockey player Kazuhiro Takahashi propels himself across the ice with sharpened hockey sticks. Above right: Wheelchair rugby is fiercely contested in custom-made reinforced wheelchairs.

ADAPTABLE ATHLETES

Specialized equipment has a major part to play in the Paralympics. Each classification category has its own technological requirements for helping athletes adapt their bodies for elite sport. Wheelchair science is now highly advanced, and the top wheelchair basketball teams, for example, benefit from light and maneuverable aluminum and carbon-fiber chairs that have been custom-built for each player. In the future, sophisticated technology may make athletes independent of assistants; for example, the sighted guides who run with visually impaired runners may be replaced by headsets equipped with sensors.

Controversy sometimes surrounds the issue of specialized equipment. Developing countries are unable to afford the cutting-edge technology enjoyed by athletes from wealthier nations. The question is increasingly being asked whether prosthetics, such as the carbon-fiber "blades" used by amputees, can actually enhance the performance of a disabled athlete beyond that of able-bodied ones. Prosthetics are limited to bringing the athlete to the stature or ability that they may have possessed without their disability—for example,

STAR PROFILE ORAZIO FAGONE

Orazio Fagone, the speed skater and sledge-hockey player from the Italian island of Sicily, is the only Paralympian to have also won an Olympic medal, a feat he achieved before an accident resulted in him becoming disabled. Fagone began his Olympic career at the Calgary Winter Olympics in Canada in 1988, finishing third in the 1,500 m and second in the 5,000 m speed skating demonstration events. Short-track speed skating was ratified as a full Olympic sport at the 1992 Winter Olympics at Albertville in France, and Fagone went on to win gold as part of the Italian men's 5,000 m relay at the Lillehammer Winter Olympics in Norway in 1994. In 1997, however, Fagone's right leg was amputated

after a serious motorcycle crash. He went on to compete as a member of the Italian ice sledge-hockey team—the Paralympic equivalent of ice hockey—at two Paralympic Winter Games: in 2006 in Turin, Italy, and in 2010 in Vancouver, Canada.

Some sports appear only in the Paralympics, not in the Olympic Games, such as boccia and goalball. Below left: Amputee athlete Josh Vander Vies of Canada throws a boccia ball. Below right: Japan's Akiko Adachi defends the goal, detecting the ball's location by the sound of the bells inside.



matching blades to original leg length.



THE GREATEST PARALYMPIAN

OCTOBER 1988-MAY 2007 THE CAREER OF A CHAMPION

Britain's Dame Tanni Grey-Thompson, who retired from competitive sport in May 2007, is one of the world's greatest Paralympians. Born with spina bifida, she was confined to a wheelchair from the age of 7—but this did not hinder her athletic career. She began wheelchair racing at the age of 13 and, during a glittering career, she competed in the widest possible range of disciplines—from 100 m to the marathon—achieving great success in all. She held 30 world records; won the London Marathon six times between 1997 and 2002; and in the course of five Paralympics won 16 medals, including 11 golds. She was made a Dame of the British Empire in 2005 in recognition of her achievements in disabled sport, and in 2010, she was sworn into the House of Lords as a life peer.

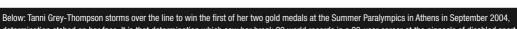
TANNI'S PARALYMPIC HONOR ROLL		
YEAR	HOST COUNTRY	MEDALS
2004	ATHENS	2 GOLD
2000	SYDNEY	4 GOLD
1996	ATLANTA	1 GOLD AND 3 SILVER
1992	BARCELONA	4 GOLD AND 1 SILVER
1988	SEOUL SEOUL	1 BRONZE

OTHER ACHIEVEMENTS

FIRST WOMAN TO BREAK ONE-MINUTE BARRIER FOR 400 M
WINNER OF 13 WORLD CHAMPIONSHIP MEDALS

FIRST WOMAN TO BREAK TWO-HOUR BARRIER FOR MARATHON

0







THE SPORTS

ATHLETICS













TRACK AND FIELD

SPORT OVERVIEW

Track and field consists of three types of events: track events (running or walking); field events (jumping or throwing); and combined events, such as the decathlon, which are a combination of both track and field events. Track and field is at the core of the Olympic movement and was featured at the first games at Olympia in 776 BCE. The popularity of track and field events wavered during Roman times, but athletics again dominated the first modern Games.

INDOORS AND OUTDOORS

Track and field events are held either indoors (during the winter) or outdoors (in the spring and summer). The majority of events are held at both indoor and outdoor meets, although there are exceptions. Limited space at indoor venues means that throws such as the javelin, hammer, and discus are only contested during the outdoor season. A smaller indoor track also means that the 100 m is replaced by the 60 m sprint.

MEASURE FOR MEASURE

Accurately measuring time and distance is a crucial part of track and field events. For track events, athletes are timed using sensors linked to cameras and measured using Fully Automatic Time. For the long jump, triple jump, and throwing events, distances are measured using a certified steel measuring tape.

KEEPING SCORE

Movable electronic scoreboards are placed around the track, enabling athletes, officials, and spectators to see how much time has elapsed since the start of a race



PHOTO FINISH

A digital line-scan camera (trained on the finish line and linked to a computerized timing sensor) determines competitor placings. It is accurate to thousandths of a second.



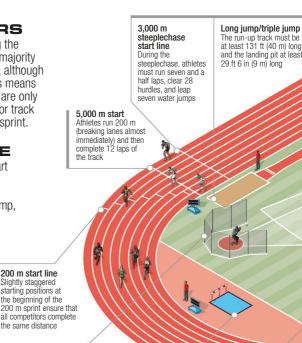
STARTER PISTOL

Track and field events are started by the firing of a starter pistol. The sound of the pistol, which contains blank shells, is a signal to the athletes to begin. It automatically starts the timers.



NEED2KNOW

- The word "athlete" comes from the Greek word "athlos," meaning a contest or competition.
- The first athletics event at the first ancient Olympiad was the "stade" race-a sprint along the full length of the stadium (a distance of approximately 210 yd/192 m).
- The order in which track and field events are competed at an official meet is determined by a random draw.



200 m start line

Slightly staggered

starting positions at

the beginning of the

the same distance

The landing area fans out at an angle of just 35°, which limits the danger posed by an errant throw

Water jump

A water jump situated just inside the running track is incorporated into the steeplechase event

Hammer

A wire cage, partly surrounding the throwing circle, protects officials and spectators from any dangerous throws

110 m hurdles start line

The men's hurdle event has a start as explosive as the 100 m sprint

100 m/100 m hurdles start line

Competitors must remain in their allocated lanes at all times

STAT CENTRAL

OLYMPIC TRACK EVENTS EVENT GENDER 100 M M & W 200 M M & W M & W 100 M HURDLES ۱۸/ 110 M HURDLES M 400 M HURDLES M & W 4X100 M RELAY M & W 4X400 M RELAY M & W 800 M M & W 1.500 M M&W 3,000 M STEEPLECHASE M & W 5,000 M M & W 10.000 M M & W MARATHON M & W 20 KM WALK M & W 50 KM WALK M

ENTS
GENDER
M & W
M & W
M & W
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M & W
M & W

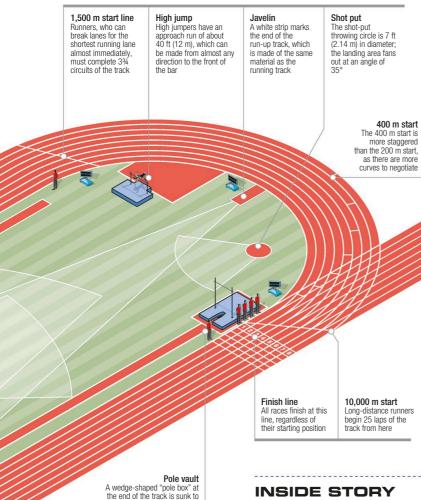
OLYMPIC COMBINED EVENTS	
EVENT	GENDER
DECATHLON	M
HEPTATHLON	W

A STELLA PERFORMANCE

POLISH-BORN ATHLETE STANISLAWA WALASIEWICZ (ALSO KNOWN AS STELLA WALSH) WON GOLD IN THE WOMEN'S 100 M AT THE 1932 OLYMPICS IN LOS ANGELES. SHE WENT ON TO SECURE SILVER FOUR YEARS LATER AT THE GAMES IN BERLIN, HOWEVER, AN AUTOPSY CARRIED OUT ON HER BODY—AFTER SHE WAS TRAGICALLY KILLED BY A STRAY BULLET DURING AN ARMED ROBBERY IN A SHOPPING MALL IN 1980—SHOWED THAT SHE POSSESSED MALE GENITALIA AND BOTH MALE AND FEMALE CHROMOSOMES. DESPITE THESE REVELATIONS, STELLA WALSH'S RECORDS STILL STAND.

TRACK AND FIELD ARENA

A full-size track usually measures 400 m in circumference, has six or eight lanes, and encircles a sports field that contains specific areas for each field sport. Most tracks have a synthetic rubber or polyurethane surface for year-round use. Indoor tracks are usually only 200 m in circumference, have four or six lanes, and have banked turns to accommodate bends that are far tighter than on an outdoor track. Whether competing indoors or outdoors, athletes always race around the track in an counterclockwise direction. Due to space constraints, indoor field events consist of only the jumps and the shot put.



DRUG TESTING

The use of performance-enhancing drugs—especially in athletics—never fails to make headline news. In a constant battle to promote fair play, the International Association of Athletics Federations runs a stringent doping control program to detect improper use of drugs such as anabolic steroids. In 1999, an independent foundation called the World Anti-Doping Agency (WADA) was also set up by the International Olympic Committee.

a depth of 8 in (20 cm)

INSIDE STORY

As well as being fundamental to the Olympic movement, athletics is a glamorous sport that can earn top athletes literally millions of dollars. The IAAF Golden League—an annual event run by the sport's governing body—has a \$1 million prize fund up for grabs, with the jackpot being shared between the athletes who win their event at all six meets during the season (although the award structure varies from season to season). During the 2000/2001 league, the prize money was even replaced by gold bars weighing in at 110 lb (50 kg).

NEED2KNOW

050

> Sprints are generally staged as part of larger athletics events, including the Olympic Games and the World Championships.

- The first Olympic Games (776 BCE) likely only featured one eventa sprint over 600 ft (182.88 m).
- Usain Bolt is the most successful 100 m runner ever, with six World or Olympic titles (2004-2017).

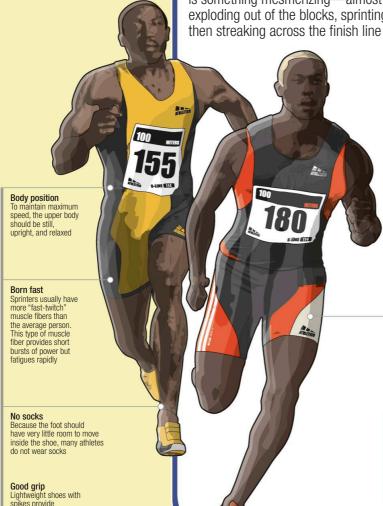






EVENT OVERVIEW

At athletic events, it is usually the sprints—which are run over 60, 100, 200, and 400 m—that most firmly grip the spectators' imagination. And it is as if the world stops for the Olympic 100 m men's final: there is something mesmerizing—almost primeval—about the competitors exploding out of the blocks, sprinting as fast as is humanly possible and then streaking across the finish line a mere 10 seconds or so later.



1996 FINAL

THE 1996 ATLANTA OLYMPICS MEN'S 100 M FINAL IS CONSIDERED ONE OF THE GREATEST SPRINTS EVER. THE FAVORITE. DONOVAN BAILEY. RECOVERED FROM A POOR START TO WIN THE RACE AND SET A WORLD RECORD OF 9.84 SECONDS.

RUNNING IN LANES

For all the sprints, runners must remain in their starting lane for the duration of the race. At the start of the events that involve rounding one or more bends (the 200 m and the 400 m), the competitors are "staggered" to ensure that each runner travels exactly the same distance.

Dressed for speed Close-fitting, streamlined Lycra body suits reduce wind resistance and

allow excellent freedom of movement

ATHLETE PROFILE

Sprinters' leg muscles are highly developed to provide explosive power. The upper body is similarly muscular because according to the laws of biomechanics, the forces created by the striding legs and the swinging arms must be equal (and opposite). Also, a quick response to the starter pistol requires sharp reflexes.

SIDELINES

maximum traction

The number of years Jesse Owens of the United States held the 100 m world record with his time of 10.3 seconds at the 1936 Olympic Games, Owens is considered one of the finest athletes ever and once defeated a racehorse over 100 yd (91 m).

The number of times Maurice Greene (United States) legally ran the 100 m in less than 10 seconds.

British athlete Linford Christie's age when he won the 100 m at the 1993 World Championships.

The winning margin, in seconds, achieved by Michael Johnson of the United States in the 200 m at the 1991 and the 1995 World Championships. This was the largest difference at this level since Jesse Owens' winning margin of 0.4 in the 200 m at the 1936 Olympic Games.

Head down

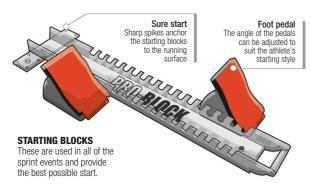
low position

Watching the track helps

the sprinter maintain a

EQUIPMENT

Sprinters wear an aerodynamically efficient Lycra body suit and very light shoes that feature spikes up to \(^3\)/s in (9 mm) long and a thin sole, which improves the competitor's feel for the track. Starting blocks allow athletes to drive forward powerfully at the starter pistol and to begin the race in the best position to achieve maximum acceleration.



THE SPRINT DISTANCES

There are four sprint distances. The 60 m, which is usually run indoors, favors runners with electrifying speed but not necessarily high endurance. Unofficially defining the "Fastest Person on Earth," the 100 m rewards sprinters who can guickly achieve and then maintain maximum speed. This demands tremendous muscular power and finely honed technique. Two hundred m runners have all the skills of an 100 m runner, with the additional ability to manage centrifugal forces when rounding the bend. They must start strongly yet have sufficient energy to finish well. Described as an endurance sprint, the 400 m is the most grueling of all the sprints. Careful pacing of this race is vital because after about 30 seconds of running at near maximum effort, lactic acid builds up in the muscles. making it more difficult and more painful to maintain speed.

FACTORS AFFECTING PERFORMANCE

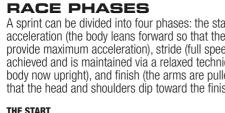
Pumping arms

propel the athlete

forward quickly

The arms drive hard to

A sprinter recording fast times will have talent, a powerful physique, and good tactical awareness; will have trained hard; and will be in good form—physically and mentally. Other factors that may influence performance include the track type (harder surfaces produce faster times) and climatic conditions, particularly wind speed and direction.



A sprint can be divided into four phases: the start (see below), acceleration (the body leans forward so that the legs can provide maximum acceleration), stride (full speed has been achieved and is maintained via a relaxed technique, with the body now upright), and finish (the arms are pulled back so that the head and shoulders dip toward the finish line).



On your marks The sprinter crouches on one knee, feet on the pedals of the blocks

Ready position

The fingers form a high bridge, with the hands slightly more than shoulder width apart

At the command of "set," the hips are raised a little higher than the shoulders

Shoulders

The shoulders

forward

are directly

above or a

little in front of the hands

On the starter pistol, the sprinter explodes out of the starting blocks

STAT CENTRAL

MEN'S 100 M: FASTEST TIMES	
TIME	ATHLETE (COUNTRY)
9.58	USAIN BOLT (JAM)
9.63	USAIN BOLT (JAM)
9.69	USAIN BOLT (JAM)
9.69	TYSON GAY (USA)
9.69	YOHAN BLAKE (JAM)

WOMEN'S 100 M: FASTEST TIMES		
TIME	ATHLETE (COUNTRY)	
10.49	FLORENCE GRIFFITH JOYNER (USA)	
10.61	FLORENCE GRIFFITH JOYNER (USA)	
10.62	FLORENCE GRIFFITH JOYNER (USA)	
10.70	SHELLY-ANN FRASER-PRICE (JAM)	
10.73	CHRISTINE ARRON (FRA)	

	MEN'S 20	0 M: FASTEST TIMES
	TIME	ATHLETE (COUNTRY)
	19.19	USAIN BOLT (JAM)
	19.26	YOHAN BLAKE (JAM)
	19.30	USAIN BOLT (JAM)
	19.32	MICHAEL JOHNSON (USA)
	19.32	USAIN BOLT (JAM)
_		

WOMEN'S	200 M: FASTEST TIMES
TIME	ATHLETE (COUNTRY)
21.34	FLORENCE GRIFFITH-JOYNER (USA)
21.56	FLORENCE GRIFFITH-JOYNER (USA)
21.62	MARION JONES (USA)
21.63	DAFNE SCHIPPERS (NED)
21.64	MERLENE OTTEY (JAM)

MEN'S 4	00 M: FASTEST TIMES
TIME	ATHLETE (COUNTRY)
43.03	WAYDE VAN NIEKERK (RSA)
43.18	MICHAEL JOHNSON (USA)
43.29	HARRY (BUTCH) REYNOLDS (USA)
43.39	MICHAEL JOHNSON (USA)
43.44	MICHAEL JOHNSON (USA)

WOMEN'S	400 M: FASTEST TIMES
TIME	ATHLETE (COUNTRY)
47.60	MARITA KOCH (GER)
47.99	JARMILA KRATOCHVÍLOVÁ (CZE)
48.16	MARITA KOCH (GER)
48.16	MARITA KOCH (GER)
48.22	MARITA KOCH (GER)

NEED2KNOW

052

- The relay is a highly tactical race, and teams pay close attention to the order in which the runners race. Usually, the fastest
- runner (the anchor) is the last to run.
- → The 4x400 m became a men's Olympic sport in 1908. (The women's competition followed in 1972.) The 4x100 m relay first appeared at the Stockholm Games in 1912. (The women's event followed in 1928.)
- The first relay races were held in the US by firemen who ran for charity, passing on a red pennant instead of a baton.

NO TURNING BACK

IN THE 4X400 M AT THE 1997 WORLD CHAMPIONSHIPS. THE US TEAM SUFFERED MISFORTUNE WHEN TIM MONTGOMERY SET OFF TOO EARLY ON THE SECOND LEG. REALIZING HIS MISTAKE, HE TURNED AROUND AND CRASHED INTO ONCOMING TEAMMATE BRIAN LEWIS.

ELAYS





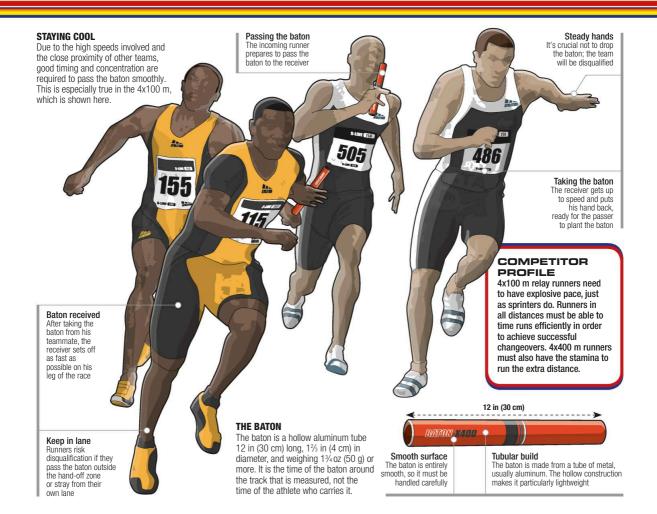


EVENT OVERVIEW

The relay race boasts the competitiveness of a sprint race and the drama of the baton changeovers. Each of the four athletes race one section, or leg, of the race, handing over a baton to the next member of the team within a marked hand-off zone. The most common relays are the 4x100 m and the 4x400 m. in both men's and women's disciplines. The men's 4x400 m is traditionally the last event of any track meet. Less common events are the 4x200 m; 4x800 m; and 4x1,600 m races.

RUNNING TRACK

Relay races are run on regular running tracks. Due to the difference in the distance run by racers on the inside lane to those in the outer lanes, the racers start at staggered points in both 4x100 m and 4x400 m competitions. The runner in the inside lane starts on the finish line in both races, while the other runners start from progressively forward positions; the positions are more staggered in the 4x400 m. The three hand-off zones are clearly indicated on the surface of the track.



LANE DISCIPLINE

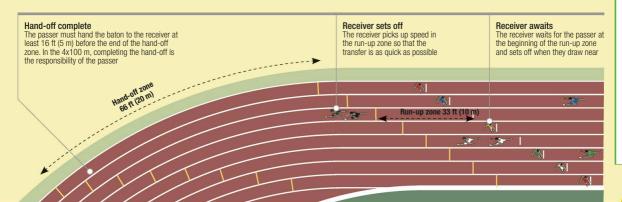
Athletes in the 4x100 m remain in their lanes from start to finish, so the hand-off takes place in the relevant lane. In the 4x400 m, runners start in separate lanes but may join the inside lane after the first 100 m of the second leg. In the final two hand-offs, race organizers place the receivers across the finish line according to their teams' placings at the time, with the leading team in the inside lane.

HIGH-SPEED HAND-OFF

Unlike the 4x400 m hand-off, where the length of each leg means that the passers are running relatively slowly, the 4x100 m hand-off (see below) is an action-packed phase when passer and receiver are running at high speed. The three run-up and hand-off zones are staggered around the bends of the track so that the length of each leg is the same for every team.

STAYING IN THE BOX

The hand-off zone is 20 m in length. The baton must be handed over while both runners are fully inside it and no less than 5 m from its end. Second-, third-, and fourth-leg runners begin running in the run-up zone, 10 m before the hand-off zone, in order to pick up speed before the transfer. As a result, in 4x100 m relays, the first athlete runs 105 m, the second and third 125 m each, and the anchor 120 m.



CHANGING TIMES

The transfer of the baton is the crucial moment in a relay race and must be handled delicately. In the 4x100 m relay, the transfer is known as a "blind hand-off," since the receiver does not maintain visual contact. The receiver starts to run when the passer reaches a certain point on the track, and the baton-carrier then shouts "stick!" to tell the receiver to hold out a hand. In the 4x400 m relay, the receiver jogs forward while looking back at the passer and holds out a hand for the baton.

UPSWEEP HAND-OFF

The baton is passed in an upward movement, a popular method in the 4x100 m relay. The receiver must adjust his grip before the next changeover.

DOWNSWEEP HAND-OFF

The passer hands the baton to the receiver in a downward movement. This method is popular in the 4x400 m relay and is less risky than the alternative.

Receiver's hand The receiver's palm faces downward, ready to take the upsweeping baton



WOMEN'S 4X100 M OLYMPIC GOLD

GREAT BRITAIN

STAT CENTRAL

MEN'S 4X100 M OLYMPIC GOLD

COUNTRY

JAMAICA

JAMAICA

JAMAICA

YEAR

2016

2012

2008

2004

COUNTRY	
UNITED STATES	Ī
UNITED STATES	
RUSSIA	
JAMAICA	
	UNITED STATES UNITED STATES RUSSIA

MEN'S 4X400 M OLYMPIC GOLD		
YEAR	COUNTRY	
2016	UNITED STATES	
2012	BAHAMAS	
2008	UNITED STATES	
2004	UNITED STATES	

WOMEN'S 4X400 M OLYMPIC GOLD	
YEAR	COUNTRY
2016	UNITED STATES
2012	UNITED STATES
2008	UNITED STATES
2004	UNITED STATES

SIDELINES

984 The length, in feet (300 m), of each leg of the earliest recorded relay races, held informally between teams of firemen in the United States in the late 19th century. The batons were red pennants. The first official relay race was run in Philadelphia in 1893.

The number of Olympic gold medals held by the US athletic team in both men's and women's' 4x100 m and 4x400 m events, the most of any nation. The US also boasts 14 world titles.

5.46 The number of seconds that have been knocked off the men's 4x100 m world record since 1912.

NEED2KNOW

Hurdles events are divided into sprint races (110 m for men and 100 m for women) and the 400 m, which is run separately by men and women.

Indoor hurdles are held over shorter distances-typically 60 m and 300 m. In such events, the distance between the hurdles remains the same as in the outdoor events; there are just fewer of them.

SIDELINES

The number of hurdles in a hurdles race, which remains the same regardless of the distance run.

The time, in seconds, of the first 110 m hurdles world record, set in 1908. The 13-second barrier was broken in 1981.

The number of times in the first 24 modern Olympic Games that gold in the men's 110 m hurdles was won by an athlete from the US. This overwhelming dominance ended in the first two Olympiads of the 21st century.

The number of consecutive 400 m hurdles races won by Edwin "Ed" Moses between 1977 and 1987.



HURDLES

EVENT OVERVIEW

Always big crowd-pullers, hurdling events are among the most exciting at any athletics meet. The object of a hurdles race is to jump over a series of gatelike obstacles and reach the finish line first. There are four main outdoor events: 100 m for women and 110 m for men (both sprint hurdles). and 400 m races for both men and women.

SPRINT HURDLES

In both the 100 m and 110 m hurdles, the competitors start out of the blocks and run along a straight course, jumping over 10 hurdles along the way. In the men's event, the first hurdle is 45 ft (13.7 m) from the starting line, and the distance between each hurdle is 30 ft (9.1 m). After the final hurdle, the runners sprint the remaining 47 ft 3 in (14.4 m) to the finish line. The first hurdle in the women's event is 42 ft 8 in (13 m) from the blocks. The hurdles are 29 ft 6 in (8.5 m) apart, and the last is positioned 34 ft 6 in (10.5 m) from the finish line.

ONE-LAP HURDLES

In the 400 m hurdles, racers start from the blocks and must leap over 10 hurdles, just like the sprint-distance hurdlers. Racers start from staggered points on the track, according to their lane position. The hurdles are slightly lower in height than their sprint-distance equivalents. The first hurdle is positioned 147 ft 7 in (45 m) from the start, and the distance between each of the following hurdles is 114 ft 10 in (35 m). The last hurdle is 131 ft 3 in (40 m) from the finish line.

The arms play a critical role in counterbalancing the forces that are applied to the torso by the legs as they swing into and out of the jumps over the hurdles

Low trajectoryIt is important that the trailing leg is kept as low as possible. It is better to hit the hurdle with the knee than to lose speed by making an unnecessarily high clearance

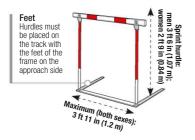
ATHLETE PROFILE

Like any other race runners, hurdlers need speed, power, and stamina. Above all, they need to develop quick reflex actions that will help propel them over a rapid succession of obstacles without a time-wasting loss of rhythm. Hurdlers also need to be flexible. (They pay particular attention to hip exercises.)

> Getting a grip A plate of small spikes on the sole of the hurdler's shoe provides traction

Material difference The uprights and bases of the hurdles are made of metal, but the crossbar is wooden



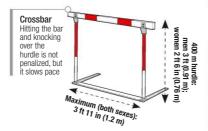


"HIGH" HURDLES

The highest hurdles (for each sex) are used in the sprint events: the 110 m race for men and the 100 m for women.

WHOLLY MOSES

EDWIN "ED" MOSES WON THE 400 M HURDLES AT THE 1976 AND 1984 OLYMPICS. AFTER RETIRING FROM THE TRACK, HE TOOK UP BOBSLEDDING AND WAS A MEMBER OF THE TEAM THAT TOOK BRONZE FOR THE UNITED STATES AT THE 1990 WORLD CUP.



INTERMEDIATE HURDLES

Slightly lower hurdles, height-adjusted according to sex, are used in the longer-distance events: the men's and women's 400 m races.

TAKE IT IN STRIDE

Hurdlers do not try to maximize the length of their stride. Their main focus is on the approach to each hurdle and maintaining a smooth, uninterrupted flow throughout the race; they should never break step for an upcoming hurdle. The other key to success is efficient and economical jumping. To achieve this, competitors "run through" the hurdles—in other words, they simply lift their legs, rather than jump in the conventional sense of the word, and try to stay as close to the track as possible throughout the race. They generally lead with the same leg over every hurdle.

ARMED FOR ACTION

The best hurdlers make full use of their arms to balance their bodies. As they attack the hurdle, they stretch forward, reaching for their lead leg with their opposite hand. This action—which is sometimes referred to as "checking the time" because the runner seems to be looking at the top of his or her wrist—brings the forehead close to the leading knee. The other arm swings backward in a normal sprint racing action.

CLEARING THE HURDLE

Sprint hurdlers lean their bodies farther forward than 400 m hurdlers because they need to minimize the height they jump and get their feet back down on the track faster.

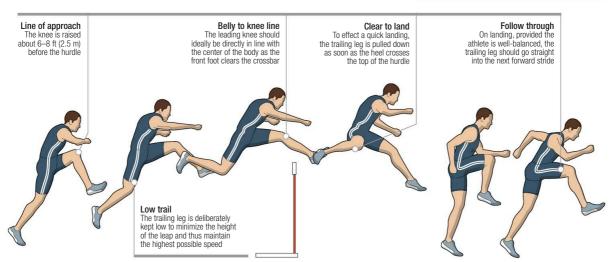
STAT CENTRAL

MEN'S	110 M HURDLES OLYMPIC GOLD
YEAR	ATHLETE (COUNTRY)
2016	OMAR MCLEOD (JAM)
2012	ARIES MERRITT (USA)
2008	DAYRON ROBLES (CUB)
2004	JLIU XIANG (CHN)
2000	AÑER GARCIA (CUB)
1996	ALLEN JOHNSON (USA)
	YEAR 2016 2012 2008 2004 2000

WOMEN'S 100 M HURDLES OLYMPIC GOLD		
YEAR	ATHLETE (COUNTRY)	
2016	BRIANNA ROLLINS (USA)	
2012	SALLY PEARSON (AUS)	
2008	DAWN HARPER (USA)	
2004	JOANNA HAYES (USA)	
2000	OLGA SHISHIGINA (KAZ)	
1996	LUDMILA ENGQUIST (SWE)	

MEN'S 400 M HURDLES OLYMPIC GOLD			
YEAR	ATHLETE (COUNTRY)		
2016	KERRON CLEMENT (USA)		
2012	FELIX SANCHEZ (DMA)		
2008	ANGELO TAYLOR (USA)		
2004	FELIX SANCHEZ (DMA)		
2000	ANGELO TAYLOR (USA)		
1996	DERRICK ADKINS (USA)		

YEAR ATHLETE (COUNTRY) 2016 DALILAH MUHAMMAD (USA) 2012 NATALYA ANTYUKH (RUS) 2008 MELANIE WALKER (JAM) 2004 FANI HALKIA (GRE) 2000 IRINA PRIVALOVA (RUS)	WOMEN'S 400 M HURDLES OLYMPIC GOLD		
2012 NATALYA ANTYUKH (RUS) 2008 MELANIE WALKER (JAM) 2004 FANI HALKIA (GRE) 2000 IRINA PRIVALOVA (RUS)	YEAR	ATHLETE (COUNTRY)	
2008 MELANIE WALKER (JAM) 2004 FANI HALKIA (GRE) 2000 IRINA PRIVALOVA (RUS)	2016	DALILAH MUHAMMAD (USA)	
2004 FANI HALKIA (GRE) 2000 IRINA PRIVALOVA (RUS)	2012	NATALYA ANTYUKH (RUS)	
2000 IRINA PRIVALOVA (RUS)	2008	MELANIE WALKER (JAM)	
	2004	Fani Halkia (GRE)	
	2000	IRINA PRIVALOVA (RUS)	
1996 DEON HEMMINGS (JAM)	1996	DEON HEMMINGS (JAM)	



MIDDLE-DISTANCE RUNNING

056







EVENT OVERVIEW

The most common middledistance events are the 800 m and the 1,500 m, with steeplechasing also regularly included. Many athletes compete in both the 800 m and the 1,500 m, as the training and physical requirements are similar. Tactics play a part in these races, which are often won or lost in the last few feet. Middle-distance races have always been among the core events of the Olympics and all athletic championships.

ATHLETE PROFILE

Middle-distance athletes need physical and mental staying power. The distances are too long for sprinting, but speed is required for the finish. Tactics are also important.

NEED2KNOW

- The women's Olympic 800 m was first run in 1928, but shock at competitors' exhaustion meant it did not appear again until 1960.
- → Women were finally allowed to run in the 1,500 m at the Munich Olympics in 1972.
- Steeplechasing of varied lengths has been a men's Olympic event since 1900. It first appeared as a major women's race in the 2005 Helsinki World Championships.

STAYING BEHIND—A GOOD TACTIC?

STAYING AT THE BACK IS NOT RECOMMENDED, BUT IN THE 1936 OLYMPICS, JOHN WOODRUFF WAS BOXED IN EARLY IN THE 800 M. SLOWING ALMOST TO A STOP, HE LET THE RUNNERS PASS AND STILL WON, IN 2004, KELLY HOLMES HAD SUCCESS USING A SIMILAR TACTIC.



THE MAIN EVENTS

In the 800 m, runners complete two laps around a standard 400 m track. They start from staggered positions along the track and have to stay in their starting lane until the end of the first curve (about 100 m). The 800 m requires speed and endurance, so competitors plan their race and use carefully considered and practiced tactics. The 1,500 m event consists of three-and-three-quarter laps around the standard outdoor track and is often called "the metric mile." With an increasingly scientific approach to performance and training, runners have been able to make this race an extended sprint. However, like the 800 m, the 1,500 m remains very mentally taxing.

BREAKING TO THE INSIDE

Leaving the starting lane after the first curve, called breaking to the inside, allows runners to compete against each other more effectively. Breaking lanes must be done without deliberately obstructing or barging another competitor, although elbow clashing is almost unavoidable.

RUNNING GEAR

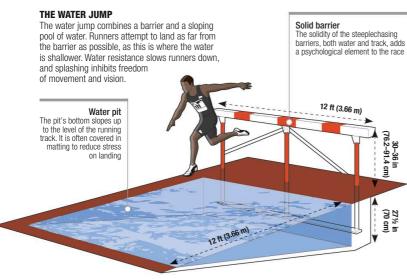
As for all athletics events, the gear a middle-distance runner wears is chosen with great care. There is an emphasis on lightweight, technical modern materials with little wind resistance and advanced wicking properties. A close, flexible, and comfortable fit are essentials in both the shoes and the clothes.

THE FOOTWEAR

Key features of middledistance shoes are their aerodynamic shape, light weight, and spiked sole.

STEEPLECHASE

Usually 3,000 m, the steeplechase includes 35 jumps, seven of which are water jumps. Normally, four barriers are placed around the track, with the water jump—the fifth barrier—at the top of the second turn either to the inside of lane one or to the outside of the outermost lane. Barriers, which do not fall over if hit, are placed 256 ft (78 m) apart; runners start jumping them after the first half lap. They must be cleared cleanly by jumping, stepping on and over, or vaulting.



THE FOOTWEAR

Steeplechasing shoes are streamlined and lightweight, usually with 1/4-3/16 in (6-8 mm) pyramid spikes on the sole. Spikes provide extra traction for negotiating the barriers and staying on the track. High-tech midsole and ankle cushioning is also provided.



RUNNING TECHNIQUES

Posture and balance are important in middle-distance running. These enable acceleration and maintenance of high speeds. The athlete concentrates on relaxing into the stride, with their arms held close to the body but hanging loosely from the shoulders, allowing them to swing with the body in a down and back movement. In the 800 m race, runners aim to complete both laps in more or less the same time. The 1.500 m is also run at a steady pace throughout.

TRAINING

Middle-distance runners need both fast- and slow-twitch muscles—the first for speed, the second for endurance. Interval training, in which fast work is interspersed with short recovery periods, is used to build these, and to increase aerobic and anaerobic fitness. Running at race speeds, as well as slower endurance runs, are included in training.

STARTING POSITIONS

Runners start without blocks. They stand on the toes of the back foot and the ball of the front foot, opposite arms back and forward respectively.

Body position

To accelerate at the start, runners lean forward, but they soon straighten their body to run

Feet position

On "go," the back foot drives forward onto the power foot. The arms swing to aid acceleration



STAT CENTRAL

MEN'S 800 M WORLD RECORDS

TIME	ATHLETE (YEAR)
1:40.91	DAVID RUDISHA (2012)
1:41.01	DAVID RUDISHA (2010)
1:41.09	DAVID RUDISHA (2010)
1:41.11	WILSON KIPKETER (1997)
1:41.24	WILSON KIPKETER (1997)

WOMEN'S 800 M WORLD RECORDS

TIME	ATHLETE (YEAR)
1:53.28	JARMILA KRATOCHVÍLOVÁ (1983)
1:53.43	NADEZHDA OLIZARENKO (1980)
1:54.01	PAMELA JELIMO (2008)
1:54.25	CASTER SEMENYA (2018)
1:54.44	ANA FIDELIA QUIROT (1989)

MEN'S 1,500 M WORLD RECORDS

TIME	ATHLETE (YEAR)
3:26.00	HICHAM EL GUERROUJ (1998)
3:26.12	HICHAM EL GUERROUJ (2001)
3:27.34	BERNARD LAGAT (2001)
3:26.45	HICHAM EL GUERROUJ (1998)
3:26.69	ASBEL KIPROP (2015)

WOMEN'S 1.500 M WORLD RECORDS

T	IME	ATHLETE (YEAR)
3	:50.07	GENZEBE DIBABA (2015)
3	:50.46	YUNXIA QU (1993)
3	:50.98	BO JIANG (1997)
3	:51.34	YINGLAI LANG (1997)
3	:51.92	JUNXIA WANG (1993)

SIDELINES

The number of times Moroccan Hicham El Guerrouj has done the 1,500 m in under 3:30. He also holds the most world titles-four. Briton Steve Cram was first to finish in under 3:30 in 1985.

The age of Moses Kiptanui of Kenya when he had already won three steeplechasing world titles (1991, 1993, 1995) and had been the first to finish in under eight minuteshis record is 7:59.18.

1,000,000 The amount, in US dollars, won by 800 m runner Maria Mutola in 2003. She was the first athlete to win the IAAF Golden League Jackpot outright.



NEED2KNOW

While the men's 5,000 m and 10,000 m events have featured in the Olympics since 1912, the women's 10,000 m and 5,000 m runs only debuted in 1988 and 1996, respectively.

058

- The length of the marathon commemorates the Greek soldier who, in 490 BCE, ran from Marathon to Athens with news of the Greek victory over the Persians.
- Marathons in London, New York, Chicago, Hong Kong, and Honolulu each attract more than 30,000 runners.

LONG-DISTANCE RUNNING







EVENT OVERVIEW

Long-distance running events include 5,000 m and 10,000 m races; cross-country running; and marathons. The 5,000 m and 10,000 m runs and the marathon are Olympic events. The runs take place on a stadium track, while the marathon route is staged around the streets of the host city. Some 5,000 m and 10,000 m races are held off-road, in which case they are usually known as 5 km and 10 km runs.



THE OVAL TRACK

In 5,000 m and 10,000 m races, the competitors start off on a slightly curved line across the track but soon move to the inside lane to minimize the total distance they have to run. One lap around the track equals 400 m. Consequently, in a 5,000 m event, the athletes must run 200 m (the starting line is near the 200 m start) and then 12 complete laps. In the 10,000 m event, the competitors run 25 times around the track. Both races finish at the same line.

ATHLETE PROFILE

Long-distance runners are lighter, more slightly built, and more wiry than the more muscular powerhouse sprinters. Stamina and endurance are essential, as is aerobic strength; it's vital that the heart pumps blood around the body as efficiently as possible to allow more oxygen to reach tired muscles. Success in long-distance running comes not only through peak physical fitness but also through mental endurance and tactical thinking. Competitors are pushed to their physical and mental limits, and being able to pace yourself to conserve energy, or knowing when to hang back or push forward, is vital.

HIGH FLYERS

OFTEN DUBBED "THE RUNNING TRIBE," THE KALENJIN PEOPLE OF THE GREAT RIFT VALLEY IN WESTERN KENYA ARE RENOWNED FOR THEIR PROWESS AT LONG-DISTANCE RUNNING. ONE POSSIBLE REASON FOR THEIR CONTINUED INTERNATIONAL SUCCESS IS THE HIGH ALTITUDE AT WHICH THEY LIVE. WITH LESS OXYGEN IN THE ATMOSPHERE AT HIGH ALTITUDES, THE BODY MUST PRODUCE MORE OXYGEN-CARRYING RED BLOOD CELLS. WHEN COMPETING AT SEA LEVEL, THESE EXTRA CELLS PROVIDE A HUGE ADVANTAGE, AS THE HEART DOESN'T HAVE TO BEAT AS FAST TO CARRY AN EQUIVALENT AMOUNT OF OXYGEN AROUND THE BODY.

SIDELINES

6,255 The number of runners to cross the finish line at the first ever London Marathon. The ever-popular annual event was first staged in the city in 1981.

The length, in miles (21.1 km), of a half marathon. Moses Tanui was the first athlete to complete the event in under 60 minutes, setting the record in 1993 in Milan.

The number of records broken in a single women's 10,000 m race at the 2002 Asian games in Busan. Chinese runner Sun Yingjie won the race, and the first four finishers produced the 3rd, 4th, 5th, and 6th best times ever.

Haile Gebrselassie's age when he won his first World Championship gold in the 10,000 m. He went on to win another three titles and is one of the most celebrated long-distance runners of all time.

EQUIPMENT

Whether running a cross-country race, a marathon on city streets, or a long-distance track event, athletes face similar physical and mental challenges but need somewhat different equipment. Staying adequately hydrated for the duration of the course is an absolute necessity. It is also crucial to provide as much comfort as possible for the feet, since blisters or other skin discomfort can cause a runner to retire from a race.

Cushioned heel

A cushioned layer in the heel and sole helps absorb shocks from hard road surfaces



ROAD SHOE

Marathons are generally raced on roads, often through cities. Marathon runners wear flat running shoes specially designed to absorb the shock of the foot repeatedly striking a hard surface.

Outer sole Rubber cleats on the outer sole provide extra grip on rough ground



OFF-ROAD SHOE

Cross-country runners race on routes that may go through all types of natural terrain. Runners wear shoes with rubber cleats to give them grip on muddy and grassy routes. They are usually less cushioned than road shoes.

CROSS COUNTRY

Cross-country runs take place off-road over all sorts of terrain, including grass, mud, and even water. There is no fixed length for cross-country running. Women's races are generally between 11/4 and 5 miles (2 and 8 km); men's events may be between 3 and 9 miles (5 and 15 km). Cross-country running was an Olympic sport until 1924, but was then dropped, as it was deemed unsuitable as a summer event. The IAAF organizes the annual World Cross-Country Championships, which is considered the most important competition in the discipline.

TEAM EVENTS

Cross-country running is unusual in that it involves athletes competing both as an individual and as part of a team. Usually, it is the first five runners in a team who have their scores put forward to determine the finishing order.

SETTING THE PACE

One of the most important tactics in long-distance running is the ability to judge pace-setting. Often following a dedicated pacemaker, athletes need to pace themselves exactly. If they run relatively slowly to conserve energy, they may not be able to put on a sufficient burst of speed to overtake the front-runners. However, if they run relatively quickly, perhaps assuming an early lead, they may not be able to sustain their advantage, ultimately running out of steam well before the finish line. The most skillful runners can force their opponents to make tactical errors.

MARATHON

Marathons are run on roads over a course 26 miles 385 yd (42.2 km) long. At the Olympic Games, the race ends in the stadium. The men's marathon is traditionally the last event of the athletics calendar and is sometimes incorporated into the closing ceremony. The marathon was held at the first modern Olympics in Athens in 1896, where the course was only 24.85 miles (40 km) long. The length of subsequent Olympic marathons varied slightly (depending on the established route for each venue) but was set at today's distance during the 1924 Games.

PUBLIC APPEAL

Marathons are also popular participation sports, with top athletes competing alongside hundreds or thousands of amateurs. Notable events take place annually in cities including London, New York, Paris, Tokyo, and Boston.

STAT CENTRAL

MEN'S 5	,000 M OLYMPIC CHAMPIONS	
YEAR	GOLD MEDALIST	
2016	MO FARAH (GBR)	
2012	MO FARAH (GBR)	
2008	KENENISA BEKELE (ETH)	
2004	HICHAM EL GUERROUJ (MAR)	
2000	MILLON WOLDE (ETH)	
1996	VENUSTE NIYONGABO (BDI)	Ī
1992	DIETER BAUMANN (GER)	

WOMEN'	WOMEN'S 5,000 M OLYMPIC CHAMPIONS	
YEAR	GOLD MEDALIST	
2016	VIVIAN CHERUIYOT (KEN)	
2012	MESERET DEFAR (ETH)	
2008	TIRUNESH DIBABA (ETH)	
2004	MESERET DEFAR (ETH)	

IVIEW 3		10,000 W OLYMPIC CHAMPIONS
	YEAR	GOLD MEDALIST
	2016	MO FARAH (GBR)
	2012	MO FARAH (GBR)
	2008	KENENISA BEKELE (ETH)
	2004	KENENISA BEKELE (ETH)
	2000	HAILE GEBRSELASSIE (ETH)

MENIC 10 000 M OLVMBIC CHAMBIONS

WOMEN'S 10,000 M OLYMPIC CHAMPIONS		
YEAR	GOLD MEDALIST	
2016	ALMAZ AYANA (ETH)	
2012	TIRUNESH DIBABA (ETH)	
2008	TIRUNESH DIBABA (ETH)	
2004	HUINA XING (CHN)	
2000	DERARTU TULU (ETH)	

MEN'S MARATHON OLYMPIC CHAMPIONS			
YEAR	GOLD MEDALIST		
2016	ELIUD KIPCHOGE (KEN)		
2012	STEPHEN KIPROTICH (UGA)		
2008	SAMMY WANJIRU (KEN)		
2004	STEFANO BALDINI (ITA)		
2000	GEZAHEGNE ABERA (ETH)		
1996	JOSIA THUGWANE (RSA)		
1992	HWANG YOUNG-CHO (KOR)		

WOMEN'S MARATHON OLYMPIC CHAMPION		
YEAR	GOLD MEDALIST	
2016	JEMIMA SUMGONG (KEN)	
2012	TIKI GELANA (ETH)	
2008	CONSTANTINA TOMESCU (ROU)	
2004	MIZUKI NOGUCHI (JPN)	
2000	NAOKO TAKAHASHI (JPN)	
1996	FATUMA ROBA (ETH)	
1992	VALENTINA YEGOROVA (RUS)	







LONG JUMP

EVENT OVERVIEW

The long jump—formerly known as the broad jump—is one of the oldest track and field events for men and women. Athletes compete in this technically demanding event to see which of them can leap the greatest distance through the air from a running start. There are five main elements to the long jump: the run-up, the last two steps before reaching the takeoff board, the takeoff itself, technique through the air, and the landing. Over the history of athletics, long jump records have been few and far between. Bob Beamon's long jump world record, set at the 1968 Mexico Olympics, stood for almost 23 years.

NEED2KNOW

- The long jump was included in the first track and field competitions at Exeter College at Oxford University, England, in 1850.
- The long jump is one of track and field's core events and has been part of every modern Olympic Games.
- Previously a men-only event, in 1948, the long jump became an Olympic sport for women as well.

ONE GIANT LEAP FOR MANKIND

IN MOST SPORTS, WORLD RECORDS CREEP UP—A QUARTER OF AN INCH HERE, 0.01 OF A SECOND LESS THERE. UNTIL 1968, NO ATHLETE HAD JUMPED MORE THAN 28 FT (8.5 M). BUT AT THAT YEAR'S OLYMPIC GAMES IN MEXICO CITY, AMERICAN BOB BEAMON CLEARED A MASSIVE 29 FT (8.9 M), ALMOST 2 FT (60 CM) FARTHER THAN THE PREVIOUS BEST. BEAMON'S RECORD STOOD FOR 23 YEARS, 216 DAYS, BEFORE FALLING TO ANOTHER US ATHLETE, MIKE POWELL.

ATHLETE PROFILE

One of the keys to success in the long jump is a fast run-up, and it is no coincidence that the brightest stars in the event are often outstanding 100 m and 200 m sprinters. Height, though not essential, is also an advantage, as the farther an athlete can reach, the greater jump distance they will achieve. Most of the leading male long jumpers are 6 ft 1 in (1.85 m) or taller; women tend to be over 5 ft 8 in (1.72 m).

LONG JUMP PIT

The approach runway, made of cinders or synthetic material, should be no less than 131 ft (40 m) long and is often 147½ ft (45 m). The landing area is a sand-filled pit at least 29½ ft (9 m) long and 9 ft (2.75 m) wide. Between the two is an 8 in (20 cm) wide takeoff board. To the front of it, judges may place a strip of plasticine, soft earth, or sand that will show if the jumper's foot was on the ground beyond the takeoff limit.

SIDELINES

Feet per second: the maximum permitted tail wind for a record long jump to be deemed valid. That is the equivalent of 4.47 mph (7.2 kph).

The number of consecutive Olympic gold medals won by US athlete Carl Lewis between 1984 and 1996.

The average number of run-up strides taken by a top-class male long jumper.

Takeoff board

This is set back at least 3¼ ft (1 m) from the front of the pit so that judges can tell more easily if the jumper's feet went beyond the forward edge before takeoff

Landing pit

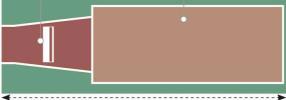
The pit is filled with sand, then moistened. After every jump, the surface is smoothed over with a rake to the same level as the runway

can move freely

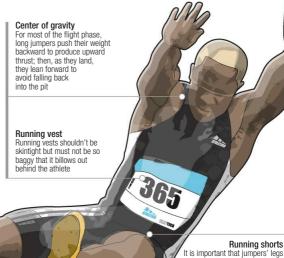
Cleated shoes

the takeoff stride

Firm running shoes with running spikes for grip and to withstand the pressure of



at least 33 ft (10 m)



When attempting a jump, competitors may tread on the takeoff board, but they must not allow any part of their feet to go over its farthest edge, called the scratch line. If they overstep the scratch line, the jump is invalid. A legal jump is indicated by an official who holds up a white flag; foul jumps are signaled by a red flag. Each contestant has three attempts (known as trials), unless there are fewer than eight competitors, in which case they may each have six jumps. At high-level events, athletes must participate in two preliminary knockout rounds, the top eight of whom contest a final. The winner is the athlete with the longest valid jump in the final round; in the event of a tie, the second-best trials are taken into consideration.

FIVE STEPS TO HEAVEN

Five elements of a long jump are crucial: a fast approach, a well-measured last two strides, an explosive takeoff, a long flight, and a well-balanced landing. Because speed in the approach is so important, it is not surprising that many competitive sprinters are also top-level long jumpers. There are three main long jumping techniques: the hitchkick, the hang, and the sail. There is no "right" or "wrong" technique, and athletes choose the one that suits them best.

Cycling legs

Explosive

As with all

techniques, good lift is crucial at takeoff

takeoff

The legs and arms move

in a rapid cycling motion

HITCHKICK

This technique is the hardest to master, but it is the method most frequently employed by elite jumpers. Also known as "running in the air," the hitchkick in fact relies on a cycling action to maintain an upright body position. On landing, hitchkickers touch down feet first and then push their torso forward to prevent losing distance by falling backward into the pit.

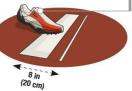
MEASUREMENTS

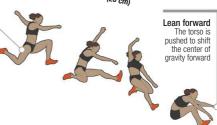
No matter where on the runway the athlete takes off, each valid jump is measured from the front edge of the takeoff board to the nearest mark made in the sand by any part of the competitor's body. (That is why the sand in the long jump pit must be completely smoothed after every trial.) Distances are recorded to the nearest quarter of an inch below the actual distance jumped if the distance was not a whole inch.

THE FINAL STEP

The takeoff board is set into the runway and may have a small hollow beneath to add springiness. The telltale strip in front of the board should be replaced every time it is stepped on.

Overstepping the mark If toe prints are imprinted on the puttylike strip in front of the board, the jump is illegal





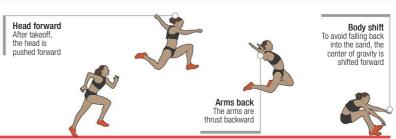
CAII

The sail is the most basic long jump technique. Once airborne, It is important to help force the body through the air by circling the arms. They should first go downward, then backward, upward, and finally forward. On landing, they must attempt to push their body forward so that their feet and arms are forced in front of them as far as possible.

Arms up The arms are stretched as high as possible at takeoff Legs forward At the apex of the jump, the legs start to move forward

HANG

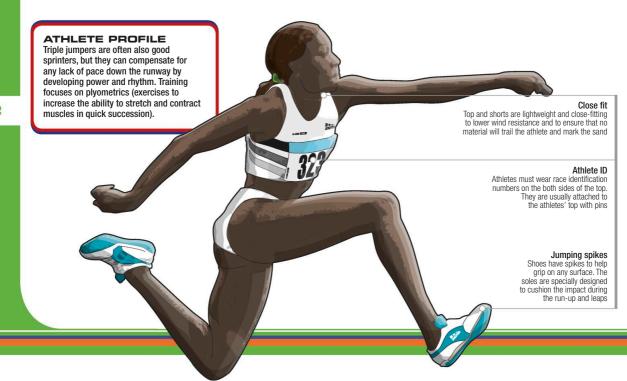
Both the arms and the legs are extended upward to reach a maximum distance from the hips. The limbs are kept "long" until after the jumper has reached the top of the jump, at which point they push the legs forward in readiness for landing. The hang technique is the easiest way to achieve a forward-falling finish, which prevents the jumper falling backward and losing distance.



STAT CENTRAL

WORLD RECORDS (MEN)		
ATHLETE	DISTANCE	YEAR
MIKE POWELL (USA)	29 FT 3 IN (8.95 M)	1991
BOB BEAMON (USA)	29 FT 21/2 IN (8.90 M)	1968
RALPH BOSTON (USA)	27 FT 4¾ IN (8.35 M)	1965
RALPH BOSTON (USA)	27 FT 41/4 IN (8.34 M)	1964
IGOR TER-OVANESYAN (URS)	27 FT 3¼ IN (8.31 M)	1962

WORLD RECORDS (WOMEN)		
ATHLETE	DISTANCE	YEAR
GALINA CHISTYAKOVA (URS)	24 FT 6¾ IN (7.52 M)	1998
JACKIE JOYNER-KERSEE (USA)	24 FT 5¾ IN (7.49 M)	1994
HEIKE DRECHSLER (GDR)	24 FT ½ IN (7.48 M)	1988
HEIKE DRECHSLER (GDR)	24 FT 4½ IN (7.45 M)	1986
HEIKE DRECHSLER (GDR)	24 FT 4 IN (7.44 M)	1985



TRIPLE JUMP







EVENT OVERVIEW

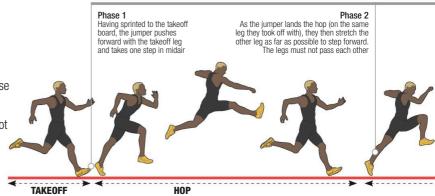
This track and field event is also informally known as the hop, step, and jump, which describes the movements of the athletes who compete in this thrilling contest. Each athlete runs down a track that is often the same as the one used for the long jump. On reaching the takeoff board (at full speed), the athlete jumps forward, lands on the takeoff foot, then takes a step onto the other foot and finally jumps into a sand-filled pit. The competitor who covers the greatest overall distance is declared the winner.

NEED2KNOW

- The men's triple jump was a medal event at the first modern Olympics in 1896. There was no women's equivalent for exactly 100 years.
- If an athlete walks back through the landing pit after they have made their jump, that jump is disqualified.
- Proportionally, the largest phase of the triple jump is the hop stage (first phase)—about 37 percent; phase two is about 33 percent, while the final phase accounts for 30 percent of the total leap.
- Elite triple jumpers cover about twice the distance of elite long jumpers. The current long jump record held by Mike Powell is 29 ft (8.95 m) and the current triple jump record held by Jonathan Edwards is 60 ft (18.29 m).

TECHNIQUES

A top-level triple jumper usually takes a run-up of around 130 ft (40 m). The approach, which will be at full speed, should be so well judged that the jumper has no need to look down at the board during takeoff—to do so would compromise the length of the jump. Athletes begin and end the hop on the same foot; as soon as they have landed, they launch the other foot into the step, stretching to cover as much ground as possible. For the final jump, the athlete uses the extension, hitchkick, or sail technique to bring the legs forward for the landing.

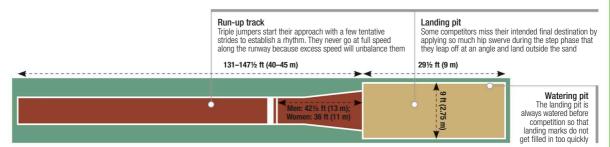


FIELD OF PLAY

The takeoff board for the triple jump is set much farther back than that of the long jump. The adjustment is made so that the athletes can perform the hop and step phases on the cinder or synthetic track before launching the final jump into the landing pit. A strip of modeling clay, soft clay, or similar material is usually placed along the leading edge of the takeoff board. This leaves a tell-tale impression of the athlete's shoe so that the officials can detect foul jumps that they may not have noticed with the naked eye. The sand in the landing pit must be level with the track and should be raked completely smooth after every jump is measured. This is so the officials can be sure that any mark made in the sand was left by the athlete who had just made the jump.

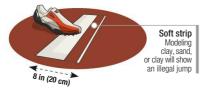
EDWARDS: THE UNSURPASSABLE?

JONATHAN EDWARDS WAS THE FIRST ATHLETE TO BREAK THE 59 FT (18 M) BARRIER, SETTING A NEW WORLD RECORD OF 60 FT (18.29 M) IN THE PROCESS. IT WAS THE EQUIVALENT OF JUMPING A LITTLE UNDER THE LENGTH OF TWO DOUBLE-DECKER BUSES.



RULES & REGULATIONS

At larger competitions, athletes have to progress through qualifying rounds before being able to compete in the final round, with the possibility of winning a medal of any color. The athletes have at least three attempts (trials) at a jump. Each jump is measured from the leading edge of the takeoff board to the nearest mark in the sand made by any part of the competitor's body. The jump is recorded to the nearest centimeter below the distance cleared. If an athlete is confident that their jump will get them into the next round or win a medal, they don't have to complete all three trials.



THUS FAR AND NO FARTHER

One of the most important skills for triple jumpers to master is to judge the run-up so that the leading foot lands as close as possible to the edge of the takeoff board without overstepping the mark and making the jump invalid.

FOUL JUMPS

The officials signal a foul jump by waving a red flag. Most foul jumps occur when the athlete oversteps the takeoff board and makes an indent in the soft strip on the takeoff board. Sometimes, the jumper will miss the landing pit altogether. A foul may be called if the athlete takes more than the agreed length of time (usually a minute and a half) to complete a jump. Foul jumps may also be called if the jumper lands the hop on the incorrect foot or if they jump off two feet instead of just one.

Phase 3 The athlete must land on the opposite foot that they took off from. To complete the jump, the athletes take off from the landing foot The final phase The jumping technique may be a hang, a hitchkick, or a sail maneuver The jumping technique may be a hang, a hitchkick, or a sail maneuver so that their mark is where they first hit the sand

STAT CENTRAL

LONGEST TRIPLE JUMPS (MEN)

MARK	ATHLETE (YEAR)
18.29 M	JONATHAN EDWARDS (1995)
18.21 M	CHRISTIAN TAYLOR (2015)
18.14 M	WILL CLAYE (2019)
18.11 M	CHRISTIAN TAYLOR (2017)
18.09 M	KENNY HARRISON (1996)
18.08 M	PEDRO PABLO PICHARDO (2015)

18.06 M PEDRO PABLO PICHARDO (2015)

18.06 M CHRISTIAN TAYLOR (2015)

18.04 M TEDDY TAMGHO (2013)

18.04 M CHRISTIAN TAYLOR (2015) 18.01 M JONATHAN EDWARDS (1995)

18.00 M JONATHAN EDWARDS (1995)

17.99 M JONATHAN EDWARDS (1998)

LONGEST TRIPLE JUMPS (WOMEN)

MARK	ATHLETE (YEAR)
15.50 M	INESSA KRAVETS (1995)
15.39 M	F. MBANGO ETONE (2008)
15.34 M	TATYANA LEBEDEVA (2004)
15.33 M	INESSA KRAVETS (1996)
15.33 M	TATYANA LEBEDEVA (2004)
15.32 M	TATYANA LEBEDEVA (2000)
15.32 M	HRYSOPIYÍ DEVETZÍ (2004)
15.31 M	CATERINE IBARGÜEN (2014)
15.30 M	F. MBANGO ETONE (2004)
15.29 M	YAMILÉ ALDAMA (2003)
15.28 M	YAMILÉ ALDAMA (2004)
15.28 M	YARGELIS SAVIGNE (2007)

15.27 M YAMILÉ ALDAMA (2003)

STEP JUMP

HIGH JUMP







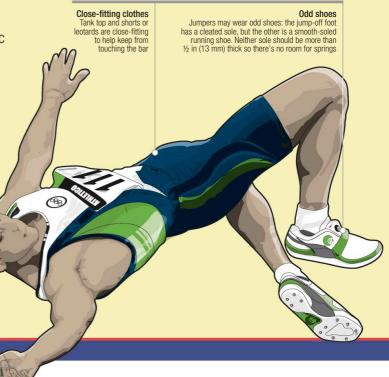
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EVENT OVERVIEW

The high jump is one of the standard track and field events that takes place at all athletic meets. Using only the strength of their bodies, competitors take running jumps to clear a horizontal bar. The high jump is very demanding, both physically and technically, and the progression of the world record shows just how much improvement there has been in the conditioning of athletes and the development of technical innovations.

ATHLETE PROFILE

Both male and female high jumpers are usually above average height. Most men are at least 6 ft 1 in (1.85 m) tall; women are usually over 5 ft 10 in (1.75 m). They nearly all have a lean, slim build but have well-developed quadriceps and calf muscles. Speed, flexibility, and good coordination are also important. Jumpers often work out on the trampoline to accustom themselves to "controlled" falling.



NEED2KNOW

- The high jump has been an Olympic event since the 1896 Olympics in Athens.
- The high jump was revolutionized in the 1960s by the introduction of soft mats that enabled athletes to land on their backs without serious injury.
- Almost all modern jumpers use a technique called the Fosbury Flop, after 1968 Olympic champion Dick Fosbury.

SIDELINES

6 • 4 • • The height, in feet (1.94 m), of Blanka Vlasic, the tallest world-class woman high jumper. Vlasic, the Croatian record holder, won silver at the 2009 World Indoor Championships.

1,312 The height, in feet (400 m), that an adult human would need to jump to emulate the high-jump world record of the common flea.

EQUIPMENT SETUP

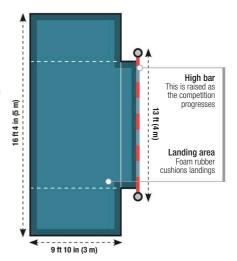
The modern high-jump bar is made of glass-reinforced plastic or aluminum. The bar is approximately 13 ft (4 m) long with a round, triangular, or square cross-section for most of its length and a square resting point at each end. It is placed at a measured height on two uprights. Directly behind the bar is a soft foam mat that provides a safe landing area.

CUSHIONED LANDING

The landing area is normally made of plastic-covered layers of foam rubber, usually at least 3 ft 3 in (1 m) thick. Old-style sandpits are still sometimes used in school and other junior events, making techniques such as the Fosbury Flop impossible.

COMPACT AREA

The high jump takes up less room than most athletic events. The run-up area—made of asphalt, like a running track—allows for approach runs of about 40 ft (12 m) from almost any direction. Right-angled approaches to the bar are rare—most jumpers come in from an acute angle.



THE COMPETITION

High jumping has few rules. Competitors can leap off only one foot and cannot knock the bar off its supports. Touching the bar is fine, as long as it does not fall—and as long as the jumper doesn't use any part of her body to hold it up.

In competitions, athletes choose the height of their opening jump, which is usually relatively low. As the competition goes on, the bar is raised by increments—usually 1 in or 2 in, but ½ in toward the conclusion of the event.

Once a height has been cleared, competitors may not attempt a lower height. They may choose to pass at any height, even if they have tried but failed to clear the bar already, but as soon as they record three consecutive misses, they are out of the competition. The competitor who clears the highest jump is the winner. Ties are decided by the lowest number of failed attempts.

DOING THE FLOP

TRADITIONALISTS WERE AGHAST WHEN US ATHI FTF DICK FOSBURY WON GOLD AT THE 1968 MEXICO OLYMPICS WITH HIS NEW TECHNIQUE. US OLYMPIC COACH PAYTON JORDAN SAID: "KIDS IMITATE CHAMPIONS. IF THEY TRY TO IMITATE FOSBURY. HE WILL WIPE OUT AN ENTIRE GENERATION OF HIGH JUMPERS BECAUSE THEY WILL ALL HAVE BROKEN NECKS.'

STAT ATTACK

MEN'S WORLD RECORD		WOMEN'S WORLD RECORD	
HEIGHT	ATHLETE (YEAR)	HEIGHT	ATHLETE (YEAR)
2.45 M	JAVIER SOTOMAYOR (1993)	2.09 M	STEFKA KOSTADINOVA (1987)
2.42 M	PATRIK SJOBERG (1987)	2.07 M	LYUDMILA ANDONOVA (1984)
2.41 M	IGOR PAKLIN (1985)	2.05 M	TAMARA BYKOVA (1984)
2.40 M	RUDOLF POVARNITSYN (1985)	2.03 M	ULRIKE MEYFARTH (1983)
2.39 M	ZHU JIANHUA (1984)	2.01 M	SARA SIMENONI (1978)
2.36 M	GERD WESSIG (1980)	2.00 M	ROSEMARIE ACKERMANN (1977)
2.35 M	DIETMAR MÖGENBURG (1980)	1.94 M	YORDANKA BLAGOEVA (1972)
2.35 M	JACEK WSZOLA (1980)	1.92 M	ULRIKE MEYFARTH (1972)
2.34 M	VLADIMIR JASHTSHENKO (1978)	1.92 M	ILONA GUSENBAUER (1971)
2.32 M	DWIGHT STONES (1976)	1.91 M	IOLANDA BALAS (1961)
2.29 M	PAT MATZDORF (1971)	1.77 M	CHENG FENG-JUNG (1957)
2.28 M	VALERIY BRUMEL (1963)	1.76 M	IOLANDA BALAS (1957)
2.22 M	JOHN THOMAS (1960)	1.76 M	MILDRED MCDANIEL (1956)

EVOLVING TECHNIQUE

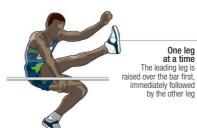
Until the late 1960s, the most popular high-jump techniques were the scissor and the Western roll. Using the scissor method, the jumper approached the bar from an angle and threw first their inside leg and then their outside leg over the bar in a scissoring motion, landing on his or her feet. For the Western roll, the jumper again approached the bar on a diagonal but used the inner leg for the takeoff, while the outer leg was thrust up to lead the body sideways over the bar. The Fosbury Flop, named after American jumper Dick Fosbury who used it to win Olympic gold in 1968, is now almost universal. The last world record breaker not to use Fosbury's method was Vladimir Jashtshenko in 1978.

HIGHER AND HIGHER

Since the end of the 19th century, high jump techniques have evolved rapidly. First sideways, then forward, then eventually backward, jumpers have been hurling themselves ever higher. In less than 100 years (1895-1993), the men's high jump world record rose by nearly 25 percent (see above).

SCISSOR JUMP

The scissor jump was first used by American Michael F. Sweeney, who took the world record in 1895 with a height of 6 ft 5½ in (1.97 m). The scissor was a popular technique until the late 1960s.



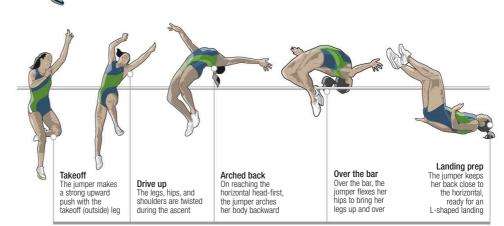
WESTERN ROLL

As they reach the high point of their leaps, jumpers rotate their torsos to cross the bar face down. George Horne used the technique to clear 6 ft 6¾ in (2 m) in 1912



THE "FOSBURY FLOP"

A "flopper" takes a curved running approach, then launches herself off the outside foot, head and shoulders first, into a modified scissor jump with her back arching backward over the bar. By the time the hips pass over the bar. the whole upper body is in descent.



OLE VAULT







066

NEED2KNOW

- > Vaulting with poles was originally a practical method of crossing natural obstacles such as ditches and marshes.
- The first recorded pole vault competition was held in England in 1812.
- → Broad jumping—a closely related sport in which athletes use a pole to gain distance rather than height-is widely practiced but has never become an established event at top-class competitive levels.
- The men's pole vault has been a medal event at every modern Olympics; the first women's competition was held in Sydney in 2000.

EVENT OVERVIEW

The pole vault is a field event for men and women. Competitors sprint along a runway carrying a long, flexible pole that they plant in a box and use to lever themselves over a crossbar suspended several feet (meters) above the ground between two uprights. The height of the crossbar is raised after every round, and athletes are eliminated from the competition if they fail three consecutive jump attempts.

Supportive shoes Close-fitting Sports tops and Vaulters wear running shoes with running shorts should cleated soles for be close-fitting to reduce the dangers of dependable grip on the runway snagging the pole on the run-up and dislodaina the crossbar during the jump

No limits The pole may be any length or diameter, but it must always be round in profile. There is no limit to the pole's flexibility

Fiberglass pole Wood was most popular until the early 20th century, when it was superseded by bamboo; aluminum was preferred between 1945 and the early 1960s, when fiberglass became the norm

ATHLETE PROFILE

Most leading pole vaulters are tall but can be any height. They need speed to build up momentum on the runway; explosive power in the legs for the takeoff; and great strength in the shoulders, arms, and abdomen to lift themselves up into an upsidedown vertical position at the top of the flight phase. Spatial awareness is key to avoiding the crossbar.

EQUIPMENT AND SETUP

The pole vault event requires a runway of 131–147½ ft (40–45 m); a pole box; two uprights with pegs; a crossbar; landing mats; and, of course, an athlete with a very long, flexible pole. Officials are on hand to oversee the contest and adjust the height of the crossbar.

At the end of the runway is a pole box into which the the jump. Wedge-shaped and open at the approach end, the box is 3 ft 3 in (1 m) long. It deepens to 8 in



Adjustable height Pegs, positioned on the supports inside the uprights, allow the crossbar to be raised as the competition progresses. The crossbar is

14 ft 9 in (4.5 m) long Landing mat

Foam rubber no less than 3–5 ft (1–1.5 m) thick

vaulter thrusts one end of the pole to gain leverage for (20 cm) and narrows to 6 in (15 cm)



Starting point

Vaulters sprint down the runway to gain enough speed to propel them into the air

White lines

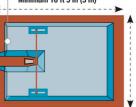
131-147½ ft (40-45 m)

The runway is marked on each edge by a white line. It is not an offense to step over the lines while running

Extra padding

The areas on either side of the pole box are padded in case the athlete falls before completing the jump

Minimum 16 ft 5 in (5 m)

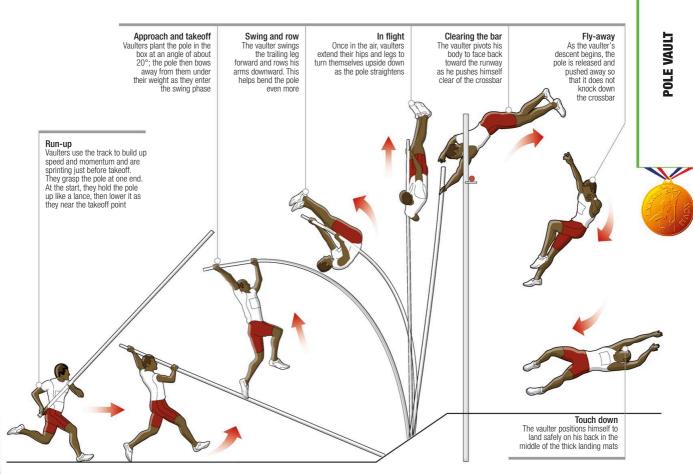


RULES OF THE BAR

An opening bar height and a sequence of incremental heights is decided by an official, and vaulters choose the height at which they wish to enter the competition. Athletes take turns vaulting. If two or more of them have cleared the bar, the height is increased by the agreed distance—typically 2 in (5 cm) or 6 in (15 cm). Vaulters may decline to jump at a certain height and wait to try at a higher one. If at the end of the competition there is a tie, the number of failures is taken into consideration. If two or more vaulters have the same number of misses, there may be a sudden-death jump-off.

LEARNING TO FLY

Pole vault is a series of phases that, performed perfectly, can produce jumps of over 19 ft 8 in (6 m)—although only 16 male pole vaulters have ever achieved this. A higher grip on the pole allows more leverage into the swing phase, while whipping the takeoff leg through to the vertical position keeps energy in the flight phase, giving the vaulter more height over the crossbar. It doesn't matter if the competitor touches the crossbar during the jump, as long as it stays in position and does not fall. Each phase of the vaulting sequence is crucial to executing a successful jump.



STAT ATTACK

MEN'S WORLD RECORD		WOMEN'S WORLD RECORD	
HEIGHT	ATHLETE (YEAR)	HEIGHT	ATHLETE (YEAR)
6.14 M	SERGEY BUBKA (1994)	5.06 M	YELENA ISINBAYEVA (2009)
5.83 M	THIERRY VIGNERON (1983)	5.01 M	YELENA ISINBAYEVA (2005)
5.82 M	PIERRE QUINON (1983)	4.88 M	SVETLANA FEOFANOVA (2004)
5.81 M	VLADIMIR POLYAKOV (1981)	4.87 M	YELENA ISINBAYEVA (2004)
5.80 M	THIERRY VIGNERON (1981)	4.85 M	SVETLANA FEOFANOVA (2004)
5.78 M	WLADYSLAW KOZAKIEWICZ (1980)	4.82 M	YELENA ISINBAYEVA (2003)
5.70 M	DAVE ROBERTS (1976)	4.81 M	STACY DRAGILA (2001)
5.67 M	EARL BELL (1976)	4.60 M	EMMA GEORGE (1999)
5.65 M	DAVE ROBERTS (1975)	4.23 M	SUN CAIYUN (1995)
5.63 M	BOB SEAGREN (1972)	4.22 M	Daniela Bártová (1995)

THE KING OF POLE VAULT

UKRAINIAN SERGEY BUBKA IS INDISPUTABLY THE GREATEST POLE VAULTER OF ALL TIME. HE BROKE 35 WORLD RECORDS DURING HIS CAREER—17 OUTDOOR AND 18 INDOOR—AND WON SIX CONSECUTIVE WORLD CHAMPIONSHIPS BETWEEN 1983 AND 1997. HE WAS THE FIRST MAN TO CLEAR THE ELUSIVE 6 M MARK, A FEAT HE ACHIEVED IN 44 COMPETITIONS. OLYMPIC GOLD MEDALS WERE HARDER TO COME BY, HOWEVER; HE WON ONLY ONE IN THE 1988 OLYMPIC GAMES IN SEOUL.

NEED2KNOW

068

- The discus became an Olympic medal event for women at the 1928 Games.
- The first man to break the 200 ft (60.96 m) mark was American Al Oerter in 1962.
- The first woman to throw the discus over 229½ ft (70 m) was Faina Melnik of Russia in 1976.

TERMS OF PLAY

Throwers have three attempts, which are called trials. They must release the discus within the circle and remain there until it has landed; they may leave only from the back half of the circle. The discus must hit the ground within the marked landing sector for the trial to be valid. The length of the throw is measured from the front of the circle to the point where the discus first lands. Distances are rounded down to the nearest half-inch (or centimeter) below the length of the throw.



PRELIMINARY SWING

The surface of the throwing circle must be smooth but not slippery

The thrower makes two or three swings by rotating the torso. This sets the body into its throwing rhythm and prepares it for the turn.



TURNING CIRCLE

The thrower turns in quick spinning jumps from the back of the circle to the front. This move winds up the momentum for the release.

EQUIPMENT

The discus is plate-shaped. It is made mainly of rubber but also has a metallic or wooden rim and core to make up the required weights. The maximum central thickness is about 1¾ in (44–46 mm). The weight and dimensions shown here are for adult competitions; both may be reduced for junior events.





- - 7 in - - ➤ (18.2 cm)





€ ----- > 8½ in (22 cm)

BRUTE FORCE AND BALLET

The thrower takes up position at the back of the circle. He or she rests the discus in the throwing hand, then makes one and a half quick, powerful turns on the balls of the feet—like uncoiling a spring—to produce the force to release the discus at shoulder level. As the discus is released off the index or middle finger, it spins clockwise (for a right-handed thrower). Discus throwers welcome a headwind because it helps increase the amount of lift, therefore lengthening the throw.



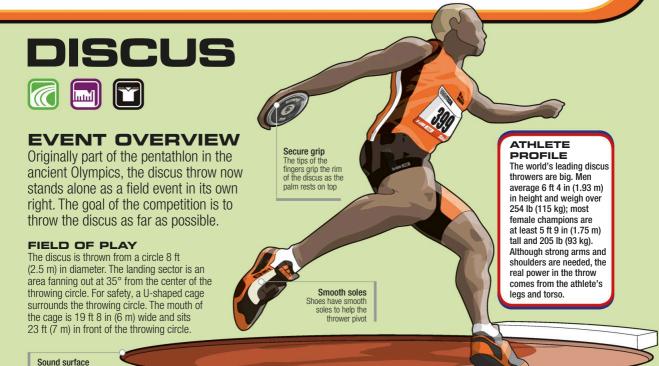
RELEASE

The power in the release comes from an explosion of energy in the body and legs. The discus spins as it is released from the hand.



FOLLOW THROUGH

After releasing the discus, the thrower continues to turn, taking the left leg through almost 360° to avoid overstepping the boundary.



8 ft (2.5 m)



The shot put is a field event for men and women. Athletes compete to see which of them can throw (put) a heavy metal ball (shot) the farthest into the landing sector. Men's shot put has been included in the Olympics since its inception in 1896, and women's since 1948.

NEED2KNOW

- The sport is believed to have originated from the practice of throwing heavy stones.
- Codified in the late 19th century, shot putting was one of the men's events at the first modern Olympics in 1896. Olympic women's shot putting first became a medal event at the 1948 Games in London, England.

GLIDE OR ROTATE?





ATHLETE PROFILE Shot putters are usually tall and

Close contact

Shot putters can use chalk on their necks to improve their grip on the shot

powerfully built: the average male is 6 ft 2 in (1.87 m) tall and weighs 277 lb (125.6 kg); women are over 5 ft 9 in (1.75 m) and 200 lb (90 kg). The rotational style of shot putting allows shorter, lighter athletes to compete at the same level as bigger and heavier ones.

Stop board

This white board arcs around the front of the throwing circle to mark its edge

.. 3

The two main styles of shot put delivery are the glide technique, which is a linear technique, or the rotational technique, which is similar in many respects to the spinning delivery used by discus throwers. In both techniques, explosive power and core strength are essential to gain medal-winning results.

THE O'BRIEN GLIDE

In this method, named after 1950s' US champion Parry O'Brien, the athlete begins on one foot in a crouching position at the back of the circle, getting all their weight behind the shot. He or she then thrusts up and forward to the front of the circle, powerfully launching the shot.

THE BARYSHNIKOV ROTATION

This technique was originated in the 1970s by Soviet athlete Alexsandr Baryshnikov. It borrows heavily from the discus thrower's spin and makes it easier to maximize the launch speed of the put. Controversial at first, the Baryshnikov Rotation is the style most used by shot putters today.



PUSH OFF

The thrower faces away from the direction of throw with the shot tucked between the neck and shoulder.



SPIN

The athlete makes one and a half revolutions across the circle.

HEAVY METAL

1208

The shot is usually made of iron or brass, must have a smooth surface, and must not be modified in any way.

8 ft (2.5 m)

WOMEN 8% lb (4 kg)





16 lb (7.2 kg)

MEN

4–5 in (11–13 cm)

THE CIRCLE

The landing area is a sector that fans out at 35° from the center of the throwing circle; its sides are usually no more than 98 ft 6 in (30 m) long.



THRUST

The final step is timed to coincide with the release of the shot.

SHOT PUT LAW

For each of the three shots, the competitor may touch the inside of but not overstep the stop board at the front of the circle. The length of the shot is measured from the front of the circle to the shot's first landing point and recorded to the nearest half-inch or centimeter below the actual length of the throw.

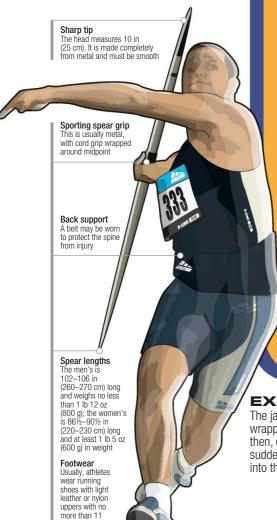
SIDELINES

The number of Olympic medals out of a possible 12 won by American male shot putters in the four Summer Games held between 1948 and 1960.

The number of consecutive shot put competitions won by Parry O'Brien in the 1950s. He also competed in four Olympic games, winning gold in two of them.

NEED2KNOW

- Finns are particularly successful javelin throwers, tallying a total of 23 Olympic medals, nine of them gold.
- Despite its long history, javelin throwing was not originally included at the modern Olympics. It made its debut only at the fourth Games in 1908, when it was a men-only event; women's javelin was introduced in Los Angeles in 1932.
- For safety reasons, the javelin was redesigned (men's in 1986; women's in 1999) to reduce the distance it could travel to around 295 ft (90 m) for men.



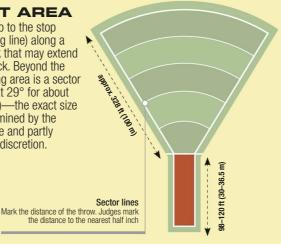
EVENT OVERVIEW

JAVELIN

Javelin throwing is a field event for men and women. Athletes compete to see which of them can throw a spearlike projectile over the greatest distance. Despite its popularity, javelin may be omitted from track meets at smaller venues because of the potential danger to spectators.

TARGET AREA

Athletes run up to the stop board (throwing line) along a synthetic track that may extend across the track. Beyond the line, the landing area is a sector that fans out at 29° for about 328 ft (100 m)—the exact size is partly determined by the space available and partly at the judges' discretion.



PERFECT THROW

Athletes get three throws each unless there are fewer than eight competitors, in which case they throw six times. For the throw to be legal, the javelin must be released before the stop board and come down point-first within the landing sector. Throws are measured from the stop board to the javelin's first contact with the ground and rounded down to the nearest ½ in (1 cm). In the event of a tie, the winner is the athlete with the longest second-best throw.

EXECUTING THE THROW

The javelin must be held over the shoulder and is always gripped by the cord that is wrapped around the fulcrum of the shaft. The athlete accelerates down the runway, then, on entering the last seven strides, prepares to throw. He or she combines a sudden stop with an explosion of power to propel the javelin as far as possible into the landing sector without touching or crossing the stop board.



Strong hips, shoulders, and elbows are key for success, as is speed along the runway. Strength and speed produce the power to throw the javelin long distances.

snikes or cleats

LEG CROSSOVER

Near the end of the run-up, athletes cross their legs in preparation for getting maximum torque on the throw.

DRAW

As the legs untwist, they pull back the throwing arm and push the other arm forward to help with aim and the follow-through.

LAUNCH

Throwers keep the iavelin behind their shoulders for as long as possible before it is released.

RELEASE

The athlete suddenly stops running and thrusts the throwing arm forward to achieve the greatest possible speed of throw.

HAMMER

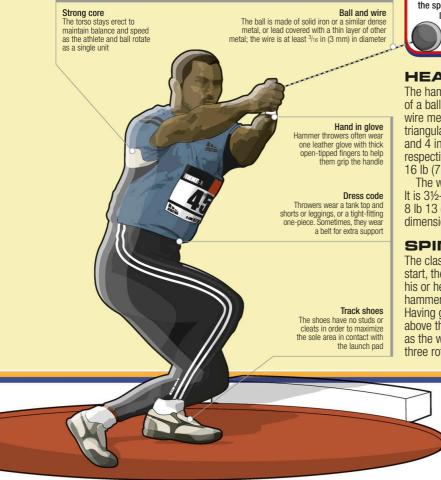






EVENT OVERVIEW

The goal of this track and field event is to throw the hammer as far as possible from a circle into a marked target area. Although the projectile used is known as a hammer, the term is misleading—it is, in fact, a heavy metal ball attached by a wire to a handle.



NEED2KNOW

- The hammer began to take its current form in the late 19th century. The sport became an Olympic medal event for men at the 1900 Games; women followed 100 years later.
- In the Middle Ages in England, villages held blacksmith's hammer throwing competitions. Scotland's Highland Games still feature a version of this traditional sport using a metal ball attached to a wooden handle.

PLAYER PROFILE

Hammer throwers are powerfully built, especially in the arms, shoulders, and torso, which they develop working out with weights and barbells. The outstanding men in the sport weigh about 243 lb (110 kg) on average; the leading women are about 176 lb (79 kg). Throwers need not be tall, but those who are have a natural advantage.

HEAVY HAMMER

The hammer used in men's events is composed of a ball $4^1/_3$ –5 in (11–13 cm) in diameter, a steel wire measuring 4 ft (1.2 m) in length, and a roughly triangular-shaped handle measuring 5 in (13 cm) and 4 in (10 cm) at its widest and longest points, respectively. The maximum combined weight is 16 lb (7.26 kg).

The women's hammer ball is smaller and lighter. It is $3\frac{1}{2}-4^{1}\frac{1}{3}$ in (9.5–11 cm) across and weighs 8 lb 13 oz (4 kg). The wire and handle have similar dimensions to the men's hammer.

SPIN TO WIN

The classic throw consists of four phases. At the start, the athlete takes up a stationary position with his or her back to the landing area, then swings the hammer back and forth in a pendulum movement. Having gained momentum, the hammer is raised above the head and whirled in what is known as the windmill sequence. This lasts for two or three rotations before the hammer is released.

CAGED CIRCLE

The throwing area is a concrete circle with a 7 ft (2.135 m) diameter. In front of the circle, the landing sector fans out at 40° and has sides 262–328 ft (80–100 m) long. The exact dimensions of the sector are determined by the space available.

HAPPY HAMMERING

7 ft (2.13 m)

In most competitions, competitors have three attempts at throwing the hammer, each of which must be completed within 90 seconds of entering the throwing circle. In larger events, there may then be a second round from which all but the eight best performers are eliminated. The finalists get another three throws each. If two or more athletes tie, the winner is the one with the second-longest throw. For a throw to be valid, the competitor must stay within the throwing circle until the hammer has landed in the landing sector. Top male competitors throw the hammer about 276 ft (85 m); women throw the hammer around 244 ft (75 m).

HAMMER CAGE

For safety reasons, the cage is made of netting capable of stopping a hammer traveling at speed.

Cage

Surrounds throwing area on three sides

Circle

Area from which the hammer is thrown















DECATHLON AND HEPTATHLON

EVENT OVERVIEW

Often seen as the jacks of all trades of athletics, decathletes and heptathletes specialize in being great all-around athletes. Their sports comprise 10 (decathlon) or seven (heptathlon) track and field disciplines that are contested over two consecutive days. Men compete in decathlon, while women compete in heptathlon. The competitions are a test of endurance and concentration to last the distance, as well as speed, strength, and skill to win the individual events. Decathlon has appeared in the summer Olympic Games since 1912 and heptathlon since 1984.

NEED2KNOW

- Decathlon consists of 10 track and field events; heptathlon of seven. Male athletes contest decathlon, while female athletes contest heptathlon.
- Both events have developed from the ancient Greek pentathlon, which featured in the ancient Olympics from around 700 BCE.
- The sequence of events in decathlon has remained unchanged since 1914.

SIDELINES

The number of years Jackie
Joyner-Kersee held the world heptathlon
record of 7,291 points (1988–2019). It is
the longest standing heptathlon record,
and she is the heptathlete who has gained
7,000 points most often.

9,026
The record number of points scored in a decathlon competition. Czech athlete Roman Sebrle attained this feat in 2001, when he became the first athlete to score more than 9,000 points at Gotzis in Austria.

The age of athlete Bob Mathias when he won Olympic gold in the decathlon at the 1948 Games in London. Despite never having competed in the event prior to 1948, he still holds the record as the youngest Olympic champion in the discipline.

DECATHLON DISCIPLINES 100 M LONG JUMP SHOT PUT HIGH JUMP 400 M 110 M HURDLES DISCUS THROW POLE VAULT JAVELIN THROW 1.500 M RUN

HEPTATHLON DISCIPLINES 200 M LONG JUMP SHOT PUT HIGH JUMP 100 M HURDLES JAVELIN 800 M

DECATHLON

This two-day competition comprises 10 disciplines: 100 m, long jump, shot put, high jump, and 400 m on day one and 110 m hurdles, discus throw, pole vault, javelin throw, and 1,500 m on day two. Competitors' speed and strength are challenged in the first day's events, while the second day tests their endurance and technical skills.

Athletes must compete in all disciplines in order to be included in the final classification.

HEPTATHLON

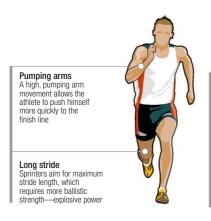
The women's seven-discipline competition comprises 100 m hurdles, high jump, shot put, and 200 m on the first day and long jump, javelin throw, and 800 m on the second day. Originally, female athletes competed in the five-discipline pentathlon, but the javelin throw and 800 m race were added in 1981 after the 1980 Olympics in Moscow to create the modern event.

COMPETITOR PROFILE

Decathletes and heptathletes need to be great all-arounders. This not only requires speed and mobility, but also strength and explosive power. They tend to have lean, athletic physiques rather than the specific adaptations developed by specialists.

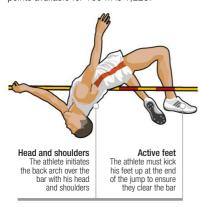
DOUBLE DALEY

REGARDED AS ONE OF THE WORLD'S BEST-EVER ALL-AROUND ATHLETES, DALEY THOMPSON HOLDS THE RECORD AS THE FIRST PERSON TO WIN OLYMPIC GOLD FOR DECATHLON TWICE, FIRST IN 1980 AND AGAIN IN 1984. HE RETIRED FROM COMPETITION IN 1992, DUE TO INJURY, BUT THAT WAS NOT THE END OF THOMPSON'S CAREER. IN THE 1990s, HE BECAME A PROFESSIONAL SOCCER PLAYER, PLAYING FOR MANSFIELD TOWN, THEN A FITNESS COACH.



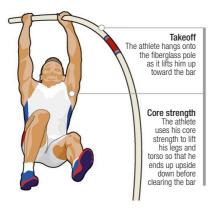
SPRINTS

Decathletes and heptathletes compete over different sprint distances. The men have two sprint events, the 100 m and 400 m, while the women race only over 200 m. The maximum points available for 100 m is 1,223.



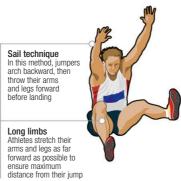
HIGH JUMP

This vertical jump appears on the first day of both the decathlon and heptathlon competitions. The decathletes are chasing a maximum score of 1,392 points, while the women are competing for 1,498 points.



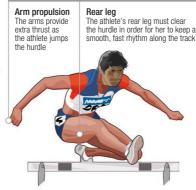
POLE VAULT

The second event competed only by decathletes, the pole vault appears on the second day of the competition. Athletes aim to jump heights of 6.49 m in order to be awarded the maximum score of 1,396 points.



LONG JUMP

The second event for men and the fifth for women, the long jump relies on speed in the run-up, good flight through the air, and a forward landing to attain the greatest distance in the pit.



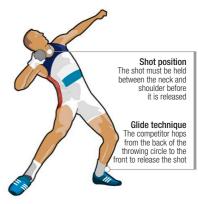
HURDLES

Raced on the first day over 110 m in the men's decathlon and 100 m in the women's heptathlon, the hurdles race carries a maximum score of 1,223 points for men and 1,361 for women.



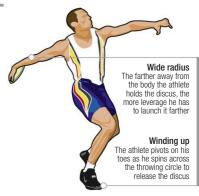
JAVELIN THROW

The final throwing event, the javelin throw features in both men's and women's combined events. Throws of 102.85 m for men and 82.63 m for women will win the competitors maximum points.



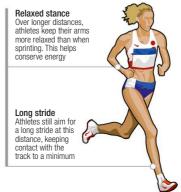
SHOT PUT

Athletes have three trials each to score the maximum points available: 1,350 for a 23.99 m put for men and 1,500 for a 24.40 m throw for women. The shots used are the same as those for the individual competition.



DISCUS THROW

The second of the throwing events is contested only in the decathlon competition. There is a maximum of 1,500 points available, but athletes must throw 79.41 m to be awarded them.



MIDDLE DISTANCE

The last event of both competitions is the 800 m for women and 1,500 m for men. Final race positions matter less than who beats whom for the last available points—a maximum of 1,250 for both heptathletes and decathletes.



EVENT OVERVIEW

Race walking bears little relation to what most people know as "ordinary" walking. Athletes look more as if they are trying to stop themselves from running. The technique—requiring short, rapid steps—is difficult to master. Races are a test of the walker's concentration and endurance.

COURSES

Most walking races are held on roads. There are judges along the course to ensure that competitors walk in accordance with the rules. Often, walkers do several laps of a circuit so that officials get the chance to observe them several times during the race.

RACE RULES

One foot must be in contact with the ground at all times, and the supporting leg must be straight, not bent at the knee, from the moment the foot touches the ground until the supporting leg passes below the body. Walkers are penalized for illegal techniques, such as "lifting"having both feet off the ground. Officials report offenses to three judges, who may show the offender a yellow warning paddle; further violations lead to a red paddle, and three red paddles mean disqualification.

NEED2KNOW

- World-class race walkers can cover 1 mile (1.6 km) in under six minutes—a speed of about 10 mph (16 kph).
- → At major race-walking events, men compete over two distances—
 50 km and 20 km—while women walk 20 km only.
- A race-walking World Cup is held biannually in evennumbered years.

SO NEAR AND YET...

AT THE 2000 SYDNEY
OLYMPICS, AUSTRALIAN
JANE SAVILLE WAS
DISQUALIFIED FOR LIFTING
JUST 492 YD (150 M) FROM
THE FINISH AS SHE LED THE
20 KM RACE. SHE WAS ONE
OF FIVE ATHLETES DISQUALIFIED
IN THE RACE.

REGULATED WALKING

Race walking is much more demanding than regular walking. Enthusiasts claim that it is even harder than running—it takes a greater toll on the body because the action is less efficient. Walkers swivel and tilt their hips to lengthen their strides and get up as high as possible on the toes of the trailing foot before placing the heel of the leading foot on the ground.



Front foot
Toes raised at about
45° so that heel hits
the ground first



Quick step Trailing leg is raised but knee kept low for speed



Short stride Small, quick steps are efficient



Bent knee
The knee is
bent once the
leg is past
vertical position

CALM ON TOP

The torso is relaxed and upright for balance; the work is done by the arms and lens

ONE AT A TIME

The lead foot must be grounded before the back foot is lifted: both feet off the ground is running.

WEIGHT AHEAD

In the middle of each stride, the upper body rocks forward over the front leg.

SWING ALONG

Walkers must swing the arms vigorously to propel themselves forward.







RACE WALKING

ORIENTEERING

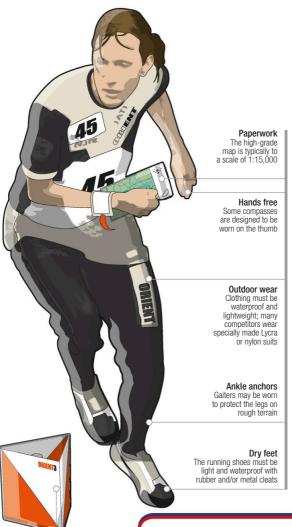






EVENT OVERVIEW

Orienteering is a cross-country race in which participants use a map and compass to navigate between checkpoints, or controls, on an unfamiliar route. The winner is the first individual or team to reach the finish or, in timed events, whoever has reached the greatest number of checkpoints at the end of an allotted period.



Course markers

Brightly colored

indicators are located at all

control points

ELEMENT OF SURPRISE

Competitors must not preplan a route. They are given a map of the course only when they arrive at a rallying point, which is usually some distance from the starting line. They may all start at the same time or at intervals of one or two minutes.

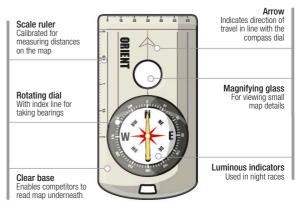
STAYING ON COURSE

Certain points are marked on an orienteering map but not the course between them. A triangle marks the start and a double circle marks the finish. Single circles show the control points that competitors must visit. These are marked by red and white or orange and white flags.

Sprint orienteering may take place in city parks and other urban settings. In events held at night, control markers should have cat's eyes or other reflective surfaces and competitors may wear flashlights on their heads to help them see.

EQUIPMENT

A map and a compass are essential equipment. Competitors normally sign in at control points, but electronic log-in devices called dibbers are sometimes worn on the fingers. At night, racers carry a whistle to attract attention in emergencies.



LAY OF THE LAND

A straight line is the shortest distance between two points, but it is not necessarily the quickest route. Race organizers often ensure that there are obstacles, such as gulleys and streams, between control points that runners must circumnavigate. Orienteers read the map to assess the landscape and choose a course between points. They use their compass to establish their position and the right direction, perhaps by taking bearings from easily identifiable landmarks.

COMPETITOR PROFILE

Successful orienteers have the stamina and speed of long-distance runners. They need to be able to read a map and compass while on the move and be expert navigators. Orienteers must be ready to use their initiative when confronted with a range of terrains that could include steep, rocky ground or marshes, as well as roads and tracks.

NEED2KNOW

- At the annual world championships, there are four timed events: long (90–100 mins for men; 70–80 mins for women); middle (30–35 mins); and relay (10–12 mins).
- Most contests are on foot, but some involve the use of mountain bikes or skis.

RACE FORMAT

Most professional triathletes compete in Olympic or Ironman races. The Olympic event consists of a 1,640 yd (1,500 m) swim, a 25 mile (40 km) cycle, and a 6¼ mile (10 km) run. The Ironman is the ultimate test of endurance. The race consists of a 2½ mile (3.8 km) swim, a 112 mile (180 km) cycle, and ends with a full marathon (26¼ miles or 42.2 km).

SWIM

The swim takes place in a lake, river, or the ocean. Swimmers may set off in a large bunch or smaller groups a few seconds apart. Any stroke can be used, but the crawl is the most popular. Wetsuits are required in cold water.

RUN

The run may be a road race or cross country, and the course may be relatively flat or up and down a hilly terrain. Regular aid stations provide water and energy drinks to sustain the athletes.

Swimming cap

This is worn mainly for identification, but in very cold water, an athlete may wear a neoprene cap and body suit to reduce heat loss

BIKE

The cycling phase is a road race that starts and finishes at the transition area. In Olympic races, the pros may cycle in a group and draft in the slipstream of riders ahead. In Ironman events, triathletes must cycle alone.

TRANSITIONS

To keep transitions smooth and efficient, competitors check out the transition area before the race and practice removing wetsuits while running and mounting the bike with cycle shoes attached to the pedals.

Carbon cycle

Pro triathletes use aerodynamic time trial bikes with strong, ultra lightweight carbon fiber frames

ATHLETE PROFILE

Stamina, speed, physical and mental strength, technical ability, and the ability to switch effortlessly from one discipline to the next are all vital. Training typically takes up to around 30 hours a week for a professional Ironman triathlete. Pros usually hit peak performances in their late 20s and early 30s.



One-piece suit
Athletes can wear a
one-piece suit or a
short top and shorts.
This outfit can be
worn for all three
disciplines, thus
eliminating the
need to change

Timing tags
An electronic chip
attached to the
ankle enables the
accurate timing of
all triathletes

RULES OF THE RACE

RACE REFEREES HAND OUT TIME PENALTIES FOR MINOR OFFENSES, SUCH AS CYCLING IN THE TRANSITION ZONE. DISQUALIFICATION RESULTS FROM SERIOUS OFFENSES, SUCH AS RECEIVING OUTSIDE ASSISTANCE.

NEED2KNOW

- The International Triathlon Union (ITU) organizes a series of world championship events annually.
- The triathlon was first introduced to Olympic competition at Sydney in 2000; there are both men's and women's events.
- The London Triathlon is the world's biggest event, with more than 8,000 triathletes swimming, cycling, and running the course in Docklands in east London.
- The World Triathlon Corporation organizes the Ironman Triathlon World Championship. Ironman events in countries around the world offer qualification slots for the big race—Ironman Hawaii.







TRIATHLON

EVENT OVERVIEW

The triathlon is an endurance event that combines three sports in one race—swimming, followed by cycling and then running. A triathlon is timed from the start of the swim to the end of the run, and the competitors seamlessly switch from one sport to the next in transition zones. Smooth transitions reduce race times, so triathletes often treat the two transitions as a fourth discipline. The standard distance for international triathletes is the Olympic triathlon, but formats vary from short sprints to long-distance Ironman events. Held annually since 1978, Ironman Hawaii is the most prestigious event in the triathlon calendar.

Modern pentathlon is a combination of five events in a day: shooting, fencing, swimming, riding, and running. The sport was the brainchild of Pierre de Coubertin, the founder of the modern Olympics, who believed it to be a measure of the "complete athlete." Men and women are awarded points for their performances in each of the first four events. The points then translate into a time advantage on the run. The overall winner is therefore the first to cross the finish line on the run.

MODERN ENTATHLON





POINTS FOR PRIZES

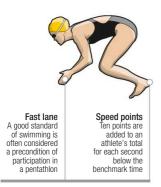
Generally, the rules governing each event are the same as when they are competed as individual sports. In the show jumping contest, however, the pentathletes draw lots for their horse and have only 20 minutes and up to five trial jumps to get to know their animal. Furthermore, there is a staggered start for the cross-country run.

ATHLETE PROFILE

Contestants need a wide range of skills. Older competitors tend to do better in the more technical events of shooting, fencing, and riding. Younger athletes generally excel in swimming and running. Top pentathletes are usually more than 28 years old.

SWIMMING

The swimming competition takes place in a standard Olympic pool. Pentathletes race against the clock—not each other—in a 200 m freestyle race. For men, a time of 2 minutes 30 seconds translates into 1,000 competition points, and the equivalent time for women is 2 minutes 40 seconds.



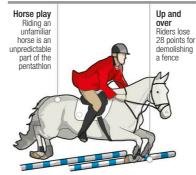
SHOOTING

The shooting takes place on a 33 ft (10 m) range. Contestants fire 20 shots with a 4.5 mm air pistol at a target that is 6 in (15.5 cm) in diameter with nine rings and a center circle, which counts the highest. Points are awarded according to how near to the target's center the contestant's 20 shots hit.



RIDING

The show jumping course is between 383-437 yd (350-400 m) long, with obstacles up to 4 ft (1.2 m) in height. Contestants have 20 minutes to get used to their horse before jumping a 12-obstacle course within a specific time limit. Starting with 1,200 points, riders lose points for faults and slow times.

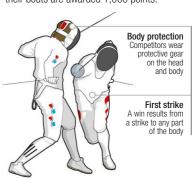


NEED2KNOW

- The lineup of events in the modern pentathlon is based on the romantic vision of the skills needed by a cavalry officer operating behind enemy lines.
- Athletes with a military background have traditionally dominated the sport.
- Women pentathletes competed in the Olympics for the first time at the 2000 Sydney Games.

FENCING

The fencing competition is held on a standard piste. Competitors fence each other in turn, and bouts last for one minute. The first to land a hit with his or her épée wins the bout. If neither fencer strikes a winning blow, they both lose. Athletes who win 70 percent of their bouts are awarded 1,000 points.



RUNNING

The run takes place on a 3,280 yd (3,000 m) cross-country course or a road track. The maximum climb of the course is 164 ft (50 m). The overall leader after the previous event—the riding—starts first, with the others behind in order of their placing. The winner of the running becomes the overall winner.



GYMNASTICS

GYMNASTICS

Annaratus

scoreboard

in that event

the marks for the

current competitor

This scoreboard gives









SPORT OVERVIEW

Gymnastics is a multidiscipline sport in which men and women compete as individuals or in teams. Individuals can compete in single disciplines or as all-arounders. The sport is split into three main sections: artistic gymnastics, rhythmic gymnastics, and trampoline. Rhythmic gymnastics is a discipline for women only. Men's artistic gymnastics consists of six disciplines: floor exercise, pommel horse, rings, vault, parallel bars, and horizontal bar. Women's artistic gymnastics consists of four disciplines: vault, uneven bars, balance beam, and floor exercise.

ON BALANCE

Floor exercises

The area for floor exercises and

acrobatic gymnastics measures 39 ft 4 in x 39 ft 4 in (12 x 12 m). Rhythmic

gymnasts use a slightly larger area

SOVIET GYMNAST OLGA KORBUT SHOT TO FAME AT THE 1972 MUNICH OLYMPICS, BRINGING HER SPORT WITH HER. SHE WAS THE FIRST PERSON TO PERFORM A BACKWARD SOMERSAULT ON A BALANCE BEAM, AND HER EXPLOSIVE. TECHNICAL STYLE REVOLUTIONIZED THE SPORT.

CODE OF POINTS

The official scoring system (the "code of points") was overhauled in 2006 following accusations of inconsistent judging at the 2004 Olympics. However, critics claim the new code rewards technical difficulty at the expense of artistry, and the coveted "perfect 10" is now impossible to attain.

Raised platform

placed on a raised platform. Only competing gymnasts are permitted on the podium during competitions

Pommel horse

Both the surface of the horse and the surface of the pommels must allow the gymnast to glide over them but must not be slippery

The 7 ft 101/2 in (2.4 m) long horizontal high bar is erected 9 ft 2 in (2.8 m) above the floor

uneven bars are placed 63 in (160 cm) apart and have a height difference of 31 in (80 cm

The apparatus and floor mats are all

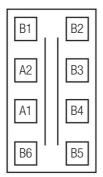
Horizontal bar

Uneven bars

Featured in women's artistic gymnastics, the

JUDGE AND JURY

Top-level gymnastics competitions are presided over by an apparatus jury. The jury is divided into an A-jury and a B-jury. The A-jury consists of two judges and the B-jury is made up of six judges. Some disciplines require other officials—such as line judges, for example, for the floor exercises. The A-judges sit in front of the apparatus, where they have a clear view of the gymnast's performance. The B-judges are positioned clockwise around the apparatus from the left of the A-jury.



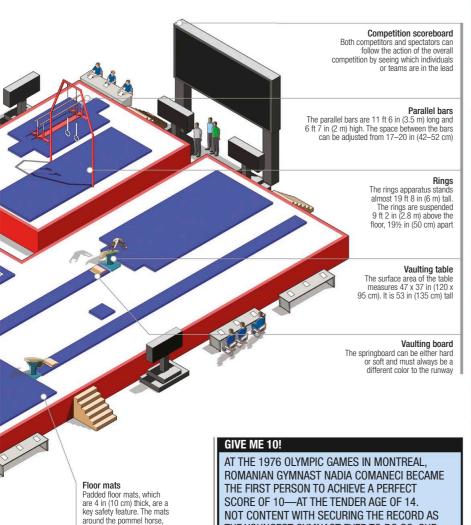
Vault runway Competitors accelerate along the 82 ft (25 m) vault runway, which is 39 in (1 m) wide

COMPETITOR PROFILE

Male and female gymnasts come in a variety of shapes and sizes, depending on their area or areas of expertise. The men's rings event, for example, requires extraordinary upper-body strength, while women's rhythmic gymnastics relies on flexibility and precise muscle control. Common attributes of all gymnasts are their incredible balance and power—especially remarkable considering the diminutive stature of many top-level competitors.

THE GYMNASTICS ARENA

The gymnastics competition arena, also known as the podium, is arranged to allow different competitions to run at the same time. For example, the men's bars events can run at the same time as the women's balance beam, as they occupy opposite ends of the arena. At large events, the competitions may be staged on different days, as was the case at the 2004 Olympics in Athens (where the rhythmic aymnastics competition was run in a different venue entirely).



INSIDE STORY

uneven bars, horizontal bar, and rings are 8 in (20 cm)

for additional protection

Both as a method of keeping fit and as a form of competition, gymnastics has a long history. The ancient Greeks used to perform the exercises naked. However, the use of clothing and special equipment for each event dates from the 18th century, when Germans developed gymnastics in military training. It soon caught on among civilians, too, and spread to other countries.

THE YOUNGEST GYMNAST EVER TO DO SO, SHE

WENT ON TO WIN FIVE OLYMPIC GOLD MEDALS.

GYMNASTICS GOVERNING BODY

A European gymnastics federation was founded in 1881; it became the Fédération Internationale de Gymnastique (FIG) in 1921, when non-European countries were admitted. Gymnastics competitions were featured at the first modern Olympic Games in 1896, and women first competed in 1928.

STAT CENTRAL

MOST OLYMPIC MEDALS INDIVIDUAL ALL-AROUND MEN NUMBER COUNTRY **SOVIET UNION** 15 JAPAN 15 8 **FRANCE SWITZERLAND** 6 ITALY

MEN'S TEAM COMPETITION	
COUNTRY	NUMBER
JAPAN	13
SOVIET UNION	9
CHINA	7
UNITED STATES	7
FINLAND	6

INDIVIDUAL ALL-AROUND WOMEN	
COUNTRY NUMBER	
SOVIET UNION	18
ROMANIA	11
UNITED STATES	8
RUSSIA	4
CZECHOSLOVAKIA	2

WOMEN'S TEAM COMPETITION	
COUNTRY NUMBER	
ROMANIA	12
SOVIET UNION	9
UNITED STATES	9
CZECHOSLOVAKIA	6
HUNGARY	5

GROUP RHYTHMIC GYMNASTICS	
COUNTRY	NUMBER
RUSSIA	5
BELARUS	3
BULGARIA	2
ITALY	2
CHINA	1

INDIVIDUAL RHYTHMIC GYMNASTICS	
COUNTRY	NUMBER
RUSSIA	7
UKRAINE	4
EUN	2
URS	2
BELARUS	2

NEED2KNOW

- of all the disciplines in artistic gymnastics, the floor exercises are considered to offer the best opportunity for the gymnast's personal expression and individuality, particularly in the women's event, where dance skills are a core element.
- Gymnastics has been part of the Olympics since 1896. Floor exercises first appeared in the men's competition in 1936 and in the women's competition in 1952.
- Some national teams hire choreographers as well as coaches to help gymnasts with their routines.

THE FLOOR

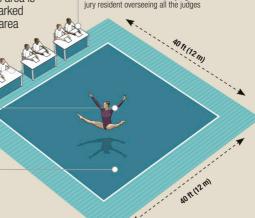
Gymnasts perform floor exercises on a square floor mat measuring 40 x 40 ft (12 x 12 m). This area is surrounded on all four sides by a clearly marked boundary line. On most floors, the padded area extends for at least 3 ft 3 in (1 m) beyond the perimeter markings to help prevent injuries. Point penalties are incurred if the gymnast steps or falls outside the boundary line.

The focus of attention

The gymnast performs a solo routine full of tumbling runs, turns, and rolls that he or she has choreographed

Soft and bouncy surface

The mat is made of foam rubber; beneath it is a layer of plywood, which makes the surface bouncy. The gymnast uses the "spring" to gain height and/or speed to his or her tumbling runs



Panel of judges

Six judges mark the execution of the routine

There are also two technique judges and one

V-SIT POSITION
This gymnast is performing

FLOOR EXERCISES





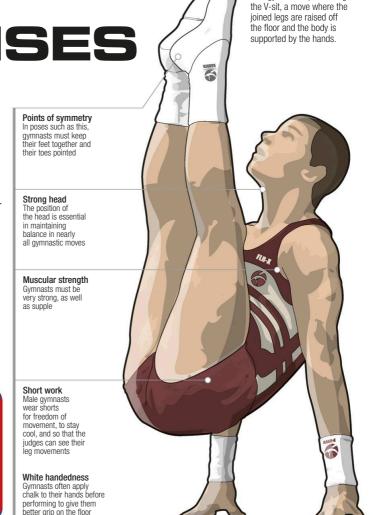


EVENT OVERVIEW

Floor exercise makes up one of the four disciplines in women's artistic gymnastics and one of the six disciplines in men's artistic gymnastics. They are among the most popular gymnastics events, giving spectators an action-packed display of skill and strength. Individual competitors perform choreographed routines on a square floor mat and are scored for both their acrobatic accomplishment and their artistic inventiveness. Competitors are expected to use the whole area of the mat during their routines, and tumbling runs are often performed from one corner of the floor to the opposite corner.

MEN VERSUS WOMEN

The men's and women's routines are broadly similar but differ in some important details. Women are expected to demonstrate tumbles, jumps, turns, and dance movements. Men are also expected to show tumbling and jumping skills, but in male competitions, there is greater emphasis on strength. In order to display their physical power, male routines normally include presses such as the V-sit position, where the gymnast takes and holds his whole weight on his hands (see right).



TAKING THE FLOOR

Women gymnasts perform floor exercise routines for a maximum of 90 seconds to musical accompaniment. (The music must be instrumental only.) Male gymnasts' routines can last for a maximum of 70 seconds and are performed without music. Gymnasts must use the whole floor mat but are penalized for stepping over the boundary marking. Three or four tumbling runs must be performed in the routine, and competitors have to show both acrobatic and dance skills.

SCORING

Floor exercise routines are scored out of 10; obtaining the "perfect 10" is rare. There are two groups of judges: one group scores a routine on its difficulty and the other awards marks for the proficiency of its execution. Each floor exercise routine must feature certain required elements (such as the reverse salto, or backward somersault) and is assigned a start value. This varies but is generally about 9.4. Every acrobatic and dance element carries a set value, ranging from A (the easiest) to G. Bonus points may be awarded to competitors who successfully perform all the required elements at whatever level. However, any slight loss of balance or incorrect body line spotted by the judges will lose marks.

SIDELINES

The highest number of successive Olympic gold medals in the floor exercise. The winner was Larisa Latynina in 1956, 1960, and 1964.

The length in years of the ban received in 2002 by Romanian Olympic double gold medalist Lavinia Milosovici for posing topless in a Japanese fashion magazine.

The number of Olympic medals (seven gold, five silver, three bronze) won by Russian gymnast Nikolay Andrianov. Floor exercise brought him two of his golds (at Munich in 1972 and Montreal in 1976) and a bronze in 1980 in Moscow. He held the men's record for most Olympic medals until 2008, when Michael Phelps increased his tally to 22.

WAYS TO GLOW

A high-scoring floor routine will feature dazzling acrobatic skills, particularly in the tumbling, which includes dynamic combinations of turns, leaps, springs, and somersaults all linked together in a fluid sequence. Acrobatics must be combined with expressive dance movements. The required elements of floor exercises include a turn of 560°, front and back tumbling, and a double salto (somersault). Female gymnasts can end their tumbles in lunge position (with one foot in front of the other); male gymnasts must land in the stuck position (both feet firmly together).



In this move, the gymnast starts from a standing position and leaps backward onto her hands and then springs off her hands to land upright again. This move is sometimes known as a flic-flac or a flip-flop and is often seen in tumbling routines



The gymnast aims to do the splits in midair, with both legs parallel to the floor; extra points are awarded if the arms are also parallel. The landing should be delicate and seque seamlessly into the next part of the routine.

COSMOPOLITAN RED STAR

SOVIET GYMNAST NELLIE KIM. FLOOR EXERCISE GOLD MEDALIST AT THE 1976 OLYMPICS, WAS USUALLY DESCRIBED IN THE WEST AS "RUSSIAN." IN FACT, SHE WAS HALF KOREAN AND HALF TATAR, BORN IN TAJIKISTAN AND TRAINED IN KAZAKHSTAN.



HOLD THAT POSE!

While the main object of any floor exercise is a fluent and aesthetically pleasing sequence of moves, there should be moments when the gymnasts strike poses. Even though these last for only an instant, they are scored according to the beauty of their execution.

the landing

REVERSE DOUBLE SALTO Stuck landing A double salto (double somersault) is one of the required elements Sharper angle At the apex of the second flip, the The gymnas in the floor exercises. This gymnast is performing her salto in the gymnast brings her legs up completes the pike position, with the legs held close to the torso. move by standing tight to her trunk stock still (no steps allowed) and raising both hands above Launch and descent Right angle her head The gymnast stands on As she starts the return to the upright her toes and stretches her arms above her position, her legs head then performs are at 90° to her the first backflip Higher aim Final approach Tuck up The hands come As she launches Hands down Hands clasped behind the knees. into the first back As she flips down to the outside of somersault the again the gymnast brings gymnast goes the gymnast the thighs in brings her body preparation for for maximum her arms down

narallel

around again

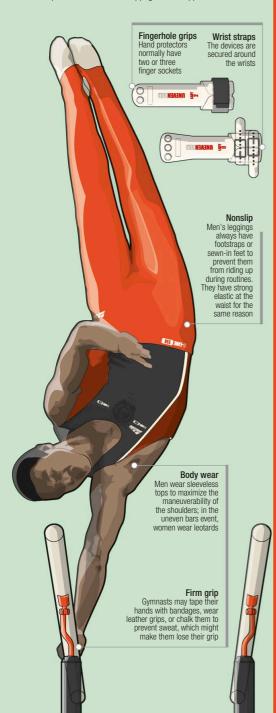
elevation

NEED2KNOW

- After many years of Eastern European domination, modern Olympic bar champions are just as likely to come from the West. At the 2004 Games, Émilie Lepennec of France took gold in the uneven bars, and Italy's Igor Cassina won the horizontal bar event.
- The outstanding nation at the 2011 World Artistic Gymnastics Championships was China.

HAND GRIPS

The latest alternative to bandages, these grips are strapped to the wrists. The upper sections are made of leather, which flexes into the palms of the gymnasts hands and up through the top of their fingers. This prevents blisters and slippage on the apparatus.



BAR VENTS







EVENT OVERVIEW

The three bar disciplines—uneven bars, parallel bars, and horizontal bar—require different skills, but all place huge physical demands on gymnasts' ability to move seamlessly and gracefully while at times supporting their swinging bodyweight with only one arm. The uneven bars are exclusively for women. and only men compete on the horizontal and parallel bars.

RAISING THE BAR

In all three events, the height of the bar or bars is measured from the ground rather than from the surface of the rubber mat, which may be up to 7\square\sin (20 cm) thick to ensure soft landings and provide a cushion in case of a fall.

The uprights may

be adjustable so

that the height

can be altered

PARALLEL BARS

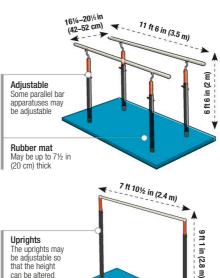
The parallel bars are made of laminated wood or plastic or a combination of both; they should be hygroscopic (absorb moisture) so that they do not become slippery. The uprights may be made of any weight-bearing material but are normally iron or steel. The height and width are adjustable for junior events.

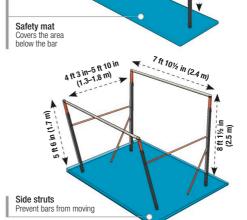
HORIZONTAL BAR

The apparatus is made of high-tensile steel and mounted on floor plates to displace the force of the gymnasts' movement. It may also be held upright by four tension cables anchored to the floor. The two uprights are usually of equal thickness. The bar is 1 in (2.4 cm) in diameter. It may be any color.

UNEVEN BARS

The uneven or asymmetric bars are made of wood, plastic, or composite materials. Whatever their composition, they should be absorbent and must not be treated with lacquer or polish that would make them slippery. The frame is of metal or steel. The uprights may be secured with floor-mounted auvs.





SWINGOMETRY

High-bar routines involve various held positions linked by spectacular swings and turns. Horizontal bar exercises feature at least 11 skills, including giant swings with a variety of holds and turns and releases and regrasps.

On the uneven bars, gymnasts must show skills from five element groups, including a release and regrasp and transition moves where they pass from bar to bar. Gymnasts are expected to swing "fluidly" and to "hold" their handstands.

HORIZONTAL BAR

Gymnasts must not touch the bar with their bodies. Routines should include forward and backward swinas usina continuous movement-over and under the bar—with multiple changes of grip. The bar should be frequently released and regrasped throughout.



UNEVEN BARS

After a few preliminary swings to build up momentum, gymnasts perform sequences of movements in both directions above and below the bars. All routines should feature twists and somersaults that can be executed only with alterations of grip. Flight movements between the bars should be as high and as spectacular as possible.



PARALLEL BARS

On this equipment, aymnasts must combine swinging movements with held positions that display their strength. They must use the whole length of the bars and move above and below them. Bonus points can be gained by performing somersaults and other particularly difficult moves.



PEOPLE POWER

WHEN ALEXEI NEMOV OF RUSSIA SCORED A MODEST 9.725 ON A HORIZONTAL BAR ROUTINE AT THE 2004 OLYMPICS IN ATHENS. THE CROWD ERUPTED IN NOISY PROTESTS. FORCING THE JUDGES TO RECONFER. EVENTUALLY, THEY UPPED THE POINTS TO 9.762, BUT THE UPROAR CONTINUED, AND IT TOOK APPEALS FOR CALM FROM NEMOV HIMSELF BEFORE THE EVENT COULD PROCEED.

TAKING PART IN EVENTS

Bar routines are a compulsory part of artistic gymnastic competitions and in international events are performed in a particular order. Men must compete in both the parallel bars and horizontal bar events, following a floor routine, pommel horse, rings, and vault. For women, the bar routine is part of a four-discipline competition that follows the order of: vault, uneven bars, balance beam, and floor exercise. Gymnasts compete both as team members and as individuals.

A MOVE TOO RADICAL

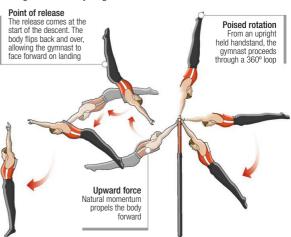
AT THE 1972 OLYMPICS, SOVIET STAR OLGA KORBUT WOWED THE JUDGES BY STANDING ON THE HIGHER UNEVEN BAR, DOING A BACKFLIP, AND CATCHING THE BAR AGAIN. THE SPORT'S WORLD GOVERNING BODY DECIDED THAT THE MOVE WAS TOO DIFFICULT FOR MERE MORTALS AND PROMPTLY OUTLAWED IT.

DISMOUNT WITH FLOURISH

When gymnasts come to the end of a horizontal bar routine, they often dismount with an aerial flourish that involves spectacular flips or twists during the final descent to the mat. Dismounts from the parallel and uneven bars necessarily have less chance of being spectacular because they are from lower heights. But, no matter which apparatus, it still takes immense skill to achieve the "stuck" landing on both feet and with no steps to maintain balance.

SWINGOMETRY

On all bar events, judges award points in four categories; difficulty. form, technique, and composition. They deduct points for execution errors, poor body shape, falls, pauses, and "empty" swings that break the sequence of an exercise. The dismount is often crucial. A good one can turn a competent performance into a medal winner; a stumble on landing can ruin everything.



SIDELINES

The height, in feet (1.65 m), of Russian Svetlana Khorkina, who was told that she was too tall to make it as a gymnast.

The number of moves in the official Code of Points named after Svetlana Khorkina. uneven bars gold medal winner at the 1996 and 2000 Olympics. No other gymnast has ever had so many.

The number of artistic gymnastics medals won by Alfred Flatow at the first modern Olympics in 1896. He took gold in the parallel bars, silver in the horizontal bar, and shared another two gold medals with fellow members of the German team that triumphed in the parallel bars and horizontal bar events. No other gymnast has since matched Flatow's amazing achievement.

The points score of the Dutch gymnast Epke Zonderland when he took the gold medal in the horizontal bar at the 2012 Olympics in London.

The difference, in points scored, between the gold medal winner He **Kexin of China and fourth-place Beth** Tweddle of Great Britain in the uneven bars final at the 2008 Olympics.









POMMEL HORSE



EVENT OVERVIEW

Gymnasts on the pommel horse perform a fluid sequence of circular and pendulum leg swings without any pauses. They touch the horse and the pommels (handles) only with their hands, which go through complex changes of position. Athletes have to perfect the artistry and technical composition of their routines.

POMMEL PARAMETERS

The performer must use every part of the top of the horse but can touch it only with his hands, "walking" back and forth along it. At least one part of a routine must be performed while holding only one of the handles. Although there is no rule about whether movements should be clockwise or counterclockwise, most gymnasts show moves in both directions. Among the optional elements, the most common are spindles (180° turns) and flares, or swinging straddles with legs on either side of the horse.

MARKING CRITERIA

The precise scoring criteria for the horse are altered regularly by the world governing body, the FIG. Whatever the specifics, every competitor starts his routine with a combined score made up of the degree of difficulty (the D-score), which in theory is unlimited, and a score of 10.0 for execution, artistry, and technique (the E-score). The judges deduct marks from the E-score if any part of the apparatus is favored excessively or omitted altogether. The absence of scissor movements is particularly heavily penalized.

Nice legs

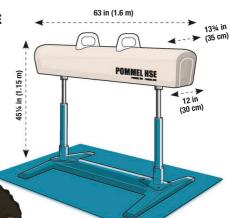
Stirrup tights are worn principally for comfort but also to accentuate the artistic lines of the aymnast's movements

NEED2KNOW

- The pommel horse is probably the most difficult of the six male artistic gymnastic events. It is the only one in which contestants do not pause or hold a pose during a routine.
- The pommel horse is still a men-only event at top level, but women also use the apparatus, both recreationally and competitively.

PLASTIC HORSE

Originally a metal frame with a wooden body and a leather cover, the modern pommel horse is typically made of plastic and covered with nonslip synthetic material. The handles may be metal but are commonly plastic. The landing mat on which the pommel horse stands is about .9½ in (20 cm) thick.





Dry grip Wristbands prevent sweat from the arms running onto the hands and loosening the grip

153/-173/ in (40-45 cm)



Horse sense Pommels are named for their resemblance to the high front of some horse saddles



IN SUSPENSE

Judges look for a combination of swings and held positions, including at least two handstands. One is entered forward from a position with the arms held at 45° before straightening out, the other exactly the same but entered backward. The legs may be held either together or wide apart. There must be at least one front lever hold, with the legs held out at 90° in front of the torso.

SCORING

Judges deduct points for technical mistakes, but also for whatever strikes them as "unaesthetic," such as too much ring and rope movement. Even falling off the rings is not necessarily disastrous since the gymnast can remount the apparatus and loses only 0.5 of the 10 points available.

HANGING RINGS

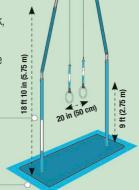
Two moisture-absorbent rings, 7 in (18 cm) in diameter and 1 in (2.8 cm) thick, are suspended on ropes or cables from either the ceiling or a free-standing frame. Safety stewards check that they are secure between each round of every competition. A rubber mat about 8 in (20 cm) thick is placed directly beneath the rings.

Ring tower

A simple steel frame supports the rings

Landing mat

Soft, thick, and wide enough to cushion even the most flamboyant landing



A QUESTION OF TENSION

Success on the rings requires maximum tension be kept on the cables at all times. This stops them from swinging and keeps the rings as still as possible to offer a solid support for the gymnast. Forward and backward swings are performed quickly to limit the time when there is no pressure on the rings.



INVERTED CROSS

The legs are held together with the arms starting close together and pushing slowly apart. The movement requires great control and strength.



FLAT OUT

A horizontal position should be held for at least two seconds but not disrupt the flow of a routine. The rings and ropes should remain as still as possible.



HANDSTAND PLANCHE MALTESE

After performing a handstand, the legs and body are lowered so they are horizontal to the floor; the arms are held at 45°.

NEED2KNOW

088

The balance beam is traditionally for women only. It is widely believed that men do not compete because of the danger it poses to their genitals; in fact, the distinction is only by tradition.

Some of the stunning feats practiced on this apparatus are all the more amazing in light of the fact that they are carried out on a surface only 4 in (10 cm) wide.







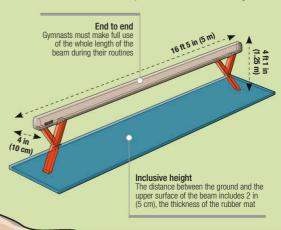
BEAM

EVENT OVERVIEW

The beam demands a supreme display of balance. On a perilously narrow bar, gymnasts perform leaps, turns, and flips that most people would find impossible, even on the ground. There is a panel of judges who looks for technical and artistic skills. dance elements, leaps, and held poses.

EQUIPMENT SETUP

Balance beams were traditionally made of polished wood. They still are wooden, but today they are sprung and covered in suede to make contact softer. The rubber mats beneath the beams should extend as far as possible for safe landings.



Dry skin Chalk may be applied to hands and feet to reduce risk of sweat causing gymnasts to slip on the beam Close crop Hair must be short or tied up tightly; points may be deducted for flopping locks Color combinations Leotards may be of any color but are commonly in team or national colors **Barefoot balance** Competitors do not wear any kind of shoes, which would affect the sensitive contact with the beam required for complete control

KEY MOVES

The compulsory elements of the 90-second routine include a 360° turn and a leap with a 180° leg split. There must also be an acrobatic sequence with at least two flight sections, during which the gymnast must leave the bar and then return to it in a smooth movement without stumbling or groping to maintain balance.



DOUBLE LEG LIFT

In this strength element that also requires perfect balance, the gymnast puts her weight on palms and wrists and brings her knees up to her face.



WORK OF ART

Balance elements must be adopted smoothly and maintained steadily; the pose itself must be shapely and aesthetically pleasing



SOMERSAULT

Routines may include a step-over somersault during which the gymnast must keep her head perpendicular to the beam to maintain balance.

STRIKE A BALANCE

Competitors must perform a mixture of compulsory and optional moves. These include acrobatic elements, in which they leave the beam altogether; strength elements, such as the double leg lift; gymnastic elements (turns, leaps, steps, and runs); balance elements (holding sitting, standing, or lying positions); and dance steps.

Judges look for elegance, flexibility, rhythm, balance, tempo, and self-control. Points are lost for not doing required elements, supporting a leg against the side of the beam, or pausing more than three times.







EVENT OVERVIEW

Vaulters take a fast run-up of up to 27 yards (about 25 m) before leaping off a springboard onto their hands on the vault table. They use their momentum to perform different midair moves before landing squarely on both feet. From takeoff, a vault takes no more than about two seconds.

FLIGHT PLAN

Speed of approach and power off the springboard generate the height and rotation to perform different styles of vaults. Vaults may incorporate moves such as somersaults and pikes, full spins of the body in the air, quarter-turns between the springboard and the table, or running handstands to flip from the floor onto the springboard. The landing is an important part of the vault. The feet should be together but often one foot is moved forward or to one side and back again for balance

Men: 4 ft 5 in (1.35 m); Nomen: 4 ft 1 in (1.25 m)

3 ft 11 in (1.2 m)

1114

3 ft 11/2 in (95 cm)

SCORE

Gymnasts usually take two vaults, one after the other. Two panels of judges mark each vault in two categories: the D-score for degree of difficulty and the E-score for technique, execution, and landing. Judges look for clean takeoffs and landings. height through the air, and precise movements at each stage.

NEED2KNOW

Leotard

Vaulters wear long-sleeved leotards

or two-piece Lycra outfits

- > Vaulting is an event for both sexes; the equipment is largely the same, although the men's vaulting table is 4 in (10 cm) higher than the women's.
- The traditional vaulting horse has given way to the vaulting table to reduce the risk of accidents. The greater surface area is safer for complicated vaults.

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Hands-on Both hands must be in contact with the vaulting table

Increased safety The collar of the vaulting table was introduced to increase athlete safety

THE YURCHENKO VAULT

In this vault, the gymnast spins immediately after takeoff, then does a backward handspring off the table followed by either a tuck or a spectacular double twisting flip in midair. The move ends with the compulsory landing: stock-still with both feet together.

Heavy duty
The base of the table is padded and heavily weighted

for safety and stability

THE LAST STRAW FOR THE HORSE

WHAT IS NOW THE VAULTING TABLE USED TO BE THE VAULTING HORSE. THE CHANGE WAS MAINLY MADE FOR SAFETY REASONS, BUT THE CATALYST WAS A MIX-UP AT THE 2000 OLYMPIC GAMES IN SYDNEY, WHERE 18 WOMEN PERFORMED BEFORE SOMEONE NOTICED THAT THE EQUIPMENT WAS SET 2 IN (5 CM) TOO HIGH.

SIDELINES

0.031The number of points by which Spaniard Gervasio Deferr beat his nearest rival, Evgeni Sapronenko of Latvia, to the gold medal at the 2004 Olympics in Athens, Greece. Deferr scored a total of 9.737 out of a maximum possible 10 points.

The number of vaulters who have won gold at consecutive Olympics: Nikolai Adrianov (Soviet Union; 1976 and 1980), Yun Lou (China; 1984 and 1988), Gervasio Deferr (Spain; 2000 and 2004), and Vera Caslavska (Czechoslovakia; 1964 and 1968).

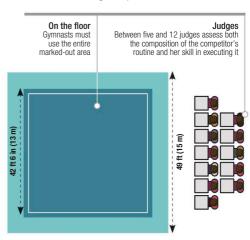


EVENT OVERVIEW In this combination of gumpostics and

In this combination of gymnastics and ballet, competitors—either singly or in teams—perform graceful choreographed routines to music while working with different types of handheld apparatus: club, hoop, ball, rope, and ribbon. The sport is dominated by women, although a few men also compete, especially in Japan.

PERFORMANCE AREA

Known as the platform, this is a carpeted area similar to but larger than that used for gymnastic floor exercises. The ceiling must be at least 26 ft (8 m) and preferably 32 ft 6 in (10 m) above the ground so that the items of apparatus can be thrown as high as possible.



Rope trick Whatever apparatus is used in a routine, it must remain in constant motion All in one Gymnasts normally wear a leotard or unitard, sometimes with an attached skirt

COMPETITOR PROFILE

As for any gymnastic discipline, competitors must have a strong, flexible body. In addition, rhythmic gymnasts need finely tuned hand-eye coordination for manipulating the apparatus and an instinctive appreciation of music and rhythm.

"GRACE WITHOUT DANCING"

RHYTHMIC GYMNASTICS HAS ITS ORIGINS IN EXERCISES DEVELOPED IN THE 19TH CENTURY TO PROMOTE SELF-EXPRESSION FOR YOUNG WOMEN—"GRACE WITHOUT DANCING." A KEY FIGURE IN THE EVOLUTION OF THE SPORT WAS US DANCER ISADORA DUNCAN, WHO REJECTED WHAT SHE SAW AS THE RESTRICTIONS OF CLASSICAL BALLET TO CREATE A FREER FORM OF MOVEMENT.

Precise balance

Slinners

The gymnast must adopt a variety of

poses to show balance and grace

Gymnasts perform in special soft slippers or in bare feet

NEED2KNOW

- Rhythmic gymnastics competitions take place at national and international levels; the discipline has been an Olympic sport since 1984.
- The world governing body of rhythmic gymnastics is the Fédération International de Gymnastique (FIG), which sets the rules for competitions and also trains judges.
- Acrobatic movements such as those used by artistic gymnasts do not necessarily find favor with rhythmic gymnastic judges, and some movements—such as handsprings—are banned in competitions.

PERFORMING PARAMETERS

Each routine is accompanied by music chosen by the competitor and should last 75-90 seconds for an individual and 135–150 seconds for teams. Gymnasts perform with four out of the five pieces of apparatus. Each year, the sport's governing body decides which apparatus is to be excluded.

SITTING IN JUDGMENT

Although the number of judges may vary, it is never fewer than five. One judge or group of judges takes into account the degree of difficulty in a routine, another considers the choreography and artistry, and a third evaluates how well the routine was executed and how many technical mistakes were made. A judge coordinator oversees the panel and collates the points, while a chief judge supervises the whole competition and has the last word in any dispute.

SCORING

In individual competitions, the maximum possible score is 20 points for each of the four pieces of apparatus being used, made up of a maximum 10 points for execution and a combined maximum of 10 points taken as an average of the technical difficulty and artistic marks. In group competitions, the gymnasts' scores are added together to give the team total.

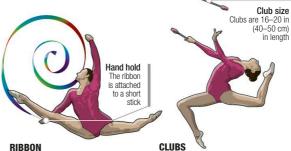
THE APPARATUS

The rules and requirements for using the apparatus are precise, and each piece makes specific physical and intellectual demands. The rope is an explosive, dynamic apparatus that calls for leaps and skipping. The ball is gentler and more lyrical, possibly the easiest piece of apparatus to perform with, while clubs test the gymnast's coordination. With the ribbon, a performer needs grace and dexterity to create dazzling colored images in the air. Handling the hoop arguably requires the greatest technical skill.

The clubs and balls were originally made of wood, the hoops of rubber, the ropes of hemp, and the ribbons of satin; the modern apparatus is nearly always made of synthetic materials such as plastics.

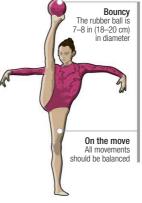
DRESS CODE

There are strict costume regulations, and competitors can lose points for not adhering to them. An outfit (and apparatus) cannot be colored gold, silver, or bronze. There are rules regarding the pattern and material of a leotard and even the cut of the garment's leg or neckline. Points will be deducted for wearing jewelry or a nonmatching hair band. In a group routine, all the gymnasts must wear identical outfits.



The ribbon, which may be more than 20 ft (6 m) long, snakes and swirls as the gymnast performs her routine.

Bottle-shaped clubs are swung, spun, tossed, and caught to demonstrate dexterity and hand-eye coordination.



BALL

The gymnast is not allowed to grip the ball but must keep it moving: bouncing it, tossing it, and rolling it around her body and on the floor.



H₀OP

Competition rules require the hoop to be rotated around the body, thrown, caught, and swung. Using the hoop is a difficult skill to master.

INSIDE STORY

By the early 20th century, various forms of exercise to music had combined in the Swedish school of rhythmic gymnastics. Although the sport had been introduced to the United States, it aroused little interest. At first, the only signs of growing popularity were in the former Soviet Union. There, rhythmic gymnastics championships were held from 1948 onward. The first international competition took place eight years later, but the event was admitted to the Olympics only in 1984 (1996 for group routines). Since then, competitors from Spain, Italy, and Brazil have challenged the traditional dominance of Eastern European countries.

SIDELINES

Ιb The age at which gymnasts qualify for senior events. Their performing careers are very short. Most rhythmic gymnasts peak in their late teens or early twenties; only a handful continue past the age of 30.

14. The weight, in ounces (400 g), of the rhythmic gymnastics ball.

The monthly salary in US dollars offered in 2007 for a Russian or Ukrainian coach to help develop rhythmic gymnastics in Vietnam by teaching schoolgirls.

The number of gold, silver, or bronze medals awarded in the all-around group competition at the World Championships. Teams include three or four gymnasts, so they just have to share.

The number of gold medals won by Russia at the Rhythmic Gymnastics World Championships between 1963 and 2018.

2.000 The estimated number of top-class rhythmic gymnasts in the world today, according to the International **Gymnastics Federation.**

TRAMPOLINING









SPORT OVERVIEW

Trampolining is a recreational and competitive sport in which individuals perform acrobatics while bouncing on a spring-bound bed. With gymnastic routines full of twists, turns, and elaborate moves reminiscent of diving, the sport is popular in the countries of Europe and the former Soviet Union. as well as the United States, Japan, and China. Trampolinists compete in individual and team events, including synchronized trampolining. double mini-trampolining, and tumble tracking.

NEED2KNOW

- The trampoline was invented by George Nissen in the United States in the 1930s. He named it after the Spanish word "trampolin." which means diving board.
- The minimum height of the ceiling in a competition hall is 26.25 ft (8 m) to allow trampolinists plenty of room to complete their routines safely.
- During World War II, the United States Navy Flight School used trampolines to increase the aerial awareness of trainee pilots.

their skills and power while

Trampolinists can control and abdomen

COMPETITOR **PROFILE**

Regular and intense training keeps trampolinists physically and mentally fit and enables them to develop timing, coordination, and rhythmic movements. The ability to achieve precise balance and body control while rotating through the air leads to increased self-confidence.



Many trampolinists develop relatively young, often between 9 and 14 years of age

Body control

the muscle tension in their limbs, shoulders, trunk,

Clothing Competitors usually prefer to wear leotards and trampolining shoes. Men may wear a T-shirt and tight-fitting pants

THE TRAMPOLINE

Modern trampolines are safe and stable, providing good control in the jumping zone and rebound characteristics that generate the height needed for aerial maneuvers. It consists of a flexible jumping bed that is constructed from nylon bands kept under tension by the surrounding springs. A steel frame supports the bed and raises it off the ground.

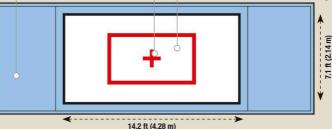
LEARNING SKILLS

Beginners learn basic skills such as jumping with knees pulled up and landing on their front and back. Intermediate skills include front and back somersaults. Advanced skills include double or triple somersaults and precision moves in fractions, such as one- and three-quarter back somersaults and somersaults with half twists.

Padding Around the bed, padding protects the trampolinist from injury

Red cross (70 cm) in diameter marks the center

Jumping zone The jumping zone is 86 in (215 cm) long and 43.2 in (108 cm) wide



THE DIVING FOOL

LARRY GRISWOLD WORKED WITH GEORGE NISSEN IN THE EARLY DAYS OF TRAMPOLINES AND LATER BECAME KNOWN AS THE DIVING FOOL FOR THE ENTERTAINING ACROBATICS. TUMBLING STUNTS. AND CLOWNING TRICKS HE PERFORMED IN A SWIMMING POOL. ON A DIVING BOARD, AND ON TRAMPOLINES.

SIDELINES

18.00 The world record degree of difficulty score for men, recorded by Jason Burnett of Canada at a 2010 World Cup event.

The world record for the number of consecutive somersaults, achieved by Brian **Hudson in September 2003 at** the Jumpers rebound center in Gillingham, UK. The previous record was 3,025.

092

INTERNATIONAL EVENTS

Individual men and women, as well as teams, compete regularly in international trampolining events such as the annual World Cup and the World Championship, which began in 1964 and alternates every two years with the European Championship and the Pan-Pacific Championship. Trampolining became an Olympic event at Sydney in 2000.

SCORING POINTS

The scoring system judges use at trampolining competitions may vary, but essentially they assess the style and execution of a routine. They look for such aesthetic elements as cleanliness of form, consistency of height, and continuity of movement. They also award points when a trampolinist achieves moves that have a certain degree of difficulty.

BODY SHAPES

Trampolining routines consist of a sequence of acrobatic movements in the air, punctuated with contact with the trampoline bed. The aerial movements feature rotations and jumps with three main body shapes—the tuck, straight, and pike—of varying degrees of difficulty. Longitudinal rotations create somersaults, while lateral rotations produce twists. The moves are initiated by taking off and landing maneuvers on the bed that involve the trampolinist's front, back, feet, or seat.

TUCK

The tuck is a body shape formed when the trampolinist clasps the knees with the hands and pulls them toward the chest. The tuck is often performed at the top of a straight jump.

PIKE

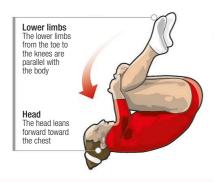
The pike is formed when the trampolinist keeps both legs straight and together and folds the body toward them, while holding the calf muscles as far down the leg as possible.

PUCK

This body position is a combination of the pike and tuck positions. The puck position is allowed during competitions when performing multitwisting multiple somersaults.

STRAIGHT

The straight is formed when the trampolinist keeps the body as straight as possible, with both legs together, while holding the hands and arms along the sides of the body.

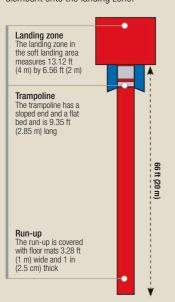






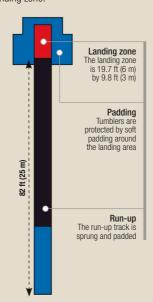
DOUBLE MINI-TRAMPOLINE

Competitors run up the track, mount the bed, and perform two moves that include up to 3 contacts with the bed. They then dismount onto the landing zone.



TUMBLE TRACK

As competitors run up the track, they perform a routine of 8 tumbling elements that are marked for good control, form, and tempo. They finish their routine in the landing zone.



INSIDE STORY

The World Age-Group Games are held in the same year and the same location as the World Championships. A maximum of 80 athletes from each federation affiliated to FIG (see below) are permitted to compete. Some games entertain as many as 800 athletes. Participating athletes are boys and girls who compete in four age groups: 11–12, 13–14, 15–16, and 17–18. They compete in individual trampoline, synchronized trampoline, double mini-trampoline, and tumbling.

GOVERNING BODY

The Fédération Internationale de Gymnastique (FIG) is the world's oldest sports federation. Formed in 1884, it governs the various sports in competitive gymnastics, including trampolining.

NEED2KNOW

The World Championships of Sports Acrobatics have been held annually since the first event, which was organized by the International Federation of Sports Acrobatics (IFSA) in Moscow in 1974. Sports acrobatics featured as a demonstration sport at the 2000 Olympic Games in Sydney.

- The sport is most popular in Russia and China, but participation has grown in many other countries, including the US and the UK.
- Sports acrobatics is also known as acrobatic gymnastics, or acro. It has close links with more conventional gymnastics, and there is increasing crossover between the two disciplines.

Top man In men's groups, the acrobat who takes up Flexible footwear positions at the top of Shoes should be soft a pyramid is smaller and lighter than other flexible and supportive: members of the team they are usually white Middle man The acrobat at the heart of the balancing act needs both strength and suppleness Firm base The biggest and strongest members of the team form the foundation Lycra clothing One- or two-piece outfit made of Lycra or similar stretchy

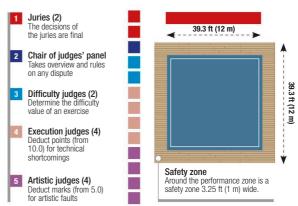
HUMAN PYRAMID

Points are awarded for technique and artistry

in this balance routine.

PERFORMANCE ZONE

Acrobats perform on either a rubber mat or a carpeted sprung floor. The judges sit together so that they have the same line of vision and can easily confer.



RULES OF PERFORMANCE

Sports acrobatics has five events: men's pairs, women's pairs, mixed pairs, women's triples, and men's quadruples. Competitors perform three routines to show off different skills, each a maximum of 2½ minutes. The routines focus on balance, dynamism, and a combination of both of these, respectively. The sequences need to be highly precise; a panel of officials is watching intently (see above).

ACROBATIC SKILLS

Competitions have three sections, each of which is designed to highlight one aspect of acrobatics and showcase certain key skills of the different members of the pair or team.

BALANCE ROUTINE Teams adopt and hold complex poses, including human pyramids. The positions must be held for three seconds. **DYNAMIC ROUTINE** Also known as the tempo routine, this part of the event is more energetic than the balance section. Acrobats throw their partners in somersaults, for example, and carry out technically demanding tumbling rapidly.

COMBINED ROUTINE The third routine should be a tour-de-force that combines the skills of the first two parts in a spectacular display.

COMPETITOR PROFILE

Team members usually complement each other: acrobats at the base are tall and strong, while the "flyers" who stand on or spring off them are small and supple. All acrobats have a strong sense of rhythm, so they make good dancers.

EVENT OVERVIEW

Sports acrobatics combines the strength, balance, and grace of gymnastics with teamwork and a musical accompaniment. Two or more acrobats perform choreographed sequences of balancing acts, handsprings, somersaults, and tumbles, earning points for execution and artistic impression.

SPORTS ACROBATICS

Stabilizer

Takes up position after the middle

man has stepped onto the base man

094

NEED2KNOW

- Sports aerobics, also called aerobic gymnastics, developed from traditional aerobics exercises.
- Trios and groups can be all men, all women, or mixed, but pairs are always mixed. Six team members make up a group.
- In 2006, Jinping Ao from China became the world men's champion. Elmira Dassaeva from Spain became the world women's champion.

OBEYING THE RULES

Accompanied by a vigorous piece of music that they have chosen themselves, gymnasts perform a continuous routine that should last exactly 1 minute 45 seconds. Using the entire performance area and moving rhythmically with the music, they must demonstrate at least 8 but no more than 12 compulsory elements, including supports, levers, jumps, leaps, flexibility, and turns. They have to perform at least two elements from push-ups, free falls, and circles with the legs and display artistic beauty and originality.

SCORING

Competitors start with 10 points, the maximum possible, and the panel of judges deducts points for errors. For example, they lose 0.2 points for every group element they miss and 1.0 point for performing prohibited moves.

SPORTS ROBICS







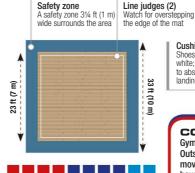


SPORT OVERVIEW

Aerobics is a fitness program that became a sport. Gymnasts—alone or in pairs, trios, or groups—execute routines that must show dynamic and static strength, jumping ability, flexibility, and balance.

PERFORMANCE AREA

Sports aerobic competitions are held on sprung wooden floors. The performance area measures 23 x 23 ft (7 x 7 m) for individuals, pairs, and trios. Groups compete on a larger area measuring 33 x 33 ft (10 x 10 m).



Cushioned footwear Shoes and socks must be white; they should be able to absorb the impact of landing after jumps

COMPETITOR PROFILE

Gymnasts need a high level of cardiovascular capacity. Outstanding performers tend to be loose-limbed and can move quickly and elegantly in time to music. They all have superb coordination and suppleness.

Regulation clothing

Women wear tights; men wear a one- or two-piece form-fitting outfit



judges (4) Mark technical Difficulty judges (4) Mark performance on strict criteria

Time judge Deducts points for programs that are too Chair of judges' panel Controls the work of

FLOOR MOVES

A routine has to include at least one element from each of four groups, demonstrating flexibility and balance, dynamic strength, static strength, and jumping. Competitors also have to present the seven basic steps: march, jog, skip, knee lift, kick, jumping jack, and lunge.



HIGH KICK

The hip of the raised leg is flexed up to 180° while the knee stays straight and the toes pointed.



THE CAPOEIRA

This move demonstrates dynamic strength, an attribute which the judges are looking for.



JUMPS

The range of leaps and jumps includes scissors, straddles, and splits (above)



STATIC SUPPORT

The weight of the body is taken on the hands while the gymnast performs the splits in midair.

INSIDE

Aerobics became established as a fitness routine during the late 1960s, with its greatest champion being actress Jane Fonda. At first, aerobics struggled to gain credibility as a sport but gradually achieved acceptance and was eventually recognized by the Fédération Internationale de Gymnastics (FIG) in 1994. The first sports aerobics World Championships were held in Paris, France, in 1995. More than 70 FIG affiliates include aerobics within their gymnastics program.

WEIGHTLIFTING





096

NEED2KNOW

- Weightlifting was a sport at the first modern Olympics in 1896. It reappeared in 1904 and became a regular event for men from 1920. The first women's Olympic weightlifting competition was held at the 2000 Games.
- Leading athletes can lift over twice their own bodyweight. In 1988, Belarussian Leonid Taranenko, representing the Soviet Union, made the heaviest clean and jerk of all time, with an astounding lift of 586.4 lb (266 kg).

Women Length: 6 ft 7 in (2.01 m) Weight. 33 lb (15 kg) Diameter: 1 in (25 mm). Men Length: 7 ft 2 in (2.2 m) Weight: 44 lb (20 kg) Diameter: 1 in (28 mm) Lifting gear The one-piece costume must not obscure the judges' view of knees and elbows The weights are made of lead and color coded from ½ lb (0.25 kg) to 55 lb (25 kg) Lifting gear The one-piece costume must not obscure the judges' view of knees and elbows

EVENT OVERVIEW

Competitors lift bars, known as barbells, loaded at each end with weights. They are allowed three attempts at any one weight and, after each successful lift, the weight is increased. The winner is the person who lifts the heaviest weight. There are two distinct weightlifting techniques: the "snatch" and the "clean and jerk."

HEAVY DUTIES

Competitors are divided into categories according to their bodyweight. There are currently eight divisions for men—the lowest is up to 123½ lb (56 kg) and the highest over 231½ lb (105 kg)—and seven for women—from below 106 lb (48 kg) to over 165¼ lb (75 kg).

Athletes take turns making attempts at each weight. The competitor who has opted for the lowest weight lifts first. Anyone who fails at a given weight can either reattempt it or try a heavier barbell later.

LIFTING METHODS

In the snatch, athletes must lift the barbell in a single, steady movement. In the clean and jerk, they must first raise (clean) the barbell from the floor to shoulder level and then, in a separate movement, lift (jerk) the bar until their arms are straight above their heads. While lifting, they must avoid touching the floor with their knees. Once the lifts are completed, they must hold the final position until the referee tells them to put the weight down.

THE SNATCH

The lifter grips the weight with hands fairly wide apart and gathers his strength for the lift

Transit mode
The lifter straightens his knees and prepares to bend his elbows

The knees may be bent again so that the lifter can get all his weight below the barbell

Final push
The legs are
straightened and the
weight is controlled
over the head



Footwear

Tight belt

To support back and abdomen; may be no

more than 4% in

(12 cm) wide

Raised heels to help the weightlifter achieve and maintain stability

Hands on The lifter grips the bar and squats in readiness to apply upward movement

CLEAN AND JERK

2 Lift off
The first upward pull
is powered mainly by
thigh and back
muscles, not the legs

Neck brace When the barbell reaches neck height, the lifter brings it close to the shoulders

Last push
Knees bent to
power final upthrust;
legs spread for
balance; arms
completely straight

Ending up Legs locked to complete the lift; the position is held until the judges' signal

ATHLETE PROFILE

Weightlifters have highly developed neck, shoulder, stomach, and thigh muscles. The effort of lifting and holding weights that are often heavier than their own bodies may produce heart rates of 190 beats per minute. (The normal rate is 60–80.)











POWERLIFTING





EVENT OVERVIEW

Powerlifting is the ultimate test of pure strength. This relatively recent sport involves athletes raising weight-loaded bars in three different lifts: the "squat," the "deadlift," and the "bench press." Powerlifting champions are justifiably known as the strongest men and women in the world.

PLAYING THE GAME

There are four age groups, from over-14s to over-50s. For men, there are 11 weight divisions between 114½ lb (52 kg) and $2751/2^+$ lb (125+kg); women have 10 bands between 97 lb (44 kg) and 198+ lb (90+kg).

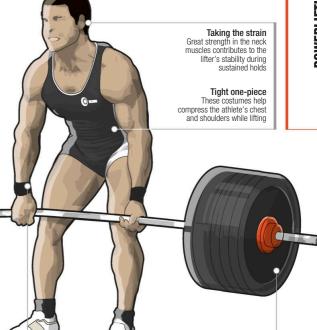
Each event has three components: squat, bench press, and deadlift. After three failed attempts, athletes are eliminated. The winner is the competitor who lifts the highest combined weight.

ATHLETE PROFILE

The key areas of a powerlifter's strength are the shoulders, chest, arms, back, thighs, and knees. Regardless of muscular build, shorter men and women have an advantage over their taller rivals, as they do not have so far to raise the weights. Lifters work out as a matter of course and, before a contest, frequently push themselves to the limit, trying to lift far heavier weights than they would expect to attempt in a competition.

NEED2KNOW

- The first world championships were held in 1970 under the auspices of the International Powerlifting Federation (IPF).
- From small beginnings, powerlifting has become increasingly popular worldwide: the IPF now has more than 100 member states.



MIGHTY METHODS

Each element of powerlifting demands the use of different muscles; competitions test a range of skills, rather than overall strength alone, and there are heavy point penalties for deviations from the required techniques.

Wrist straps Bandages may be used for

support; they must not exceed 4 in (10 cm) in total width Weight disks
These are made
of lead and may be
color coded so that
officials can easily
see which is which



SQUAT

Competitors take the barbell off the rack, step back, and squat with the weight on the shoulders until the hips are below the knees. They then return to the starting position and hold it until the judges' signal.

Strong arms Deadliffs are powered by the biceps and triceps in the upper arms

DEADLIFT

Solid grounding

Shoes have heels and smooth soles to help balance and maximize weight distribution

The barbell is raised until the competitor is upright with a straight back, and held until the judges' signal; it must then be replaced on the ground, not dropped.



BENCH PRESS

The competitor reclines on the bench, lowers the weight until it touches the chest, then pushes it back up to its original position and replaces it on the rack.

TEAM SPORTS



SOCCER









GAME OVERVIEW

The beauty and popularity of soccer (or football, as it's known in most of the world) lies in its simplicity: two teams of 11 players each attempt to kick a ball into the opposing team's goal. Compared with more complex team sports such as cricket or rugby, there are fewer rules, and matches are often free-flowing and highly exciting spectacles. Considered the world's most popular sport, soccer is enthusiastically played and watched in just about every country on Earth.

"KING OF SOCCER"

BRAZILIAN LEGEND PELÉ (EDSON ARANTES DO NASCIMENTO) IS PROBABLY THE GREATEST PLAYER OF ALL TIME. HE WAS PART OF THE BRAZILIAN TEAM THAT WON THE 1958, 1962, AND 1970 WORLD CUPS, AND EARNED 91 CAPS AND SCORED 77 GOALS (A NATIONAL RECORD) FOR HIS COUNTRY. WITH EXTRAORDINARY TECHNIQUE, SPEED, CREATIVITY, AND FINISHING, PELÉ WAS THE PERFECT PLAYER.

Shorts

Made of a durable synthetic material, soccer shorts allow freedom of movement. Shirts may feature stripes, hoops, or other patterns; the shorts are usually one color, sometimes with a stripe down the sides

Ball
The dimensions of the ball are specified in the Laws of the Game.
If the ball bursts or becomes defective during the course of a match, play is stopped, and the referee requests a replacement ball

Socks and shinguards

Shirt

Usually made of polyester, a soccer shirt is light and breathable. All the players on a team (except the goalkeeper) wear the same colors and patterns

> The socks must cover the shinguard, which is now a compulsory part of the player's equipment

Good traction Studded soccer

boots provide increased grip on sometimes muddy and slippery surfaces

PLAYER PROFILE

Soccer players are mostly lean and athletic, with excellent ball skills. They are strong and balanced runners, able to change direction quickly and repeatedly. Players combine impressive sprinting skills with the huge reserves of energy required for 90 minutes of almost nonstop running. Since soccer is a contact sport, players—particularly the goalkeeper—require a degree of courage, especially when tackling or competing for a header.

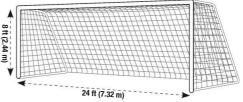
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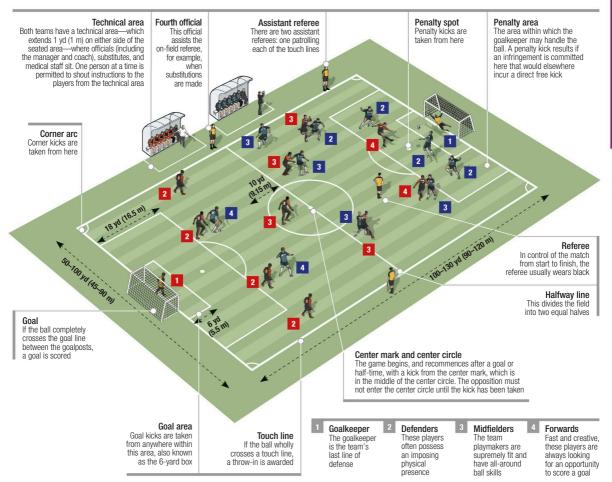
- The sport has been officially known as "association football" since the formation of the Football Association in 1863. The term "soccer" was originally derived from "association."
- A soccer match is played by two teams of 11 players on a rectangular field, or pitch. The game consists of two 45-minute halves separated by a short interval.
- Other forms of the game include beach soccer and indoor soccer (which is also known as "futsal" and is played by two teams of five players over two halves of 20 minutes each).
- The world governing body of soccer, Fédération Internationale de Football Association (FIFA), formed in 1904 and has 208 member nations.

GLOBAL PHENOMENON

ACCORDING TO FIFA'S GLOBAL
"BIG COUNT" IN 2006, THERE ARE
265 MILLION PLAYERS AND FIVE
MILLION OFFICIALS. THIS TOTAL
OF 270 MILLION PEOPLE ACTIVELY
INVOLVED WITH SOCCER REPRESENTS
ABOUT FOUR PERCENT OF THE
WORLD'S POPULATION.

Soccer is played on a flat, rectangular grass or artificial turf field (also known as a pitch), the dimensions and markings for which are shown below. The outer extremes of the field are delineated by the touch lines and goal lines, and if the ball wholly crosses any of these line, it is out of play (or a goal is scored if the ball crosses the goal line between the goalposts). If part of the ball is on the line, it is still in play. While most matches are played on grass, artificial turf is increasingly employed in places such as Africa, where conservation of resources like water is an acute issue. But whatever the surface, anyone can play social soccer: all that is needed are two teams, a ball, two makeshift goals, and a flat playing surface—anything from a park or field to a street or beach.





PLAYER POSITIONS

A soccer team is divided into forwards, midfielders, defenders, and one goalkeeper. Team members take positions that match their skills and style of play. The main job of the forwards, or strikers, is to score goals (although any player, including the goalkeeper, may score a goal). Strikers have excellent speed, good aerial ability, skillful footwork, and an accurate shot. The midfielders provide the link between the defenders and the forwards: their role involves both defensive and attacking play. Defenders assist the goalkeeper in protecting the goal. These players have an effective tackle and are commanding in the air. The goalkeeper, the sole player allowed to handle the ball (but only within the penalty area), has good catching and kicking skills combined with considerable agility and sharp reflexes. Substitutes are permitted during a match, but once substituted a player may not reioin the game.

BEHIND THE SCENES

Although a team of 11 people plus substitutes takes the field on match day, leading soccer clubs rely on the work of dozens of "back-room" staff to get their first team primed and ready. Specialized fitness trainers keep the players in physical condition, while teams of physical therapists and medics help to keep the players at their best and to recover from injuries. On the technical side, clubs employ a variety of coaches to work with different sections of a team, while at the helm is the manager, the chief tactician and team selector.





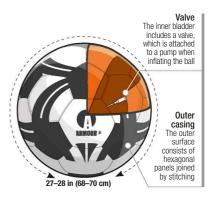


EQUIPMENT

One of the enduring appeals of the sport is that so little equipment is required. An informal game can therefore be enjoyed by all people, no matter what their means. For an official game, it is compulsory for players to wear a shirt with sleeves, shorts, socks, shinguards, and footwear. It is forbidden to wear anything, such as jewelry, that could present a hazard. A player incorrectly attired will be asked to leave the field of play by the referee and may only return when the referee has confirmed that the equipment is correct.

MODERN BALL

A game ball has a circumference of 27-28 in (68-70 cm), weighs 14-16 oz (410-450 g), and is inflated to a pressure of 8.5 lb/sq in-15.6 lb/sq in (600-1100 g/sq cm). Most balls have a covering of synthetic leather panels stitched together (real leather, as used in the past, tends to absorb water and make the ball very heavy). Inside is the air bladder, which is usually made from latex or butyl. Between the bladder and the outer covering is the lining, which is made from polyester or cotton and helps give the ball its strength and bounce.



PLAYING THE GAME

Before the match commences, the two teams take their positions in their respective halves in any one of a multitude of set formations. Play begins with the kick-off, whereby the ball is placed on the center mark and kicked backward by one of the attackers. Then, very simply, each team attempts to kick the ball into the opposition's goal. The ball may be moved about the pitch using any part of the body except the hands and arms, and the winning team is the one that has scored the most goals after 90 minutes. If at the end of play neither team has scored, or if both teams have scored the same number of goals, the game is a draw. However, in order to find a winner, some competitions allow for "extra time" followed by, if necessary, a penalty shoot-out.

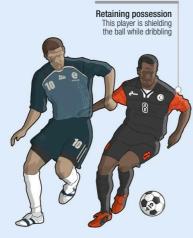
ATTACK

The team in possession of the ball and moving forward is said to be on attack. The ultimate aim of any attacking move is to score a goal, and this can only be achieved if the player with the ball is close enough to the goal to shoot. Attackers must therefore pass or dribble the ball around the field, retaining possession and avoiding defenders as they go. In order to outmaneuver the defense, attackers off the ball should always be looking for space—an area of the field where there are no defenders—to run into, ready to receive a pass.

One-two Shown here is an attacking move in which a player beats an opponent by passing the ball to a teammate, then receives it back once in a more advanced position On the move A one-two relies on anticipation, quick passing, and the player's speed across the ground

PASSING

A well-executed pass consists of three elements: correct weighting (power used), appropriate direction, and good timing. Three parts of the foot can be utilized when passing: the inside for swift, short passes; the instep for long, powerful passes; or the outside for short, disguised passes on the run.



DRIBBLING

Running with the ball under close control, mostly using the outside and top of the foot, is known as dribbling. The player dribbling should look up often to assess attacking options and defensive dangers.



CROSSING

The cross pass, where the ball is quickly moved from the edge of the pitch to the center, is used to deliver the ball toward players in attacking positions. Well-hit crosses are very hard to defend against.



SHOOTING

As the ball will arrive to the player at a variety of speeds and angles, there are many shooting techniques. However, the most common method is a low, hard shot struck off the instep of the boot.

Cleats

In some boots the cleats are fixed, but more commonly these are detachable so that the length of cleat can be altered to suit different playing conditions. Some modern boots feature molded blades instead of cleats, providing a more stable base



Shinguards When tackling or being tackled, shinguards provide good lower-leg protection





Gloves Many modern gloves have removable protective reinforcement inside the fingers

Defensive

pressure The marker

always stays

close to

SOCCER BOOTS

Soccer players need comfortable, lightweight, and durable footwear. On grass, players wear cleats; on artificial turf, shoes with rubber pimples on the sole provide good grip.

SHINGUARDS

Guards protect the shins, are made of plastic, rubber, or similar, and must be covered entirely by the socks.

GLOVES

The goalkeeper wears gloves that provide extra grip when catching the ball. The back of the glove is breathable, and a wrist strap gives extra support.

DEFENSE

The job of the defending players is to prevent the attackers from scoring and to win back possession so as to mount an attack in return. Defenders can do this by intercepting attacking passes, closing down the space available to the ball carrier and other attackers, close marking of players in the hope of forcing a mistake, and by gaining possession of the ball directly via tackling. Soccer teams employ defensive strategies to help combat attacking moves. One example is the zone defense system, in which the defenders are assigned a set area in which to work and mostly move in relation to each other. Another strategy is person-to-person defense, where each defender is assigned a specific attacker to mark.



This player saves goals by catching the ball, tipping it over the crossbar or beyond the goalposts, or punching or kicking it away. The goalkeeper then starts the next attack with a kick or throw.



TACKLING

Using the feet to take the ball away from a player is known as tackling. The slide tackle (above) can be highly effective, but the defender's timing must be perfect, as there is a risk of conceding a foul.



INTERCEPTION

When a defender intercepts an attacker's pass, this is often the result of the pressure applied by the defending team as a whole, through persistent marking and closing down the available space.



MARKING

When a defender closely shadows the movements of an attacker, this is known as marking. It gives the defender the chance of an interception, and an attacker might not pass to a marked teammate.

SIDELINES

The approximate number in miles (11 km) run by a midfielder during a game. Forwards run about 5 miles (8 km), defenders 4 miles (7 km), and the goalkeeper 21/2 miles (4 km).

The age of the oldest player— Roger Milla of Cameroon-to score a goal in a World Cup finals game.

The world record number of international caps, currently held by Kristine Lilly of the United States.

10.89 The number of seconds it took Hakan Sukur of Turkey to score against South Korea in the third-place playoff of the 2002 World Cup-the fastest goal in World Cup history. Turkey went on to win the game 3-2.

The number, in millions, of Americans who watched the FIFA Women's World Cup in 2019.

1.281 The number of goals Pelé scored in 1,363 games over his 22-year career playing for Brazil, Santos, and the New York Cosmos.





SET PIECES

If the referee stops play for an infringement, or if the ball crosses a touch or goal line, a predetermined, fixed move-such as a corner kick or a throw-in—executed by the attacking team follows. This is called a set piece. As a high percentage of goals come from set pieces, the attacking team will take up positions and adopt patterns of movement designed to produce a score, while the defending team will do everything in its power to stop this from happening. For example, when a free kick is awarded near the goal, the defenders might set up a line of players (called a defensive wall) in front of the kicker to try to block the ball. For a throw-in or corner, the attackers look for free space to run into and the defenders closely mark the attackers.



The player taking the throw-in must release the ball from behind the head using both hands and with both feet on the ground

THROW-IN

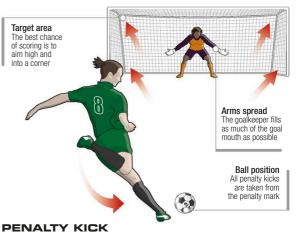
When the ball completely crosses the touch line, a throw-in is awarded to the team opposing the player who last touched the ball.



CORNER

When the ball crosses the goal line having last touched a defender, a corner kick is awarded. The kick is taken from the corner arc nearest the point where the ball crossed the line, and a goal may be scored directly.





If any of the offenses that would normally incur a direct free kick are committed inside the penalty area, a penalty kick is awarded. Until the kick has been taken, the goalkeeper must remain on the goal line. Because a goal is the usual result from a penalty kick, there can be enormous pressure on the kicker, particularly during a penalty shoot-out.

THE OFFICIALS

The referee has full and final authority during a match. This includes enforcing the 17 Laws of the Game (see p.105) and acting as match timekeeper. The referee may play "advantage" by allowing play to continue after an offense if it is felt that to stop play would disadvantage the team offended. A good referee will encourage a free-flowing, good-spirited game.

MISCONDUCT

If a serious breach of the Laws of the Game has occurred, such as showing dissent, the umpire may issue either a caution (indicated by a yellow card) or send the player from the field (indicated by a red card). Two yellow cards in the same match automatically incur a red card.

REFEREE SIGNALS

Distinguished from the players by differently colored clothes (often black), the referee blows a whistle to start or stop play and uses a set of official signals (see right) to indicate decisions made.

ASSISTANTS

The two assistant referees-one on each touch line-officiate in situations where the referee is not in the best position to make a decision. These include offside infringements and which team should be awarded a throw-in.



DIRECT FREE KICK

INDIRECT



YELLOW CARD



RED CARD (SENDING OFF)



ADVANTAGE







SUBSTITUTION OFFSIDE

PLAYING BY THE RULES

In 1863, the first uniform set of rules for soccer were devised. Today, there are 17 Laws of the Game, and these are administered by the Fédération Internationale de Football Association (FIFA). They have been modified over time. The Laws regulate everything from the dimensions of the field of play and the equipment used to the referee's role, fouls, and set pieces.

COMMITTING A FOUL

Law 12 covers fouls and misconduct and the associated sanctions. A direct free kick is awarded if a player kicks, trips, jumps at, charges, strikes, or pushes an opponent with reckless or excessive force; the same is also applied if a player (except the goalkeeper) handles the ball, makes contact with the opponent before the ball during a tackle, or holds or spits at an opponent. An indirect free kick is awarded if a player impedes an opponent, stops the goalkeeper from throwing or rolling the ball, or plays in a dangerous way. It is also given for a variety of infringements specific to the goalkeeper, for example, if this player takes more than six seconds to release a ball held with the hands.



HOLDING

If one player holds another's clothing or person, this is a foul. Referees keep a sharp eye out for holding, which is very frustrating for the player held.



DANGEROUS PLAY

This can take many forms but is most commonly associated with a high or reckless tackle, which is dangerous for the player tackled and the tackler.



Law 11, "Offside," is probably the most controversial and regularly modified rule in soccer. A player is in an offside position if any part of the body (excluding hands and arms) is in the opponents' half, and nearer to the opponents' goal line than both the ball and the second-last opponent. A player is not in an offside position if level with the second-last opponent or last two opponents. A player in an offside position at the moment the ball is last touched by a teammate is only penalized for interfering with play (by playing or touching a ball passed or touched by a teammate, or interfering with an opponent). For offside offenses, an indirect free kick is awarded. The Law was introduced to prevent attackers from loitering near the goal, which could result in games consisting mostly of long kicks from one end of the field to the other.

"HAND OF GOD"

SOMETIMES A PLAYER INFRINGES A LAW AND GETS AWAY WITH IT. PERHAPS THE MOST FAMOUS INSTANCE WAS DURING THE 1986 WORLD CUP QUARTERFINAL BETWEEN ARGENTINA AND ENGLAND. JUST INTO THE SECOND HALF, ARGENTINE DIEGO MARADONA FOLLOWED A LOBBED BALL, LEAPED, AND PUNCHED THE BALL INTO THE NET. THE GOAL WAS ALLOWED, AND ARGENTINA WENT ON TO WIN THE GAME (2-1) AND THE TOURNAMENT. MANY YEARS LATER. MARADONA ADMITTED TO THE HAND BALL BUT AT THE TIME CLAIMED THAT IT WAS, "A LITTLE OF THE HAND OF GOD, AND A LITTLE OF THE HEAD OF MARADONA."



If a defender tackles the player rather than the ball, this is a foul, Because it is difficult to play the ball first when tackling from behind, tackles are made from the front or side. A mistimed slide tackle (above) can easily result in a foul.



OBSTRUCTION

If a player is positioned between the ball and an opponent and makes no attempt to play the ball, this is impeding the opponent (obstruction).



Dangerous and unsportsmanlike, tripping constitutes a foul. However, it is sometimes difficult to tell if a player was tripped or fell deliberately.



Offside

This is an offside position

No auestion Player A is clearly nearer to the goal line than all the defenders except the goalkeeper

Passing forward Player B has passed the ball to Player A who is offside

Onside

goal line

OFFSIDE

In the situation above, Player A is offside, and an indirect free kick would result. This is because when Player B passed the ball (indicated by the arrow), there was only one defender (the goalkeeper) between Player A and the goal line.



ONSIDE

In the scenario shown here, Player A is not offside. This is because when Player B passed the ball (indicated by the arrow), there were two defenders between Player A and the goal line. Player A may now continue the attack.









BALL SKILLS

Soccer players must be able to control the ball with the feet, but also with any other body part except the hands and arms. A team that controls the ball retains possession. Key techniques are kicking and passing, close control (including trapping, where the ball is stopped "dead" with the feet, head, chest, or thigh), running with the ball (dribbling), shooting, tackling, and heading. The goalkeeper must master all these skills and a set of different techniques, too.

TRAINING

Soccer players train hard and often, and techniques can be practiced at team sessions or individually. Good fitness is also essential: an exhausted player is of little use to the team. Fitness training might include sprinting (to develop speed), circuits (for muscular endurance and stamina), weights (strength), and stretching (flexibility).



Good balance With one foot off the ground, the arms are used for balance

Quick shot Volleys are commonly used for swift shots at goal

The player's chest can be used to trap or pass the ball. When trapping, the chest "cushions" the ball as it falls; when passing, the chest is thrust out to meet the oncoming ball.

THIGH CONTROL

The thigh is used for balls arriving above knee height but too low for the chest. To control the ball, the thigh is lowered slightly before impact to cushion the ball.

Kicking the ball before it bounces is called a volley. Because the ball is not brought under control prior to being kicked, the direction of the kick is less easy to manage, but the ball is redistributed very quickly.



HEADING

This is an important skill in soccer because it gives the player the opportunity to reach a ball too high to be controlled by means other than the head. It is used for passing, shooting, or controlling the ball.

When a player in possession is positioned between the ball and a defender, this is known as shielding or "screening." So long as the person in possession is playing the ball, then this is perfectly legal

HIGH EARNERS

FOR THE WORLD'S BEST PLAYERS. THE FINANCIAL REWARDS CAN BE STAGGERING, IN 2018, THE ESTIMATED EARNINGS OF THE HIGHEST-PAID SOCCER PLAYER (LIONEL MESSI OF BARCELONA) WAS \$138.5 MILLION. TOP ENGLISH PLAYERS CAN EARN MORE THAN 200 TIMES THE AVERAGE SALARY IN THE UNITED KINGDOM. THE RICHEST SOCCER CLUB IN THE WORLD IS REAL MADRID, WITH ESTIMATED REVENUES OF OVER \$925.4 MILLION FOR THE 2017-2018 SEASON, THESE FIGURES REFLECT SOCCER'S STATUS AS THE WORLD'S MOST POPULAR SPORT.

BENDING THE BALL

To curve the ball from right to left (from the player's perspective) using the right foot, the player strikes the bottom half of the right side of the ball with the inside of the boot. To curve the ball from left to right with the right foot, the player strikes the left side of the ball with the outside of the boot. In both cases the foot and leg follow through in the opposite direction from that of the intended flight path so as to slice across the ball to impart spin on it. This skill is used to curve the ball around defenders when passing, shooting, or when taking a penalty, corner, or free kick.



FORMATIONS

A team's on-field formation is represented by a set of three or four numbers. For example, 4-4-2 describes four defenders, four midfielders, and two forwards. The numbers always add to 10 because the goalkeeper is not included in the formation. A team usually starts a match with a formation based on its style of play (see below), but according to the match situation, this might change. If, for example, a team with a lead does not want to risk conceding a goal, it might employ a more defensive formation. There are many combinations, and shown here are three common examples.



4-4-2

This is probably the most common formation used in soccer today. The 4-4-2, also known as the "flat back four," is an adaptable system in which the midfielders work extensively with the defenders and the forwards. Always the workhorses, the midfielders have plenty of running to do in this formation.



STAT CENTRAL



3-5-2

In this formation, the left and right midfielder players generally take a more attacking role supporting the forwards, while the central midfielder often works closely with the defense to help resist opposition counterattacks launched when much of the team is in the opposition's half.



4-3-2-1

Also known as the "Christmas Tree." this formation is a variation of 4-4-2 (see above) in which one of the midfielders is pushed forward into an attacking position. This means that in effect there are three forwards, with the center forward playing slightly in front of the other two.

FIFA WUKLD GUP (WUMEN)		
YEAR	WINNER	RUNNER-UP
2019	UNITED STATES	NETHERLANDS
2015	UNITED STATES	JAPAN
2011	JAPAN	UNITED STATES
2007	GERMANY	BRAZIL
2003	GERMANY	SWEDEN
1999	UNITED STATES	CHINA PR
1995	NORWAY	GERMANY
1991	UNITED STATES	NORWAY

EIEN WODI D CIID (WOMEN)

INSIDE STORY

The earliest known form of soccer was played in China in the second and third centuries BCE. Soccer-like games were also played in Ancient Greece and Rome and in other early civilizations. However, the development of modern soccer occurred mainly in Britain, over the last thousand years. Early games took many forms, and a "match" was often an anarchic contest between two whole villages. During the 19th century, the pivotal moment in the sport's history was reached. Earlier in the century, soccer had become very popular in private schools (known as public schools in England). But without standardized rules, some schools favored a rougher game that included handling and running with the ball, while others preferred a game based around dribbling.

SOCCER RULES

In 1863, meetings were held to formalize the rules. As part of this process, rugby became a separate sport, and the Football Association and with it "association football"—where handling the ball was prohibited—was born. In 1872, the world's first soccer competition, the FA Cup, was held, and in 1904, the Fédération Internationale de Football Association (FIFA) was founded. Today, FIFA boasts 211 member nations.

INTERNATIONAL COMPETITIONS

Undoubtedly, the most significant international competition is the FIFA World Cup, held every four years. With worldwide total viewing figures in the billions, it ranks alongside the Olympic Games as one of the great uniting global sporting events. There are World Cups for men and women. Some of the many other international competitions include: the UEFA European Championships for men and women, Copa América (South America), the African Cup of Nations, and the Asian Cup.

CLUB COMPETITIONS

Many supporters follow club competitions with unparalleled fervor. Championships include the Premier League (England), La Liga de Fútbol Profesional (Spain), Serie A (Italy), and the Bundesliga (Germany). Some competitions are played between the top clubs of different nations, such as Copa Libertadores da América (South America) and the Champions League (Europe).

EUROPEAN CHAMPIONSHIP WINNER RUNNER-UP YEAR 2016 **PORTUGAL** FRANCE **SPAIN** ITALY 2012 2008 **SPAIN GERMANY** 2004 GREECE **PORTUGAL** 2000 FRANCE GERMANY CZECH REPUBLIC 1996 1992 **DENMARK GERMANY NETHERLANDS** 1988 HSSR

UEFA WOMEN'S CHAMPIONSHIP

YEAR	WINNER	RUNNER-UP
2017	NETHERLANDS	DENMARK
2013	GERMANY	NORWAY
2009	GERMANY	ENGLAND
2005	GERMANY	NORWAY
2001	GERMANY	SWEDEN

COPA AMERICA		
YEAR	WINNER	RUNNER-UP
2019	BRAZIL	PERU
2016	CHILE	ARGENTINA
2015	CHILE	ARGENTINA
2011	URUGUAY	PARAGUAY
2007	BRAZIL	ARGENTINA
2004	BRAZIL	ARGENTINA
2001	COLOMBIA	MEXICO

BASKETBALL









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GAME OVERVIEW

Invented in the late 19th century, basketball is a fast-paced, highly technical ball sport, whereby two teams of five players attempt to score points in the opposing side's basket. Most popular in the United States, where the National Basketball Association (NBA) and Women's National Basketball Association (WNBA) run the professional game, it also has a strong presence in Europe. Basketball has been an Olympic sport since 1976.

PLAYER PROFILE

Muscular and athletic, basketball players require all-around fitness. Being such a fast-paced game, players need superb stamina allied to agility. Above all, of course, they need to be tall. Players are rarely under 6 ft (1.8 m) and often as tall as 7 ft (2.1 m).

Court gear

Players wear loose-fitting vest tops and shorts on court, which permit total freedom of movement for the upper and lower body

Wear and tear

In a sport characterized by continual changes of pace and direction, players' knees are highly susceptible to injury

Big air

Modern-day sneakers feature air-cushioned soles—which both provide comfort during fast-moving play and leverage for even higher leaps

JAMES A. NAISMITH

NAISMITH WAS NOT JUST A PIONEER OF BASKETBALL. HE IS ALSO CREDITED WITH BEING THE FIRST MAN TO INTRODUCE THE HELMET INTO FOOTBALL.

NEED2KNOW

- Basketball was invented in 1891 by a Canadian, James A. Naismith.
- In the United States, more people play basketball than any other team sport, according to research by the National Goods Association.
- College basketball is at least the equal of the professional game in terms of popularity in the US, with men's and women's college teams playing to a high standard.
- Top NBA stars enjoy superstar status and earn prodigious salaries—two of the top-five athletes in the Sports Illustrated 2014 Fortunate 50 (top earners in sports) were NBA stars.

Two-point zone

Two points are awarded for any field goal scored from inside the three-point line

The key

Players on the offense can remain in this area up to three seconds

Three-point arc

A player who scores a field goal from anywhere outside this line earns three points

Out of bounds

The area outside of the court markings

Jumping power Strong leg

muscles are a

must in a sport

focused or

jumping and

frequent sprints

THE SHOT CLOCK

Introduced to the NBA in 1954 in an effort to speed up play, the shot clock is a 24-second timer. The offense must shoot within that time frame. Failure to attempt a shot that hits the rim within this time results in loss of possession. A buzzer sounds when the clock reaches zero.



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The scoring hoop which is 18 in (45 cm) wide

Backboard Rectangular in shape and made of reinforced plastic, glass, or fiberglass, this is used to deflect the ball into the basket

of the court, three-point line, and free-throw line. The baskets are always 10 ft (3.05 m) above the floor and attached to

The basketball court is a rectangular playing surface

highly polished. Courts come in different shapes and sizes. In the National Basketball Association (NBA), the court is 94 ft (28.5 m) long by 50 ft (50.25 m) wide. Under International Basketball Federation (FIBA) rules,

usually made out of a hardwood, often maple, and

the court is slightly smaller, measuring 92 x 49 ft (28 x 15 m). Lines mark out the dimensions

rectangular (or sometimes fan-shaped) backboards.

THE COURT

WHO PLAYS WHERE

Free-throw line

FREE-THROW LINE

Because penalties play such a

basketball, the percentage of free throws scored can be the

difference between winning and

between one and three attempts

committed by the opposing team.

losing a game. Free throws are

always worth one point and

are awarded to a team

depending on the penalty

large part in the sport of

From where a player takes an unopposed shot at the basket following a foul

Often the fastest player on the team, the point guard organizes the team's offense by calling preplanned offensive plays, controls the ball, and creates scoring opportunities

50 ft (15.25 m)

Point guard

Shooting guard
This player creates a high volume of shots on offense, and guards the opponent's best perimeter player on defense

Small forward

Small forwards are primarily responsible for scoring points, and are often secondary rebounders behind power forwards and centers. Small forwards are prolific scorers

Power forward

Though not as physically imposing as centers, they need to be aggressive rebounders and score most of their points from about 6 ft (2 m) from the basket

The tallest player on the team. Uses size either to score (on offense) or to protect the basket closely (on defense)

Sideline Line that marks the court on both sides

Jump ball tosses the ball up between two players who tip it to a teammate to start the game

Center line The middle of the court separating both

SIDELINES

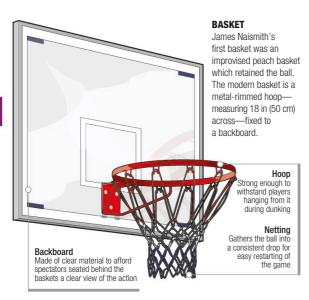
The shirt number of former Chicago **Bulls star Michael Jordan, widely considered** the greatest player of all time. Jordan chose the number out of admiration for his older brother. Larry wore 45, and Michael, believing he had only half his brother's talent, chose 23 (rounded up from 22.5). It was also the shirt number chosen by soccer player David Beckham when he signed for Real Madrid in 2003.

38,387 The total number of points accumulated by Kareem Abdul-Jabbar. Although retired since 1989, he remains the NBA's leading all-time points scorer.

110,000 The cap for a WNBA player's salary in US dollars—far below the salaries of NBA players.

The height, in feet (2.19 m), of Margo Dydek. The Polish player, who played in the WNBA from 1998-2008, was the tallest in the association's history.

Circumference of a modern basketball in inches (76 cm). The WNBA uses a smaller ball (circumference of 28.5 in).

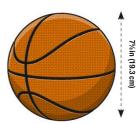


EQUIPMENT

The beauty of basketball is that you can play almost anywhere, with very little equipment. All that is really required for social play is a ball and two baskets—or one if you play half-court. For tournament and professional play, teams wear regulation shirts and shorts bearing their chosen squad number. In a sport where the legs, particularly the ankles and knees, take heavy punishment, sneakers are carefully chosen for comfort and game-improvement, and some form of muscle and joint support is common. Wrist and headbands are usual, too.

BALL

The basketball has come a long way since the style first used in the late 19th century. That ball was heavy, with prominent sticthing and an inconsistent bounce. Today's basketball is made from eight finely stitched pieces of leather filled with air. It has a radius of 7½ in (19.3 cm) and a circumference of 30 in (76 cm). It weighs 21–23 oz (600–650 g).



PLAYING THE GAME

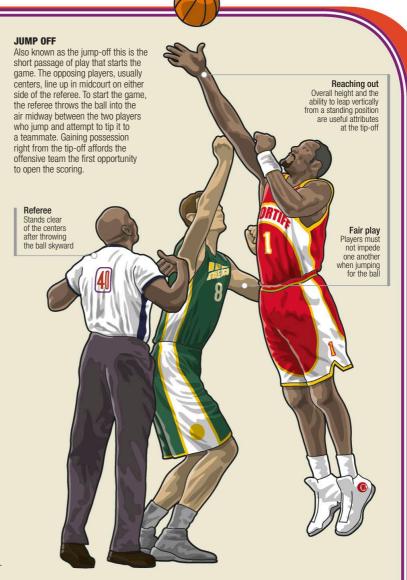
Following the jump off which starts the game (see right) the two sets of players simply aim to score more points than the other. Attacks are mounted via a combination of passing and dribbling, and when a player feels they are in a position to score, they shoot. Basketball is truly an "end-to-end" sport with numerous baskets scored during the course of a game. Often the winning side will have accumulated more than 100 points.

BASKETS, POSSESSION, AND REBOUNDS

If a player is successful in shooting a basket, the team is awarded two or three points depending on the distance from the basket. The game restarts with the opposing team in possession on the end line underneath their own basket. If a shot is unsuccessful, and it bounces off the rim or backboard, players compete for "rebounds." If the offense picks up a rebound, they can prepare for another shot: if it is the defense, they then mount a speedy counterattack. Having a center who is particularly adept at picking up rebounds on defense is a huge advantage as turning defense into attack at such speed catches the opposition unaware and often leads to a basket. In the NBA, players such as Shaquille O'Neal have made careers out of this.

OUT OF BOUNDS

The ball is out of bounds when it touches the floor, or any object on, above, or outside of a boundry, or the backboard supports. When the ball goes out of play the clock is stopped. The ball is put back into play by the team that did not not touch it last when it went out of bounds. A player has five seconds to put the ball in play after the referee signals the restart.



RULES AND REGULATIONS

Basketball was born in 1891 with 13 rules covering all the basics of play. Incredibly, the NBA has only 12 main rules today—but each has many clauses and sub-sections. There are subtle rule differences between the game played by the NBA, WNBA, International Basketball Federation (FIBA), and National Collegiate Athletic Association (NCAA). Games are made up of four 12-minute quarters in the NBA. Teams can have up to 12 players but only five of these can be on the court at a time.

PERSONAL AND TECHNICAL FOULS

The team of a fouled player either receive the ball to pass inbounds, or receive one or more free throws if they are fouled in the act of shooting, depending on whether the shot was successful. If a player commits five fouls, they are removed from the game.

PERSONAL FOUL This is a breach of the rules that concerns illegal personal contact with an opponent including charging, blocking, pushing, holding, and reaching.

TECHNICAL FOUL This is an infraction of the rules usually concerning unsportsmanlike noncontact behavior, and is generally considered a more serious infraction than a personal foul. This includes profane language by a player or coach, contesting decisions, fighting, time-wasting, and illegal substitutions.

VIOLATIONS

Violations are infractions of the rules governing how the ball can be handled. The ball must stay within the court: the last team to touch the ball before it travels out of bounds forfeits possession. The ball-handler may not move both feet without dribbling, known as traveling, nor dribble with both hands or catch the ball in between dribbles, a violation called double dribbling. A player's hand cannot be under the ball while dribbling: doing so is known as carrying the ball. A team, once having established ball control in the front half of the court, may not return the ball to the backcourt.

TIME LIMITS

There are various limits imposed on regulation play, all of which are designed to promote more offense. The time taken before progressing the ball past center court (eight seconds in international, NBA, and WNBA; ten seconds in NCAA and high school); before attempting a shot (24 seconds in the NBA and WNBA. 35 seconds in NCAA); holding the ball while closely guarded (five seconds); and remaining in the restricted area (the lane, or "key") (three seconds) are all monitored by the referee.

SCOREBOARD

With four replicate sides, the scoreboard keeps all members of the crowd informed about the action. A main screen is surrounded by details of timeouts, points, fouls, score, and time remaining.

Big screen This can offer a direct feed from the live action on the

court, or replay action



Time and score The bottom of the scoreboard displays the points total of the two teams and the amount of time left in a quarter, or half

Team/player stats This section shows the total points scored and fouls committed by each player, as well as group fouls and timeouts

Advertising In the NBA, WNBA, and in college basketball, space around the perimeter of the board is used for advertising

OFFICIALS' SIGNALS

With a myriad of different rules to enforce—it is not just the players but also the coaching staff off-court who can incur penalties—basketball officials need to make split-second decisions and have excellent peripheral vision. Two referees are ably supported by a scorekeeper, timekeeper, 24-second clock operator, crew chief, and commissioner. Referees have a series of established gestures and signals to indicate aspects of play and rule breaches to fellow officials. A selection of these are shown below.



BLOCKING

The referee places clenched fists against the waist to indicate a player illegally impeding another.



CHARGING

An offensive foul that occurs when an attacking player runs into a defender, who has an established position.



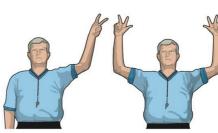
TRAVELING

This rotating motion denotes traveling-essentially moving with the ball (definitions differ) for a period without bouncing it.



JUMP BALL

When two opposing players both have a grip of the ball the referee will hold his arms aloft to signal a jump ball.



TWO-POINT SCORE

Left arm raised with the index and middle fingers extended denotes a two-point basket to the watching scorekeeper.



Both hands raised with three fingers on each hand extended indicates a score made from outside the three-point arc.

TIMEOUT

Timeouts are breaks in the action which can be called by team coaches and players, usually at key points in the game, to discuss tactics and raise player morale. In the NBA, teams are allowed one 20-second timeout per half, and seven full timeouts over the course of the entire game.

STAT CENTRAL

NBA ALL-TIME LEADING POINTS		
POINTS	PLAYER	
38,387	KAREEM ABDUL-JABBAR	
36,928	KARL MALONE	
33,643	KOBE BRYANT	
32,543	LEBRON JAMES	
32,292	MICHAEL JORDAN	
31,560	DIRK NOWITZI	
31,419	WILT CHAMBERLAIN	
28,255	SHAQUILLE O'NEAL	
27,409	MOSES MALONE	
27,313	ELVIN HAYES	

NBA ALL-TIME PLAYOFF POINTS		
POINTS	PLAYER	
6,911	LEBRON JAMES	
5,987	MICHAEL JORDAN	
5,762	KAREEM ABDUL-JABBAR	
5,640	KOBE BRYANT	
5,250	SHAQUILLE O'NEAL	
4,761	KARL MALONE	
4,457	JERRY WEST	
4,233	TIM DUNCAN	

WNBA ALL-TIME PLAYOFF POINTS		
POINTS	PLAYER	
1,228	DIANA TAURASI	
1,141	TAMIKA CATCHINGS	
1,077	MAYA MOORE	
953	LINDSAY WHALEN	
908	LISA LESLIE	
891	SEIMONE AUGUSTUS	
871	CANDACE PARKER	
867	DEANNA NOLAN	

NBA ALL-TIME PPG		
POINTS	PLAYER	
30.1	MICHAEL JORDAN	
30.1	WILT CHAMBERLAIN	
27.4	ELGIN BAYLOR	
27.2	LEBRON JAMES	
27.0	JERRY WEST	
27.0	KEVIN DURANT	

WNBA ALL-TIME PPG		
POINTS	PLAYER	
21.0	CYNTHIA COOPER	
20.3	ELENA DELLE DONNE	
20.0	BREANNA STEWART	
19.6	DIANA TAURASI	
19.1	ANGEL MCCOUGHTRY	
19.1	ARIKE OGUNBOWALE	

TECHNIQUES

While height and athleticism are prerequisites for a basketball player, so too are ball-handling skills. An ability to pass, dribble, shield the ball from opponents, and above all shoot baskets is essential and must be mastered for a player to progress. Teamwork is also important. Basketball players will always work as a unit, whether on defense (double-teaming to turn the ball over) or in offense (setting screens to allow a teammate a clear shot). The following techniques are among the most common.

Which foot?

The player's position upon receiving the

MOVING

Players have unrestricted movement on the court but are prohibited from running while holding the ball. While holding the ball, players can use the pivot foot—one foot set on the ground—while having full mobility with the rest of the body.



When an opponent is positioned to block a normal chest pass, a player can bounce the ball to a teammate instead. This takes longer to complete than the chest pass, but it is also harder for the opposing team to intercept as it is aimed at the court floor.

DRIBBLING

Dribbling is the act of bouncing the ball continuously, and is a requirement for a player to take steps with the ball. When dribbling past an opponent, the dribbler should dribble with the hand farthest from the opponent, making it more difficult for the defensive player to get to the ball. It is therefore important for a player to be able to dribble competently with both hands.

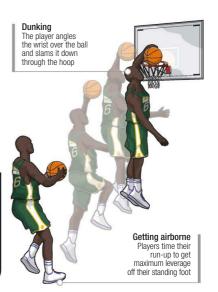
ing

SHOOTING

Shots are commonly made from a standing or jumping position (known as a jump-shot), or as a lay-up shot, which requires the player to be in motion toward the basket and to "lay" the ball in off the backboard. The highest-percentage accuracy shot is the crowd-pleasing slam dunk (right), in which the player jumps very high and throws the ball downward through the hoop.

LITTLE BIG MAN

MUGGSY BOGUES, FORMER PLAYER FOR THE CHARLOTTE HORNETS, IS THE SHORTEST PLAYER EVER TO PLAY IN THE NBA, AT 5FT 3 IN (1.60 M).





TACTICS

While the object of basketball is simple—to score more points than the opposing team—some of the strategies to achieve this can be increasingly complex as the standard of play rises. Offensive plays usually center around rapid counterattacks, using a variety of formations to get the ball up court as quickly as possible. Offense is often directed by the team's point guard. Defensive plays require discipline, tracking an opponent stride for stride and attempting to spoil their work. Timeouts called by the coach will invariably be used to discuss tactics.

OFFENSE

Teams almost always have several offensive plays planned to ensure their movement is not predictable, including the fast break (right). Plays normally involve planned passes and movement by players without the ball. A quick movement by an offensive player without the ball to gain an advantageous position is called a cut. A legal attempt by an offensive player to stop an opponent from guarding a teammate is a screen or pick. Screens and cuts in offense allow the quick passes and teamwork which can lead to a successful basket.

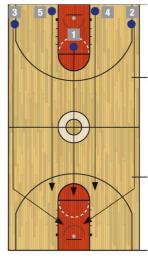
DEFENSE

There are two main defensive strategies: zone defense and player-to-player defense. Zone defense involves players in defensive positions guarding whichever opponent is in their zone, such as the zone press (right). In man-to-man defense, each defensive player guards a specific opponent and tries to prevent them from dribbling, making passes or shots by staying as close as possible—invading the opponent's "bubble.' Defenders focus on the position of the hands (both their own and the attacker's) and must be adept at spotting a fake pass or shot and stealing.

THE NBA PLAYOFFS

The NBA season starts in November with the regular season, in which teams from the Eastern and Western Conferences compete in a round-robin format, playing a grueling 82 games. The top eight teams from each Conference qualify for the playoffs, which begin in late April. Teams in the playoffs are seeded accordingly to their performance in the regular season. A series of elimination rounds culminates in a best-of-seven series between the victors of both conferences. Known as the NBA Finals, it is held annually in June. The victor in the NBA Finals wins the Larry O'Brien Championship Trophy. With 16 NBA Finals victories, the Boston Celtics are the most successful team in NBA history.

FAST BREAK



Best ball handler

He or she should fill the middle land of the court

Shooting guard

Fills the left outside lane and runs into court within 12 in (30 cm) of the sideline

Small forward

but in orwards as shooting guard but on other side of court. Too many players fail to do this and the team does not benefit from the spread (floor spacing) needed for a successful primary break

Power forward

Also the nonrebounder, trailing the play. He or she should continue downcourt to follow any attempted shots by players #1, #2, or #3

Center/rebounder

Keeps to his or her own lane and serves as "safety" in case there is a sudden change of possession

ZONE PRESS



Top-court press

The shooting guard takes position in the front half of the near foul circle and forces opponents to move. Ideally a smaller player with good speed and quick hands. They are limited to lateral movements in the backcourt

III IIIE DAUNGUI

Wing players.
The wing players, #2 and #3, are taller forward players. The more athletic forward should be placed in the #2 position, as the defensive team should force the attack in his/her direction.

Centerfielder

The player should be the quickest on the team with good court sense and anticipation

Last line of defense

The player at the back is usually the center, the tallest team member and the best rebounder. The primary responsibility of this player is to prevent easy shots by the opposing players

INSIDE STORY

The International Basketball Federation, more commonly known by the French acronym FIBA, is an association of national organizations that governs international competition in basketball. The association was founded in Geneva in 1932, two years after the sport was officially recognized by the IOC. Its original name was Fédération Internationale de Basketball Amateur. Eight nations were founding members: Argentina, Czechoslovakia, Greece, Italy, Latvia, Portugal, Romania, and Switzerland. During the 1936 Summer Olympics held in Berlin, the Federation named James Naismith (1861–1939), the founder of basketball, as its Honorary President. FIBA has organized a FIBA World Championship for men since 1950 and a World Championship for Women since 1953. Both events are now held every four years, alternating with the Olympics.

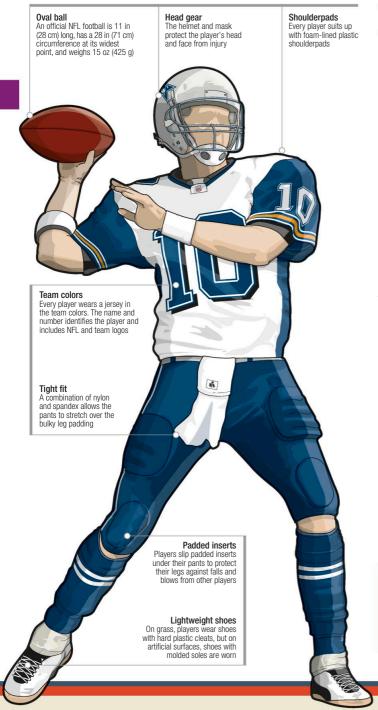
NATIONAL BASKETBALL ASSOCIATION

The NBA and the WNBA are the world's premier basketball leagues. The NBA has 30 teams: 29 in the United States and one in Canada. The league was founded in New York City on June 6, 1946, as the Basketball Association of America (BAA). The league adopted the name National Basketball Association in the fall of 1949 after merging with the rival National Basketball League. The league's several international and individual team offices are directed out of its head offices located in the Olympic Tower at 645 Fifth Avenue in New York City.

HARLEM GLOBETROTTERS

THE HARLEM GLOBETROTTERS ARE AN EXHIBITION BASKETBALL TEAM AND ONE OF THE WORLD'S MOST FAMOUS SPORTS FRANCHISES, THEY WERE CREATED BY ABE SAPERSTEIN IN 1927 IN CHICAGO. THE TEAM ADOPTED THE NAME HARLEM BECAUSE OF ITS CONNOTATIONS AS A MAJOR AFRICAN-AMERICAN COMMUNITY, OVER THE YEARS. THEY HAVE PLAYED MORE THAN 26,000 EXHIBITION GAMES IN 123 COUNTRIES AND TERRITORIES, MOSTLY AGAINST DELIBERATELY INEFFECTIVE OPPONENTS. THEY HAVE WON OVER 98 PERCENT OF THEIR GAMES.





NEED2KNOW

- Football is the most popular spectator sport in the United States. Every year, almost half of all Americans tune in to watch the Super Bowl—the NFL championship game.
- A professional league in Canada plays a version of football using specific Canadian rules.
- American football enjoys limited popularity outside of North America. Leagues exist in countries such as Britain, Germany, Japan, and Mexico.
- The first regular NFL season game to be held outside the United States was staged in Mexico City in 2005. An NFL-record 103,467 people packed the stadium.

GAME OVERVIEW

Jokingly described as "not a contact sport but a collision sport," football is also known as gridiron football in some countries and just football in the US. Two teams of 11 players compete during four periods of play (known as quarters) to score points by advancing an oval ball into the opposition's end zone or by kicking it through the opponent's goal posts. The offense has a series of four attempts, or "downs," to move the ball 10 yards up the field. If successful, it is granted a new set of downs. The defense attempts to stop them and win possession of the ball. While huge linemen clash at the line of scrimmage. running backs and lightning-quick receivers provide options for the playmaker: the quarterback. Highly tactical, explosive, and fast, football is like armored chess.

PLAYER PROFILE

Because there are so many different positions, each with specific roles and physical demands, there is no typical physical make-up. But most players combine strength and power with outstanding athletic ability, and excellent hand-eye coordination is essential. Depending on the position, heights range from 5'11" to 6'8" (1.8 to 2 m) and weights range from 190 to 300+ lb (86 to 136+ kg).

FOOTBALL







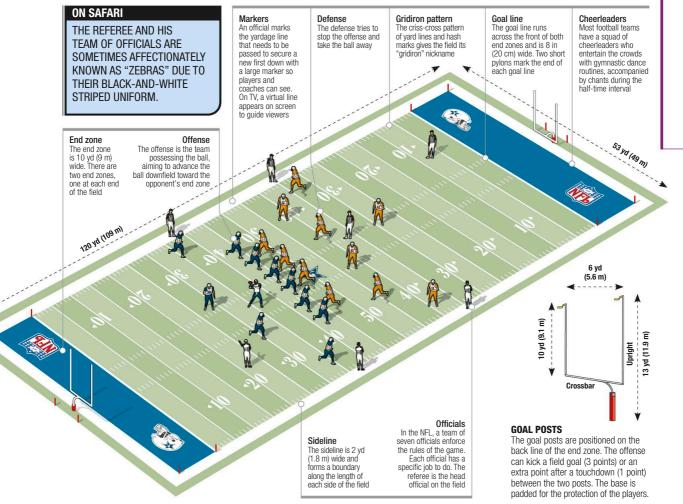


THE GRIDIRON

A professional football field is bounded by long sidelines and short end lines, forming a rectangle that measures 120 x 53 yd (109 x 49 m). The 100 yd (91 m) between the end zones are divided by yard lines that cross the field every 5 yd (4.5 m) and are numbered every 10 yd (9 m). Four rows of hash marks run the length of the field—the outer two mark 1 yd from the sidelines; the inner two mark the area in which plays must start if the ball goes out of bounds on the previous play. The scoring area (end zone) is bounded by the goal line, the end line, and sidelines. Most fields are covered in grass, but many have artificial surfaces.

PLAYERS AND POSITIONS

Every NFL team has a roster of up to 53 players. Only 11 are on the field at any one time, but many are used in the course of a game—some or all of the team may be substituted in the break between plays, if there is enough time. Each player has a specialized role within one of three main playing units: offense, defense, and special teams. The offensive players include the quarterback, offensive linesmen, receivers, and running backs. The defensive positions include defensive linesmen, linebackers, cornerbacks, and safeties. Positions in the special teams include kicker, punter, holder, long snapper, short snapper, and punt returner.



SIDELINES

5,300,000 The estimated cost, in US dollars, to screen a 30-second television advertisement during coverage of the 2019 Super Bowl.

200 The NFL record for quarterback sacks—a defensive maneuver where the quarterback is tackled behind the line of scrimmage before he is able to release the ball. It is held by Bruce Smith of the Buffalo Bills (1985–1999) and Washington Redskins.

70,081 The attendance at the 2019 Super Bowl at the Mercedes-Benz Stadium in Atlanta, Georgia, where the New England Patriots defeated the Los Angeles Rams 13–3.

The record for the most points scored in the Super Bowl throughout a player's career. The record is held by San Francisco 49ers player Jerry Rice, widely acknowledged as one of the greatest wide receivers in NFL history.

PADDED FOR PROTECTION

Football is a full contact sport. Every part of the body needs to be protected from charging players or flying hits to the chest or ribs. Spectacular head clashes are common, but serious injuries are rare. A helmet is the most vital piece of equipment, with internal padding, a chin strap, and a mask to protect the face from accidental blows. Most players also wear a mouth quard to shield the teeth from hits.

The players' equipment is what gives them their "top-heavy" appearance. Hard shoulder pads are worn over soft shock pads, which absorb hard blows. Other pads are used depending on the player's position and as protection against specific injuries. Linemen wear gloves to protect their hands from being trapped between helmets or shoulder pads.

PROTECTIVE PADDING

A range of pads can be worn, each of which are designed to protect specific parts of the body.





Arm guard
Tight-fitting arm
guards are worn
to cushion the
forearms and protect
any existing injuries

Head and face

The helmet consists of a shell, the face mask, and a chin strap. Air bladders inside the helmet prevent it from slipping. The quarterback's helmet often incorporates a microphone and speaker so he can receive plays and discuss tactics with the coach

Shoulder and chest

The shoulder pads protect the shoulders and chest area. The outer shell is made from a tough plastic, while the insides are padded with foam to make them more comfortable. The pads are fixed with straps and buckles

Hip protection

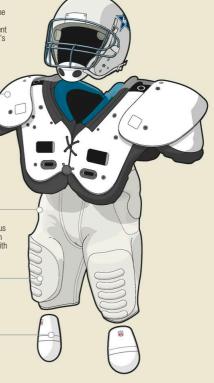
Pads for the hips come in various shapes and styles depending on field position. Players dealing with an injury may also wear them for extra protection

Thigh pads

Pads for the thighs give extra protection to these high-impact areas

Knee protection

Rigid pads slip into pockets inside the pants to absorb blows to the knees



SCORING POINTS

The aim of the game is to score more points than your opponent. The main way to do this is by scoring touchdowns, worth six points, by advancing the ball into your opponent's end zone. It can be run over the line or passed to a teammate in the end zone. After a touchdown, the offense can score an extra point by kicking the ball through the uprights, or two points by running or passing the ball into the end zone. A field goal worth three points can be scored by kicking the ball through the uprights. A safety (two points) is awarded if an opponent is tackled in his own end zone or drops the ball in his end zone and it goes out of play.

KICKOFFS

A kickoff starts each half and follows each score. The kicker boots the ball from the 30-yard line while his teammates follow it upfield. The opposition's kick returner catches the ball and advances with it; the offensive drive starts where he is tackled. A "touchback" is signaled if the returner catches the ball in his end zone and kneels down. (The drive then starts from the offense's 20-yard line.) A touchback also occurs if the kick goes beyond the end zone or if there is a turnover (the ball passing from offense to defense) in the end zone. If a safety is scored, the opposition kicks the ball to the scoring team from its 20-yard line.

PENALTIES

Penalties are given for rule violations and usually consist of moving the ball toward the offending team's end zone and replaying the down. Some of the most common penalties include:

BLOCK IN THE BACK An offensive player pushes an opponent in the back. **FACE MASK** Grabbing an opponent's face mask.

HOLDING Illegally holding an opponent other than the ball carrier.

INTERFERENCE Illegally obstructing a player attempting to catch a pass.

ENFORCING THE RULES

Officials wear a distinctive uniform consisting of shirts with black-and-white stripes, white pants, and a black or white hat. The head referee guides six officials with specific duties—the umpire, head linesman, line judge, field judge, side judge, and back judge. An official signals an infringement by throwing a yellow flag. The referee then conveys the decision using a hand signal and an announcement. One referee described the job as "trying to maintain order during a legalized gang brawl involving 80 toughs with a little whistle, a hanky, and a ton of prayer."



INTERFERENCE

A penalty in which a player has interfered with another player during a passing play.



OFFSIDE

A defensive player is on the wrong side of the line of scrimmage at the start of play.



FIRST DOWN

The offense is granted a new series of four downs after gaining 10 yards.



HOLDING

A penalty in which a player of either side has illegally held an opponent.



FAI SE START

This is called when a member of the offense moves illegally before the ball is snapped.



ILLEGAL BALL TOUCH

A penalty in which a player of either side has illegally touched the ball.

10 YARDS AT A TIME

Territory and possession are the keys to success in football. The team in possession of the ball is the offense. They have four chances, or "downs," to run or pass the ball 10 yards toward the end zone of the defense. If the offense gains the yards, they get another four downs in which to advance another 10 yards. The drive continues until the team scores, runs out of time, or loses possession. The offense might not make 10 yards in four downs, for example, or there could be a turnover if a pass is intercepted or the ball is fumbled. The two teams then switch roles, and play continues.

IN POSITION

The three main playing units in a football team are the offense, defense, and special teams. Offense and defense are comprised of a range of different players in a variety of positions, such as the basic offense and defense formations (see right).

Special teams are the units that do anything that is not regular offense and defense, particularly kicking and returning kicks. They comprise kickers, snappers, ball holders, and returners. The kicker kicks off and scores points by kicking the ball between the uprights. The punter "punts" the ball back to the opposition if his own team is unlikely to make 10 yards. Snappers restart play by passing the ball to a teammate. Ball holders hold the ball upright when a kick is taken, and kick returners are catchers and runners who catch kickoffs and punts and advance them up the field.

BASIC DEFENSE

The defense aims to stop the offense from gaining yards. Most teams in the NFL use a formation called the 4-3 defense, in which four defensive linemen (two defensive ends and two defensive tackles) line up in front of three linebackers. Two safeties play behind to stop longer passes and runs, while two cornerbacks cover passes to the wide receivers.

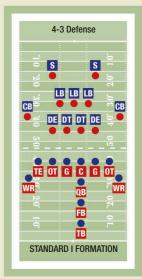
DE Defensive ends **DT** Defensive tackles LB Linebackers CB Cornerbacks S Safeties

BASIC OFFENSE

The Standard I Formation is a common attacking offense using five offensive linemen (two offensive tackles, two guards, and the center). A tight end sits on one side of the line, and a wide receiver starts at each end of the line. This offense is typically used in running plays.

POSITIONS:

WR Wide receivers OT Offensive tacklers G Guards C Center QB Quarterback FB Fullback RB Running back TE Tight end



PLAYING BY THE BOOK

Strategy is an important part of every game of football. Every team, from the professional NFL down to high school teams, has a playbook of plays that have been practiced on the training field. Sometimes, teams start a game with five or six plays already decided, after which the coach calls plays to suit the stage of the game.

SPECIAL SKILLS

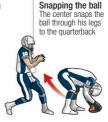
Each player develops specific skills according to his position. For example, blocking and tackling are important attributes of defensive linemen, a good throwing arm is an obvious requirement for a quarterback, and wide receivers combine lightning acceleration with excellent catching ability. Other players, such as the kicker and punt returner, specialize in one part of the game.



One of the most important duties of a quarterback is to pass the ball to a receiver. Strength and accuracy are vital, as he must be able to throw the ball to a specific player over long distances.

THE SNAP

Each down begins when the center snaps the ball to the quarterback. The quarterback usually stands directly behind the center. In the shotoun formation. he stands farther back to create more space for the pass.





THE TACKLE

The tackler bends his knees and crouches as the ball carrier approaches. On impact, he accelerates up and through the opponent, generating power by straightening his legs and using his upper body to get the ball carrier to the ground.

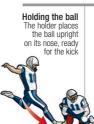


Play over The play ends when the tackled player touches the ground with any part of body apart from hands and feet



THE FIELD GOAL

For a field goal attempt, the ball holder stands 7 yd (6 m) behind the center, who snaps the ball to him. The holder then catches it and sets it up for the kick. The kicker steps forward and swings his foot through the ball, propelling it between the uprights.



Kicking for goal The kicker boots the ball hard and true, aiming







STAT CENTRAL

SUPER BOWL WINNERS		
YEAR	WINNER	
2019	NEW ENGLAND PATRIOTS	
2018	PHILADELPHIA EAGLES	
2017	NEW ENGLAND PATRIOTS	
2016	DENVER BRONCOS	
2015	NEW ENGLAND PATRIOTS	
2014	SEATTLE SEAHAWKS	
2013	BALTIMORE RAVENS	
2012	NEW YORK GIANTS	
2011	GREEN BAY PACKERS	
2010	NEW ORLEANS SAINTS	
2009	PITTSBURGH STEELERS	
2008	NEW YORK GIANTS	
2007	INDIANAPOLIS COLTS	
2006	PITTSBURGH STEELERS	
2005	NEW ENGLAND PATRIOTS	

NFL ALL-TIME TOUCHDOWNS		
NO.	PLAYER	
208	JERRY RICE	
175	EMMITT SMITH	
162	LADAINIAN TOMLINSON	
157	RANDY MOSS	
156	TERRELL OWENS	
145	MARCUS ALLEN	
136	MARSHALL FAULK	
131	CRIS CARTER	
128	MARVIN HARRISON	
126	JIM BROWN	
125	WALTER PAYTON	
118	LARRY FITZGERALD	
116	JOHN RIGGINS	
116	ANTONIO GATES	
113	ADRIAN PETERSON	

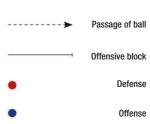
NFL ALL-TIME TOUCHDOWN PASSES		
NO.	PLAYER	
539	PEYTON MANNING	
527	TOM BRADY	
522	DREW BREES	
508	BRETT FAVRE	
420	DAN MARINO	
383	PHILIP RIVERS	
363	BEN ROETHLISBERGER	
362	ELI MANNING	
346	AARON RODGERS	
342	FRAN TARKENTON	
310	MATT RYAN	
300	JOHN ELWAY	
294	CARSON PALMER	
291	WARREN MOON	
290	JOHNNY UNITAS	

PHYSICAL SPORT

Because the only way in which to stop a ball carrier is to knock him to the ground, American football is physically very demanding on the players. Kicks, punches, and trips are strictly prohibited, and the tackler cannot lead with his helmet or grab the ball carrier's face mask in the tackle. Even with all the safety equipment, rules, and penalties governing physical contact, however, some tackles can still result in serious injuries. Most at risk are targeted players such as the quarterback and running backs. They rarely manage to play a full season without picking up an injury, and teams need a full roster of replacements.

PLAYS

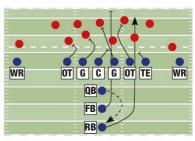
Offensive plays aim to advance the ball toward the opposition's end zone, with the ultimate goal of scoring a touchdown. Defensive plays aim to stop the offense from moving forward, forcing errors that could result in a turnover. Every team uses different positions and formations to deal with specific game situations.



Player movement

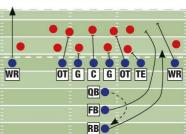
RB OFF-TACKLE

The running back off-tackle is the most common running play in the offense. The quarterback hands the ball off to the running back, who runs through a hole created by the offensive tackle and the tight end.



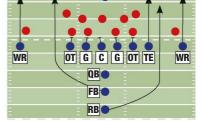
SWEEP

The sweep is a long-developing offensive running play in which the running back takes a pass from the quarterback and then runs parallel to the line of scrimmage. This gives the fullback and offensive linemen time to block defenders in front of the running back. Once a gap appears in the defensive line, the running back turns back upfield and runs straight through it.



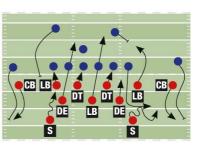
HAIL MARY

The Hail Mary is a passing play in which the quarterback throws a long ball toward a number of receivers who are simultaneously running at the defense's end zone. The play is often used as a last resort by the trailing team at the end of the game. The Hail Mary has relatively little chance of completion success, but it can force a pass interference penalty from a disorganized defense.



BLITZ DEFENSE

Defenses use the blitz to put extreme pressure on the opposing quarterback and try and force a sack. Linebackers, safeties, or cornerbacks rush the quarterback to disrupt the play. A blitz is a great way to force quarterback errors, but it also leaves receivers open to passes if the offense reads the play.

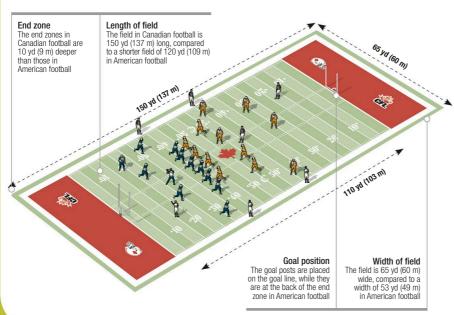


CANADIAN FOOTBALL

Canadian football is essentially the same as American football but with a few key differences, as well as many minor rule distinctions. The playing field in Canadian football is generally longer and wider. Each team has 12 players on the field at any one time—the extra player in the Canadian game usually occupies a backfield position. And there are three downs to advance the ball 10 yards in Canadian football compared to four in the American game.

CANADIAN FOOTBALL LEAGUE

The Canadian Football League (CFL) has been the national governing body for Canadian football since 1958. Prior to this, the sport came under the ruling of the Canadian Rugby Union (CRU). Canadian football has developed independently of American football, and the governing bodies in each country have retained separate rules and regulations.



CROSS COUNTRY

SOME FOOTBALL PLAYERS
HAVE PLAYED IN BOTH
AMERICAN AND CANADIAN
LEAGUES, SUCH AS THE
HIGHLY DECORATED
QUARTERBACK WARREN
MOON. THE ONLY PLAYER
TO BE INCLUDED IN BOTH
NFL AND CFL HALLS OF
FAME, MOON'S CAREER
STATS COMBINE TOTALS
FROM BOTH LEAGUES.

CELEBRATING THE DIFFERENCES

Although the equipment and playing area of Canadian football may at first glance seem identical to American football, they are, in fact, subtly different. The field is slightly larger, the goal posts are placed in a different position, and the football carries different markings.



Ball stripes

CFL-sanctioned balls are roughly the same size and weight as those used in the NFL, but they have two white stripes 1 in (2.5 cm) from each end. NFL balls have no stripes at all

INSIDE STORY

Football grew from rugby football, a game played in England in the early 1800s. By the 1880s, football and rugby football had grown apart as each sport developed standardized rules. Originally a college sport, football went professional in the early 1900s, and the National Football League (NFL) was formed in 1920. It became more popular in the 1950s, when TV coverage brought the sport to a national audience. Since the 1990s, football has eclipsed baseball as the most popular spectator sport in the US.

AMERICAN FOOTBALL AROUND THE WORLD

AMERICAN FOOTBALL ENJOYS LIMITED POPULARITY OUTSIDE THE UNITED STATES AND CANADA. THE NFL NOW STAGES AT LEAST ONE REGULAR-SEASON GAME OUTSIDE THE UNITED STATES EACH YEAR. WEMBLEY STADIUM IN LONDON, ENGLAND, HAS SERVED AS A VENUE FOR MANY OF THESE GAMES. SEVERAL EUROPEAN NATIONS RUN LEAGUES WITH VARYING DEGREES OF SUCCESS. JAPAN HAS THE SUCCESSFUL PRO X-LEAGUE, AND THE SPORT IS ALSO PLAYED IN AUSTRALIA, MEXICO, AND NEW ZEALAND.

THE SUPER BOWL

The annual Super Bowl is the championship game of the NFL. Following a playoff series involving 12 teams from the NFL conferences (six from the American Football Conference and six from the National Football Conference), two teams compete for the Vince Lombardi Trophy, named after the coach of the Green Bay Packers, who won the first two Super Bowls in 1967 and 1968. Traditionally, the game takes place on "Super Bowl Sunday" (in late January or early February) and is watched by hundreds of millions of people worldwide.

NATIONAL FOOTBALL LEAGUE (NFL)

The NFL is the leading pro football league in the United States. It comprises 32 teams in two conferences—the American Football Conference (AFC) and the National Football Conference (NFC). Each team plays 16 games during the regular season. The top six teams from each conference then compete in the playoffs that culminate in the annual Super Bowl competition.

NATIONAL COLLEGE FOOTBALL LEAGUE

The college football season begins two to three weeks earlier than the NFL, toward the end of August. The regular season continues through early December, ending with the annual Army-Navy Game and several conference championship games on the same weekend. The postseason consists of a series of bowl games that showcase top college teams.



PLAYER PROFILE

Rugby union is a hard-fought contact sport that requires players to be extremely fit, strong, and robust. The contest is particularly tough between the forwards, who are often more than 6 ft 2 in (1.8 m) tall and weigh in excess of 240 lb (110 kg). They tend to have great upper-body strength and powerful leg muscles, which they use to drive themselves forward. Backs are usually shorter and smaller in frame and tend to be more nimble. Ball handling and balance are important for the backs, who execute passes, moves, and tackles at high speed. They also need the coordination and concentration to kick and catch the ball under considerable pressure.

Rugby boots Similar to soccer shoes, they have leather uppers and flexible, synthetic soles holding studs

cotton socks many players protect their legs

Leg protection

eath the long wear shin pads to









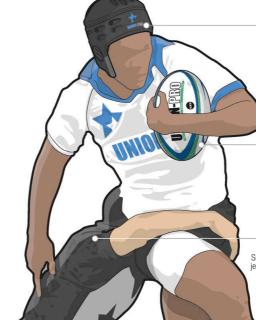
UGBY UNION

GAME OVERVIEW

Vividly described as "a hooligans' game played by gentlemen," rugby union is one of the most physically punishing of all ball sports. played under a rigorous rule code. Wearing minimal protection, two teams of 15 players clash to win possession of the oval ball, then advance it toward the opposition's try line. After two halves of 40 minutes each, the winner is the team that has amassed more points by scoring tries—grounding the ball in the opposition's in-goal area or by kicking conversions, penalty kicks, and drop goals between the uprights and above the crossbar of the opposition's goal posts. The fast pace and great physicality of the game can make it a highly dramatic spectacle.

NEED2KNOW

- Rugby union is the most popular form of rugby, the other being rugby league.
- → The sport is played in more than 100 countries around the world. It is particularly popular in Britain, Ireland, France, Australia, New Zealand, and South Africa.
- → The inaugural Rugby World Cup, held jointly in New Zealand and Australia in 1987, was won by rugby's most famous team: the New Zealand All Blacks.
- The Women's Rugby Football Union was set up in Britain in 1983. The first official women's Rugby World Cup was held in 1998.



Oval hall

Head protection Bandages, soft padding, or scrumcaps are often worn by forwards, whose heads regularly come into contact with other heads, knees, and boots

The focus of every rugby game, the oval-shaped ball is made of four stitched or glued panels of leather or (more recently) synthetic materia

Evolving style

Since the mid-1990s, rugby jerseys worn by professional teams have evolved from heavy-duty cotton shirts to hard-to-grab, closefitting, and lightweight shirts made from technologically crafted synthetic materials

Heavy duty

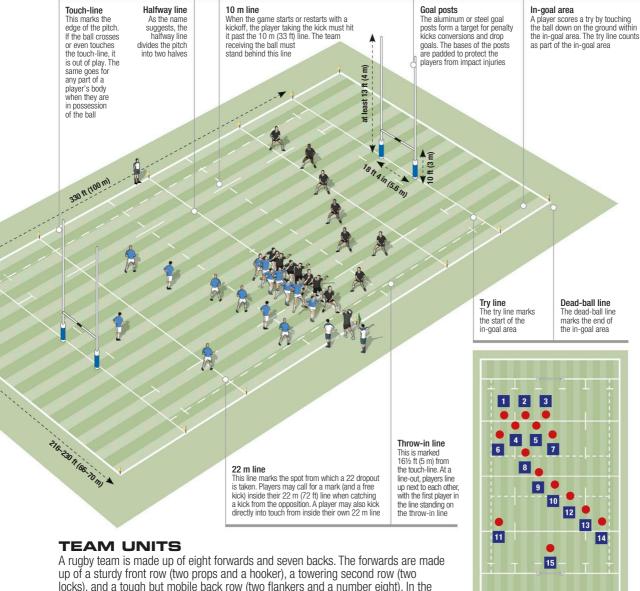
Usually made of heavy-duty cotton, shorts may have the player's number on the leg

DECLARATIONS OF WAR

MANY SOUTHERN HEMISPHERE TEAMS PSYCH THEMSELVES UP AND INTIMIDATE THEIR OPPONENTS BY PERFORMING TRADITIONAL WAR DANCES BEFORE INTERNATIONAL MATCHES. THE MOST FAMOUS IS THE "HAKA" OF THE NEW ZEALAND ALL BLACKS. THE FIJIAN RUGBY TEAM PERFORMS THE "CIBI" (PRONOUNCED "THIMBI"), THE TONGAN TEAM PERFORMS THE "KAILAO," AND THE SAMOANS PERFORM A WAR DANCE CALLED THE "MANU."

THE RUGBY PITCH

Rugby union is played on a rectangular grass playing field or pitch. In professional rugby, the length of the pitch is always 330 ft (100 m) from try line to try line, but the width of the pitch and the distance from try line to dead ball line may vary. Each team defends an in-goal area behind the goal posts defined by the try line, the dead ball line, and the touch-lines. Between the two try lines, a series of solid and dotted white lines are marked at regular intervals. These divide the pitch into zones, indicating where restart kicks are taken from and where players need to position themselves during set pieces.



A rugby team is made up of eight forwards and seven backs. The forwards are made up of a sturdy front row (two props and a hooker), a towering second row (two locks), and a tough but mobile back row (two flankers and a number eight). In the backs, the tenacious scrum half follows the ball and moves it between the forwards and the backs. The fly half is the team's playmaker and pivotal figure. He calls and initiates moves and usually does most of the kicking. The two centers are the defensive heart of the backs and, in attack, look for holes in the opposition's defenses. The wingers and fullback are the team's real speed merchants, often running in tries at the end of backs moves, but also the last line of defense.

POSITIONS BY NUMBER:

1 Loosehead prop 2 Hooker 3 Tighthead prop 4 Left lock 5 Right lock 6 Blindside flanker 7 Openside flanker 8 Number eight 9 Scrum half 10 Fly half 11 Left wing 12 Inside center 13 Outside center 14 Right wing 15 Fullback



RUGBY GOLDMINE

ALTHOUGH RUGBY LEAGUE HAD LONG BEEN A PROFESSIONAL SPORT, RUGBY HELD ONTO ITS AMATEUR STATUS UNTIL 1995. POPULAR WITH SPECTATORS AND TV AUDIENCES. IT HAS SINCE BECOME THE MORE PROMINENT AND LUCRATIVE FORM OF THE GAME AND HAS ATTRACTED SOME OF THE BEST LEAGUE PLAYERS.

WHAT THEY WEAR

Traditional rugby gear consists of just a jersey, shorts, socks, and boots. Although at most levels of the game little has changed, the professional game has seen quite an advance in the materials used in making rugby shirts. Similarly, a new approach to injury prevention has seen the emergence of various body protection systems.

Some forwards wear scrum caps to avoid "cauliflower ears"—permanent swelling caused by rubbing of the ears during scrums—and to provide protection against impacts. Upper-body padding has evolved more recently and is becoming increasingly popular.

BODY PROTECTION SYSTEMS

Unlike most sports that involve crunching physical contact, rugby players traditionally wore relatively little in the way of protective clothing. Some professional players now choose to wear padding around the head, shoulders, and collarbone.

Scrum cap Like the other items of padding. the headguard must meet World Rugby standards. It fits snugly on the head and is kept in place using a chin strap. Holes keep the head well ventilated

Universally worn shield An orthodontic mouth quard is custom-made by a dentist. Cheaper versions are molded by biting into a mouth guard that has been softened

Body padding

in hot water

Any padding worn on the shoulders must be light and thin enough to conform to strict World Rugby guidelines. Most shoulder-pad systems are made of sections of ventilated honeycombformed material sewn into tight-fitting nylon tank tops worn under the rugby shirt



BALL DIMENSIONS

Although balls used in junior rugby come in smaller sizes, balls used in senior rugby must be 11-12 in (28-30 cm) long and 23-24 in (58-62 cm) at their widest point.



HIGH-CUT BOOTS

Although some rugby boots are made with high-cut designs, giving extra ankle protection, many rugby players prefer to wear low-cut soccer shoes offering extra mobility.

SCORING POINTS

There are four ways of scoring in rugby: a try, a conversion, a penalty goal, and a drop goal. A player scores a try by grounding the ball in the opposition's in-goal area. A try is worth five points and earns the chance of a conversion—a place kick that is worth an extra two points. A kick at goal as the result of a penalty is taken just like a conversion but is worth three points. Also worth three points, a drop goal can be taken at any time from anywhere on the pitch, but the player must drop the ball on the ground just as he kicks it.

TELEVISION MATCH OFFICIAL

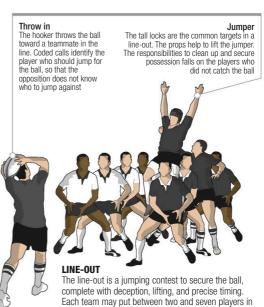
Professional rugby matches are frequently shown on sports channels. In these games, a television match official will be present to assist the match referee. The television match official (TMO) is a fully qualified referee, and his or her main job is to decide whether a try has been scored when the match referee is in doubt. Most TMO decisions confirm whether the player is in full control of the ball when it is grounded. The TMO studies television replays from various angles to spot any foul play or infringements, as well as to decide whether to award a try.

PLAYING THE GAME

Teams gain territory by running with the ball in hand, and passing it between players. Passes must not go forward, but kicking the ball forward is allowed. Kicking is a key way to gain territory, often by sending the ball into touch and setting up a line-out. The main method of defense is tackling the player with the ball. Tackles must be made below chest height, and tackling a player without the ball is forbidden.

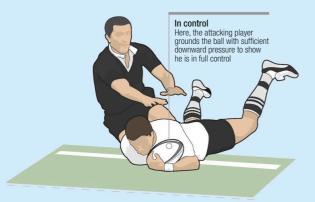
SET PIECES

Central to the sport are the set pieces that restart a game after a stoppage: restart kicks at the start of each half and after a score; line outs when the ball has gone in to touch; and scrums after infringements such as a forward pass.



GROUNDING THE BALL

The grounding of a ball in the opposition's in-goal area is technically more complicated than it might appear. The key rules are: first, the player must be inbounds, and second, they must be in control of the ball as they ground it. Players are allowed to slide into the in-goal area to score a try, but they cannot make a double movement to get the ball on or over the line.



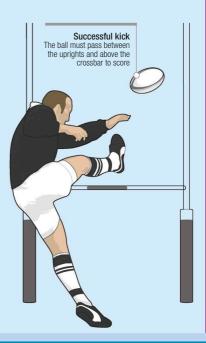
PENALTY TRY

A penalty try is awarded for deliberate or repeated foul play, or if a penalty offense prevents the scoring of a probable try. The subsequent conversion is lined up between the posts.

KICKING POINTS

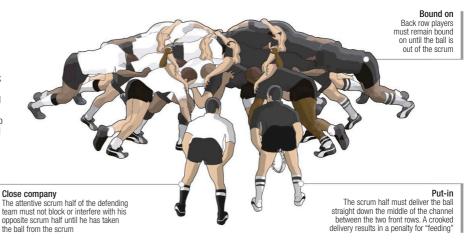
A penalty kick is taken from the place where the offense was committed or from where the ball lands if a player is obstructed after he punts it. While the kick is being taken, the opposing team cannot encroach within 33 ft (10 m).

A conversion is taken from any distance in line with the spot where the try was scored. Defenders can start to charge down conversion attempts as soon as the kicker starts to move toward the ball.



HEAD TO HEAD

A scrum is a contest of brute strength and scrummaging technique. The forward pack of each team binds together in formation and on the order of the referee engages the other pack head-on. On a signal given by the hooker, the scrum half rolls the ball into the channel between the two teams. The hooker then attempts to secure the ball by heeling it toward the back of the scrum.



RUCKING AND MAULING

Rucks and mauls are contests for ball possession during open play. A ruck forms when the player carrying the ball goes to ground. The first players to arrive from either side can bind together over the ball, pushing their opponents back and using their feet to "ruck" the ball back to their side. A maul is similar to a ruck, but the ball carrier remains on his or her feet, allowing the clump of players to move up and down the field.



Gone to ground When the ball carrier goes to ground, he or she must release the ball immediately or risk a penalty

NO HANDS

Players bound in a ruck may not use their hands to free the ball. If the ball becomes stuck, a scrum is given to the advancing side.

SIDELINES

6.288 The distance, in yards (5,750 m), that the áverage professional rugby back covers during a game.

The highest number of points scored by a single player in a Rugby World Cup match. It was achieved by Simon Culhane of New Zealand during their 145-17 victory over Japan during the 1995 Rugby World Cup.

750.000 The estimated number of people who gathered in London's Trafalgar Square on December 9, 2003, to greet England's World Cup-winning squad.

The highest winning margin in an international game. Argentina beat Paraguay 152-0 in May 2002. Japan won by the same margin in its 155-3 victory over Chinese Taipei in July 2002.

RULES OF RUGBY

The most fundamental rule in rugby is that the ball must not be passed or knocked forward from the hands. The result is a scrum to the opposition. Free kicks are awarded for lesser infringements, such as technical offenses, while penalties are awarded against players who become involved in the game while in an offside position or commit acts of foul play.

STAYING ON SIDE

During open play, a player is deemed offside if he or she is in front of a teammate who is carrying the ball. They are liable to concede a penalty if they try to take part in the game before they are back in an onside position. A scrum is awarded against players who are accidentally involved in the game while in an offside position. The offside rule also comes into play at set-pieces and when mauls and rucks are formed.

PENALTIES AND FOUL PLAY

Many penalties are awarded for fouls at close quarters, such as in a ruck or maul. Players often foul to slow down the speed at which the opposition release the ball into play or in order to speed up their own ball. Examples of foul play fall into one of four categories: obstruction, unfair play, repeated infringements, and dangerous play and misconduct.

OBSTRUCTION Charging or pushing when players are running for the ball; running in front of a ball carrier; blocking a tackler; blocking the ball; a ball carrier running into a teammate during a set-piece; obstructing a scrum half during a scrum.

UNFAIR PLAY Time wasting; intentionally throwing or knocking the ball out of play; intentionally infringing any law of the game or playing unfairly.

REPEATED INFRINGEMENTS A player's repeated infringement of any law of the game, whether intentional or not; repeated infringements committed collectively by a team.

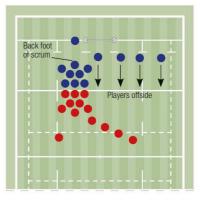
DANGEROUS PLAY AND MISCONDUCT Offenses include: stamping on or kicking an opponent; tripping an opponent with a leg or foot; early or late tackles; tackling an opponent above shoulder height; tackling a player without the ball; tackling a player with their feet off the ground; intentionally charging a player that has just kicked the ball; dangerous play in a scrum, ruck, or maul; retaliation.

CARD CAUTIONS

As in other sports, such as soccer, rugby referees may make use of a card cautioning system. Any player who infringes any part of the foul-play law is subject to a verbal warning, then yellow and red cards. If the referee shows a player a yellow card, they must spend 10 minutes off the pitch in what has become known as the "sin bin," leaving their team short-handed. If the player commits a further cautionable offense once back on the pitch, they are awarded a red card and sent off for the remainder of the match.

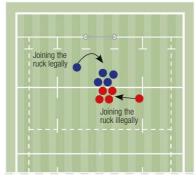
"HE IS A FREAK...!"

THE 1995 RUGBY WORLD CUP SAW THE EMERGENCE OF A TRUE RUGBY SUPERSTAR. AFTER JUST TWO CAPS, JONAH LOMU'S INCLUSION IN THE ALL BLACKS SQUAD CAUSED RAISED EYEBROWS. BUT BEFORE LONG, HE WAS SWEEPING ASIDE ALL BEFORE HIM. IN THE SEMIFINAL, IN A DISPLAY OF PURE POWER, LOMU DESTROYED THE ENGLISH BACK, SCORING FOUR TRIES AND LEAVING THEIR PRIDE AND BODIES DENTED. AFTER THE GAME, THE DEFEATED ENGLAND CAPTAIN WILL CARLING SAID OF LOMU, "HE IS A FREAK, AND THE SOONER HE GOES AWAY, THE BETTER."



OFFSIDE AT A SCRUM

As in other set-pieces, once a scrum is formed, specific offside rules come into play. Imaginary offside lines run across the pitch behind the rear player in the scrum's back foot on each side. Any players, apart from the scrum halves, that cross these lines are deemed offside.



RUCK INFRINGEMENT

Offside rules apply to players joining rucks and mauls. During a ruck or maul, a player is deemed offside if he or she enters from the side or from the side or from the side or goosing team. Players may only join the ruck or maul and bind onto their teammates from the very back.

TACTICAL APPROACHES

Although the styles of rugby playing have evolved over time and have even varied in different parts of the world, there are two main tactical approaches to the game of rugby.

PACK-ORIENTED GAME

The first is a forward-dominated kicking game in which the attacking team secures the ball and keeps it at close quarters, using forward drives and resulting mauls, rucks, and scrums. They also use searching kicks into touch to move upfield and rely on forward muscle to regain the ball in advanced positions. Coupled with a keen blanket defense, this is often an effective approach, resulting in lots of kicks at goal.

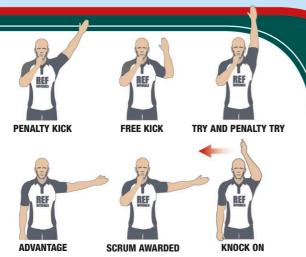
15-MAN RUGBY

The second approach is a fast-moving running game in which the team uses speed of movement and ball skills to create space and gain territory. Often referred to as "15-man rugby," this style of play relies on the full integration of mobile forwards and swift backs and at its best results in an entertaining display of try-scoring action.



SET MOVES

Both forwards and backs have set moves or plays that they practice in training. The backs' move shown left, known as a loop, involves drawing opposing players out of position to create an overlap that the fast wide players can exploit.



REFEREEING THE GAME

Rugby referees communicate with the players—and, by extension, the spectators—through arm and hand gestures. These signals are broken into two tiers: primary signals, which indicate the decision that has been given, such as a penalty kick, advantage, or free kick; and secondary signals, which communicate why a decision has been made, such as a knock on, high tackle, or offside. Rugby referees are assisted by touch judges, one positioned on each touch-line, whose primary responsibility is to indicate to the referee whether the ball or a player carrying the ball has strayed out of bounds.

INSIDE STORY

The apocryphal story of the game's invention recounts how William Webb Ellis, a pupil at Rugby School in the 1820s, picked up the ball during a game of soccer and ran with it. By the end of the century, the Rugby Football Union (RFU) and the International Rugby Football Board (IRFB) had been formed to standardize the rules and govern the game. Eventually the RFU joined the IRFB, and in 1995, the IRFB became the International Rugby Board (IRB) as the game entered the professional era. The IRB became World Rugby in November 2014.

MAJOR CHAMPIONSHIPS

Staged every four years since 1987, the Rugby World Cup is the sport's leading competition, with 20 countries competing to become world champions. The World Cup features group and knock-out stages, and the winners of the final are awarded the Webb Ellis Cup. Rugby's other international championships, held annually, are the Rugby Championship in the Southern Hemisphere and the Six Nations in the Northern Hemisphere.

DOWN UNDER

The Rugby Championship is the annual competition contested by the Southern Hemisphere: Australia, New Zealand, South Africa, and Argentina. The competition is organized as a mini-league, with each team playing the other twice. The overall winning team in the matches between Australia and New Zealand also win a trophy called the Bledisloe Cup.

OLD RIVALRIES

In the Northern Hemisphere, the Six Nations is the premiere European tournament. England, France, Ireland, Italy, Scotland, and Wales play each other once, with home advantage alternating from year to year. Victory in all five games is called a Grand Slam. There is also a women's Six Nations that used to feature Spain and not Italy, but Italy has now replaced Spain.

STAT CENTRAL

RUGBY WORLD CUP V	WINNERS
YEAR	COUNTRY
2015	NEW ZEALAND
2011	NEW ZEALAND
2007	SOUTH AFRICA
2003 I	ENGLAND
1999	AUSTRALIA

MOST FIVE AND SIX NATIONS TITLES		
NO WINS	(SHARED)	COUNTRY
28	(10)	ENGLAND
27	(12)	WALES
17	(8)	FRANCE
15	(9)	SCOTLAND
14	(9)	IRELAND

EUROPEAN (HEINEKEN) CUP WINNERS			
YEAR	TEAM	COUNTRY	
2019	SARACENS	ENG	
2018	LEINSTER	IRL	
2017	SARACENS	ENG	
2016	SARACENS	ENG	
2015	TOULON	FRA	
2014	TOULON	ENG	
2013	TOULON	FRA	
2012	LEINSTER	IRL	
2011	LEINSTER	IRL	
2010	TOULOUSE	FRA	

HIGHEST POINTS TOTAL IN TESTS		
POINTS	PLAYER	TEAM
1,598	DAN CARTER	NZL
1,246	JONNY WILKINSON	ENG/LIONS
1,090	NEIL JENKINS	WAL/LIONS
1,083	RONAN O'GARA	IRE/LIONS
1,010	DIEGO DOMINGUEZ	ITL/ARG
970	STEPHEN JONES	WAL/LIONS
967	ANDREW MEHRTENS	NZL
951	FLORIN VLAICU	ROM
911	MICHAEL LYNAGH	AUS
893	PERCY MONTGOMERY	RSA

MOST TRIES IN TESTS				
TRIES	PLAYER	TEAM		
69	DAISUKE OHATA	JPN		
67	BRYAN HABANA	RSA		
64	DAVID CAMPESE	AUS		
60	SHANE WILLIAMS	WAL/LIONS		
55	HIROTOKI ONOZAWA	JPN		
50	RORY UNDERWOOD	ENG		
49	DOUG HOWLETT	NZL		
47	BRYAN HABANA	RSA		

126







GAME OVERVIEW

Rugby sevens is a free-flowing and fast variant of rugby union, with teams reduced in size from 15 to seven players. The sport is spectator-friendly, with fewer players and more space resulting in more try-scoring opportunities. The major sevens tournaments have historically been regarded as a proving ground for promising players hoping to move into rugby union.

RUNNING AND PASSING

Despite the diminished number of players, matches take place on a full-sized rugby union pitch, shifting the emphasis away from attritional forward play and toward quick passing and explosive running. The increased fluidity of the sport places a different set of physical demands on participants, with speed and stamina becoming more important than strength. The team comprises three "forwards" (the props and hooker), three "backs" (the fullback, center, and fly-half), and the scrum-half.

NEED2KNOW

- Rugby sevens has done much to popularize rugby in Asia. Hong Kong hosts one of the largest and best-attended sevens tournaments in the world.
- Some of rugby union's finest players began their career in rugby sevens. New Zealand international Jonah Lomu and George Gregan, a former captain of Australia, both played international rugby sevens before establishing themselves as prominent figures in the 15-a-side version of the game.

PLAYER PROFILE

Rugby sevens is a physically demanding contact sport, and all players must be strong enough to make decisive tackles and fend off opponents. However, set pieces in rugby sevens are scaled down and less frequent than in rugby union, so forwards tend to be quicker, less bulky, and more agile. In addition to covering large amounts of ground quickly, backs must be able to open up opposition teams with creative passing and imaginative running, so game intelligence is just as important as rapid acceleration and physical endurance.

Scrun

Scrums in rugby sevens are formed by three players from each team—with the hooker positioned between the two prop forwards

Hooker

In rugby sevens, hookers have the option of binding under or over the arms of their prop forwards; an overbind is always used in the larger scrums of the 15-man version

Props

Props plant their feet shoulder-width apart and try to get as

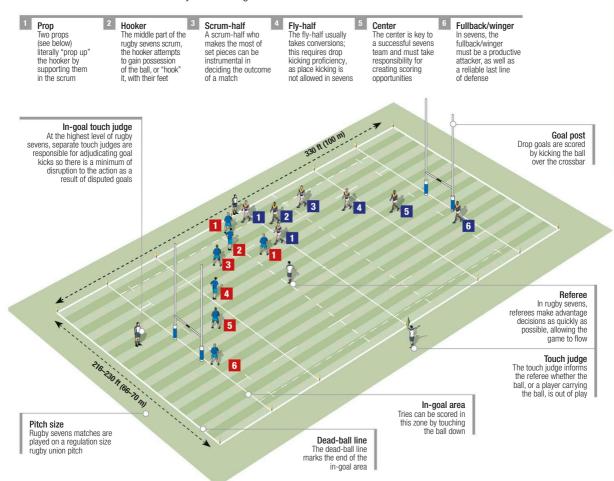


WHAT MAKES RUGBY SEVENS DIFFERENT?

The rugby sevens code is similar to rugby union but, in addition to the reduced number of players, there are other differences: matches consist of two halves of seven minutes each, separated by an interval of one minute; conversions must always be drop kicked rather than place kicked; and all scrums feature only three players per team rather than eight. Union teams may select seven substitutes and use all of them during a match, while sevens teams are restricted to five substitutes and can make only three changes.

ORIGINS OF RUGBY SEVENS

THE ORIGINS OF RUGBY SEVENS LIE IN THE SCOTTISH BORDER TOWN OF MELROSE IN THE 1880s, WHEN A LOCAL BUTCHER NAMED NED HAIG ORGANIZED A GAME AS A CHARITY FUNDRAISER. THE GAME PROVED POPULAR AND QUICKLY SPREAD ACROSS THE WORLD, BUT THE ANNUAL MELROSE TOURNAMENT IS STILL A FIXTURE IN THE RUGBY SEVENS CALENDAR TODAY.



THE TOURNAMENTS

The most important sevens competition is the Rugby World Cup Sevens, which has been held in different countries around the world every four years since 1993. Fiji have won the trophy twice, making them the most successful team in the tournament's history. In 2009, Australia won the inaugural women's World Cup Sevens tournament.

Rugby sevens became an Olympic sport in 2016, with Fiji winning gold. Other major competitions include the Commonwealth Games and the World Rugby Sevens World Series, in which teams compete for points based on their finishing positions at nine tournaments. New Zealand are the outstanding performers, having won 12 out of the 20 Sevens World Series played since 1999, and have won five of the six Commonwealth Games tournaments contested.

SIDELINES

23 The number of tries scored by the Rugby World Cup Sevens all-time leading try scorer, Marika Vunibaka of Fiji.

The number of nations to have held the Rugby World Cup Sevens and the Rugby World Cup titles simultaneously.

The number of nations participating in the 2013 Hong Kong Sevens, the highest in the tournament's history.

The margin of victory achieved by Chinese Taipei over Qatar at the Asian Games in 2006, a record in professional rugby sevens.

GAME OVERVIEW

Regarded as one of the most demanding contact sports in the world, rugby league is played between two teams with 13 players on each side. The object of the sport is to use a ball to score more points than the opposing team over two 40-minute periods. Points are awarded by touching the ball down over the opposition's try line and by kicking the ball over the crossbar. With its roots in the north of England, this fast-paced sport also enjoys popularity in Australia, New Zealand, and the Pacific region.

SIDELINES

40 The percentage of active rugby league supporters who are female.

1,735 The greatest number of points in all competitions in one season was scored by Wigan over 45 matches in 1994–1995.

The number of tries scored by George West of Hull Kingston Rovers when playing Brookland Rovers in 1905.

248,645
The number of registered rugby league players in the UK, playing for over 450 clubs nationwide.

RUGBY LEAGUE



NEED2KNOW

- New Zealand's victory in the 2005 Tri-Nations Cup was Australia's first test series loss for 27 years.
- The biggest knockout rugby league competition in the world is the Carnegie Champion Schools tournament held in New Zealand, with over 1,000 schools and 16,000 players taking part.
- The first Rugby League World Cup was held in France in 1954, with Great Britain, Australia, and New Zealand playing alongside the host nation.

Socks Part of the team uniform, socks are designed to be hard-wearing

Boots High cut to provide support for the ankle

PLAYER PROFILE

To succeed in a demanding sport like rugby requires physical strength, stamina, and speed. Ball-control skills are key, both through kicking and catching, with an ability to handle the ball at pace a vital skill. All-around tactical awareness is essential, particularly for those in positions such as stand-off and scrum half.

LEAGUE FIELD

A rugby league field is a grass playing area covered with markings and with goal posts at either end. The playing area is bordered by a touch-line and is divided into a number of different zones. The line that runs underneath the posts is called the try line, and it is across this that a team will attempt to touch the ball down to score a try. Behind this is the dead ball line, beyond which is out of bounds. Lines are also marked out every 33 ft (10 m) along the field.

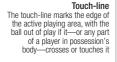
POSITIONS BY NUMBER:

1 Fullback 2 Right wing 3 Center 4 Center 5 Left wing 6 Stand-off 7 Scrum half 8 Prop 9 Hooker 10 Prop 11 Second row 12 Second row 13 Loose forward



THE RUGBY BALL

RUGBY LEAGUE IS PLAYED WITH AN OVAL-SHAPED BALL THAT HAS TO MEASURE BETWEEN 11-12 IN (280-300 MM) IN LENGTH. MOST ARE MADE OF LEATHER, ALTHOUGH WATER-RESISTANT SYNTHETIC MATERIALS ARE SOMETIMES USED.





Playing surface

As in rugby union, a field is usually covered with grass though some hybrid fields have a mix of real and artificial playing surfaces

In-goal area This is the area within which a try can be scored

Dead ball line

This line marks the limit of the horizontal playing area with any ball crossing it considered out of bounds

20 m line

This is where the game is restarted from by the defending team after various situations, including a defending player in the in-goal area catching an attacker's kick

Goal posts

The posts are 18 ft (5.5 m) wide and 52 ft (16 m) high. with the crossbar 10 ft (3 m) off the ground

WHAT THEY WEAR

This high-impact sport needs high-quality body protection. Mouth guards are universally used, while many players also choose to wear body padding and some sort of headgear. All will provide some degree of protection from opposing players' flailing boots and grappling hands.



Custom fit The mouth guard is individually made by a dentist

MOUTH GUARD

Made from molded plastic, this protects the teeth and mouth and is an essential piece of equipment.

Head protection

The scrum cap should be a comfortable fit but too tight to be pulled off



HEADGEAR

Scrum caps, or skullcaps as they are sometimes known, wrap around the head and ears. They are usually worn by the players who form part of the scrum.

Pad flexibility

Foam pads are often removable to suit a player's needs

Shoulder pads

Padding protects the most impact-prone area of the body

Chest plate This protects the sternum (breast bone)

Flexible material Elasticated material allows

freedom of movement

PROTECTIVE UNDERSHIRT

Rugby tackles put immense strain on a player's shoulders, hence the reason why many wear padding on the upper body. Protective undershirts are made from a breathable, elasticated material.



PLAYING RUGBY LEAGUE

A game starts with a player from one team kicking the ball into the opposition team's half. As soon as the ball is under control by a player, that player's team is given the chance to try to work the ball up the field and over the opposition try line by passing the ball to each other while avoiding being tackled and kicking the ball upfield. If the attacking team has not scored after being tackled six times, then possession is handed over to the opposing team, although if a try seems unlikely after the fifth tackle, then the usual course of action is a long kick into the opposition's half.

PLAY-THE-BALL

After a player has been tackled, he must return the ball into active play through a motion called a "play-the-ball." This involves the player standing up and rolling the ball under his feet to a teammate standing behind him who then initiates play once more by running with the ball, passing it, or kicking it. During the play-the-ball, players from the opposing team must be situated at least 33 ft (10 m) away from the action; otherwise, the referee has the option of awarding a penalty against that team for being "offside."



RESTARTING PLAY

After a break in play, the game is restarted with a kick-off, a play-the-ball, a dropout kick, a penalty, or a "scrum." A scrum is when the six forwards from each side interlock and apply pressure against each other, with the ball then fed into the central "tunnel."

20 M DROPOUT

If a team is awarded a penalty, it can decide to kick into "touch" (out of bounds but in a penalty situation moves the action up to the point where the ball crossed the line). If the kick crosses the dead-ball line, the game restarts with a drop-kick from the 65½ ft (20 m) line.

20 M RESTART

Play restarts from the 65½ ft (20 m) line if a player from a defending team standing in the "in-goal" area (behind the try line) cleanly catches a ball kicked by an attacking player. It also restarts from here if a defending player touches a ball before it crosses the dead-ball line.

40/20 KICK

If a player positioned within his team's 131½ ft (40 m) line kicks the ball in general play and the ball bounces before it goes into touch within the opposing team's 65½ ft (20 m) line, his team gets put-in at a scrum. The likelihood is that the team will win the scrum and get a further six tackles.

SPECIALIST SKILLS

Rugby league involves a range of individual skills and techniques that, when used together, enables a team to secure the points needed to win a game. Players need good passing and catching ball-handling skills, while the ability to make a strong tackle is a core prerequisite of playing the sport. All kicks—whether a drop-kick, a positional punt upfield, or a placekick after a try—need to be executed with accuracy.

PASSING

Passing is a basic skill required by players in every position. If timed and delivered well, a pass can take out opponents and create a try-scoring opportunity. Players must always pass the ball backward—a forward pass results in the team in possession being penalized.

PASSING FROM THE GROUND

Picking the ball up from the ground and passing it occurs after a play-the-ball and a penalty kick into touch.

CATCHING

This can range from taking a pass from a teammate in close proximity to catching a high kick from the opposing side with that team's forwards bearing down on you. Good hand-eye coordination is essential.

CATCHING A HIGH BALL

A player needs to keep his eye on the ball and, if opposition players are close by, time his jump to make the catch.



ILLEGAL TACKLES A tackle around the neck is deem

A tackle around the neck is deemed to be dangerous and is penalized by the referee, as is any player who tackles another player who is not in possession of the ball.

TACKLINGA tackle is defined as the point

when a player with the ball is brought down so that the ball or the arm carrying the ball touches the ground while the tackler is touching him. Strong upper body strength and a good sense of timing are key to making a tackle.

MAKING A SIDE TACKLE The player lowers his

The player lowers his shoulders and wraps his arms around the opponent.

KICKING

A range of kicking skills are required during a game, from long-range penalty kicks to deft chips through a group of players. The stand-off is a team's specialist kicker, executing most of the tactical and penalty kicks.

DROP-KICKING A BALL

Throwing the ball up, a player waits until the point when it just hits the ground before striking it forward.





POINTS SYSTEM

The highest number of points (4) is obtained by touching down for a try, but there are a number of other ways that a team can score points. Immediately following a try, the scoring team can secure an extra 2 points if one of its players is able to placekick the ball over the crossbar between the posts; this is known as a conversion. Penalties are awarded against a team for numerous offenses, and one of the options available is to kick for goal as in a conversion and also with a value of 2 points. Drop-kicking the ball over the crossbar from open play is worth 1 point.

A try is deemed valid if the player crossing the try line applies downward pressure on the ball to touch it on the ground. If two players of opposing sides are both holding the ball as it is grounded, the try also counts. It is invalid if a player has any part of his body in touch.

CONVERSION

A conversion can be taken anywhere along a line directly opposite where the try was scored. In top-class games, touch judges stand next to the posts and check whether the ball passes over the crossbar and between the posts.

SCRUM

A forward pass, knock on (accidental forward movement of the ball, which then touches the ground), and restart after kick into touch all result in a scrum. This consists of a maximum of six forwards—a front row of two props and a hooker, two second row forwards, and a loose forward slotting in at the back.

PENALTY

A penalty is given to one team when a player from the opposing team violates the rules and is taken from the point that the offense occurred. If the infringement happens while the ball is in touch, the penalty is taken 33 ft (10 m) in from the touch-line.

DROP GOAL

The extra point secured by a drop goal can win a match if the two teams are level approaching full-time and the attacking team is still some way from the try line. A player can score a drop goal from anywhere on the field.

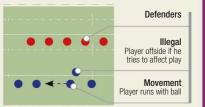


RUGBY RULES

While most infringements are punished by a penalty or a scrum, some more serious violations will result in a player being sent to an area next to the field called the sin bin. He is forced to remain there for 10 minutes, thereby putting his team at a disadvantage for that period.

OFFSIDE

A complex rule of the game, offside can take place in open play for a few reasons, one of which is when a player ahead of the one with the ball tries to play the ball. At a penalty kick, a player is offside if he is in front of the kicker.



ADVANTAGE

Instead of blowing the whistle for an infringement by one team, a referee can keep a game flowing by giving the other team an advantage. An example is if a player is high-tackled but still passes the ball out to a teammate to score.

TEAM TACTICS

With the object of the game to score more points than the opposing team, rugby league is about penetrating attacking play and a solid defense. Both rely on a combination of teamwork and individual skills such as throwing a dummy (making a motion toward passing to a teammate but keeping the ball and running past the opposing player). Kicking into touch is another key tactic used by an attacking team to gain territorial advantage or by a defending side to relieve pressure on the back line.



THROWING A DUMMY

A player approaches an opponent with a teammate nearby and just after looking over at him positions the ball in his hands as if he is about to pass it to him.

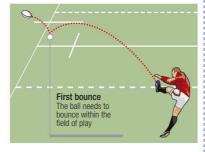
KICK TO TOUCH

The most important thing to remember when kicking the ball into touch in open play is that the ball must bounce within the field of play before it goes out. The resulting scrum is taken 33 ft (10 m) in from the point where the ball crosses the line. However, if the ball goes straight out, the scrum-down takes place at the point of the original kick. In both situations, the opposite team to that of the kicker puts the ball in at the scrum, so territorial advantage is countered by a high chance of ball possession.



SIDESTEPPING PAST

With the opponent thinking that the ball is going to be passed, his weight shifts over to that side, making it easier for the attacker to sidestep him and run past.



GOLDEN POINT

If a game is tied at the end of full-time, 10 minutes of extra time is played. This period is often called "sudden death," as the first team to score wins the game.

INSIDE STORY

Rugby league was born out of the original union game that began in the 1830s. A dispute in 1892 between the Rugby Football Union (RFU) and clubs in the north of England that were paying their players—which went against the amateur spirit of the game—led to the breakaway Northern Rugby Football Union being formed in 1895. The 13-a-side game began in 1906, and the name rugby league was adopted in 1922.

In the UK, the Rugby Football League (RFL) administers the sport. It controls the national leagues, the Super League, the Challenge Cup, and Great Britain's national team.

WORLDWIDE GOVERNING BODY

The Rugby League International Federation (RLIF) is the controlling body in charge of the sport worldwide. It makes decisions on laws and international team rankings.









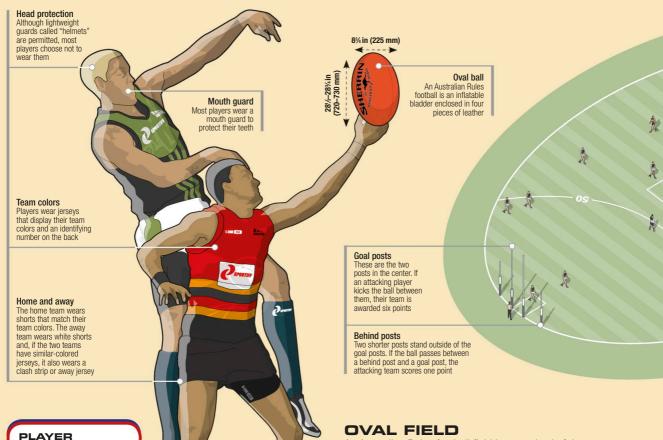
Australian Rules is played in more than 20 countries, as well as in Australia. It is popular in Britain, New Zealand, Indonesia, South Africa, Canada, and Japan.

- The annual Australian Football League (AFL) **Grand Final attracts** crowds of nearly 100,000, making it the world's best attended domestic club championship event.
- Women's Australian Rules football has also spread to many countries, such as the US, Britain, New Zealand, Canada, and Papua New Guinea.

AUSTRALIAN RULES FOOTBALL

GAME OVERVIEW

Australian Rules Football—known to locals as "Aussie Rules" or "footy"—is a very tough, fast-paced team sport. Two teams of 22 players (18 on the field, four interchangeable) display great courage in their ferocious attack on opponents and the ball, which is passed with incredible accuracy across an oval-shaped field. The aim is to score points by kicking the ball through a set of goals, made of four upright posts. After four quarters of 20 minutes each, the team that has amassed the most points wins. Australian Rules is the most popular winter sport in Australia.



PROFILE

Australian Rules players are usually tall and athletic. They are fast sprinters and must have enough stamina for sustained running. Players are also physically strong and able to withstand the force of on-rushing opponents.

Cleated shoes

shoes with studs or cleated soles

Players wear soccer-style

An Australian Rules football field is comprised of three areas. Play begins with a "center bounce," in the "center square" in the middle of the ground, at the beginning of each quarter and after a goal is scored. The "wings" of the field are the two areas on either side of the center square; transitional play from defense to attack is directed through these areas. The "goal arcs" are the prime goal-scoring areas, marked by a line about 164 ft (50 m) from the goal face at each end of the field.

GO THE DISTANCE

On average, an Australian Rules player will cover close to 8 miles (13 km) over the four 20-minute quarters. The majority of this distance is covered by jogging and sprinting. In comparison, a rugby-union player will only cover around 4 miles (6 km). Women also play Australian Rules football and, while the tackling rules are sometimes modified, the women need just as much stamina as the men.

Boundary umpires

Two umpires police the boundary line. If the ball rolls or bounces out of play, an umpire throws it back in. They also award penalties if it is kicked over the line in the air

Field umpires Three umpires adjudicate on-field

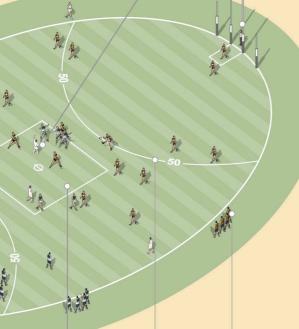
play, covering the

ground, the wings.

and both goal arcs

center of the

Goal umpires An umpire stands on each goal line to judge if it crosses the line and assess if it is a goal or point



Center square Only eight players

are permitted inside this area before play starts—the other 28 play has begun

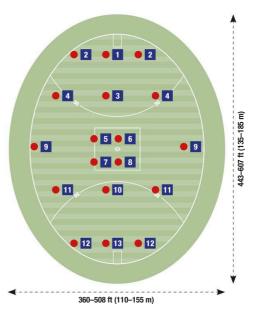
50 m line This is a curved

players Four substitute players are allowed line used to designate the goal per team, with no limit on the amount arcs at both ends of times players can of the ground be interchanged

Substitute

WHO PLAYS WHERE?

Positions are fluid: players go where needed rather than staying in strict zones. The diagram below shows positions for a team at the start of play. Play starts with a center bounce, which can only be contested by the ruckman. Offensive players ("forwards") move around the forward area seeking possession of the ball, while defensive players ("defenders") try to negate opposition forwards and create play by running up the field. Midfield players contest the ball in all areas of the ground.



1 Full forward 2 Forward pockets 3 Center-half forward 4 Half-forward flanks 5 Ruckman 6 Ruck-rover 7 Rover 8 Center 9 Wingmen 10 Center half-back 11 Half-back flanks 12 Back pockets 13 Fullback

INTERNATIONAL RULES

Australia and Ireland contested the first official International Rules series in 1998. Mixing elements of Australian Rules and Gaelic football, the games are fast-paced and infamous for violent clashes between players. (In 2006, the extreme violence led to the cancellation of the 2007 match.) To date, Australia has won five of the matches, Ireland has won seven, and two matches have resulted in a draw.

SIDELINES

7,595,165 The total number of Australians who attended top-grade AFL games in 2018. That's roughly equal to one-third of the Australian population.

121.696 The highest ever attendance at a top-grade game. Achieved at the 1970 Grand Final between Carlton and Collingwood, which Carlton won by 10 points.

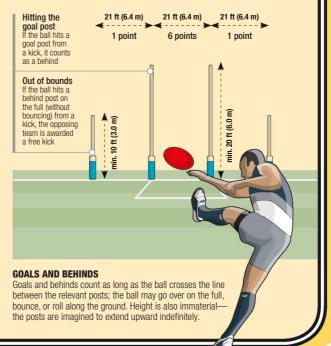
36.962 The average attendance at an AFL regular season game in 2018. (English Premier League soccer averaged 38,182 in the 2018-2019 season.)

RULES

The ball may be passed in any direction using only the feet (a kick), a clenched fist (a handpass), or an open-handed tap. A mark is awarded if a player catches the ball from a kick. That player can take a kick or handpass unimpeded from where they caught the ball. A player can run with the ball but must bounce it or touch it to the ground every 50 ft (15 m). A player running with the ball can be put under pressure or tackled, and if tackled must pass or dispose of the ball immediately or risk being penalized. Penalties, known as free kicks, are awarded for infringements such as pushing an opponent in the back, tackling illegally (see opposite), and holding a player who does not have the ball. Finally, a player can be placed on report for striking, tripping, pushing, or kicking another player and potentially suspended from future games.

SCORING

A goal (six points) is scored only when an attacking player kicks the ball between the goal posts. A behind (one point) is scored when the ball crosses the line between a behind post and the nearer goal post or is kicked into a goal post. A behind still counts if it comes off a defender's foot or is knocked over the goal or point line by any other part of a player's body. The total score is the sum of goals and points expressed in two parts: for example, "20.14 (134)" means 20 goals (20×6) and 14 behinds (14×1) , a total of 134 points.



ANTIPODEAN ARTISTRY

Considered a chaotic game to the uninformed, Australian football is, in fact, a highly skillful affair. Players must win and maintain possession of the ball and advance up the field using strategic passes to teammates. Accurate kicking and passing are the most efficient ways of doing this. Players use passes by foot to leading or open players and quick handpasses, taps, or punches to find an open teammate when in close proximity. Once near goal, players will try to score either from a mark and kick or by kicking on the run.

THE HANDPASS

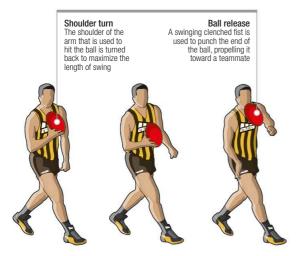
Almost as common as a kick for passing the ball in today's game, the handpass involves a punch applied with the thumb and index finger of a clenched fist to the pointed end of the ball.

MACEDONIAN MARVEL

ONE OF THE MOST SKILLFUL PLAYERS EVER WAS PETER DAICOS, OTHERWISE KNOWN AS THE "MACEDONIAN MARVEL." DAICOS WAS RENOWNED FOR HIS AMAZING KICKING SKILLS AND HIS ABILITY TO KICK UNLIKELY GOALS CONSISTENTLY FROM ANYWHERE IN THE OFFENSIVE PART OF THE GROUND. DAICOS PLAYED FOR THE COLLINGWOOD MAGPIES DURING THE 1980S AND 1990S.

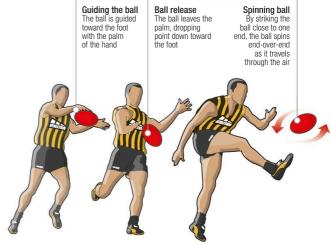
KICKING

There are four main kicks: the drop punt, used in general play; the torpedo, a spiraling rugby-style kick used for extra distance; and the snap and checkside (or "banana") kicks, used to curve the ball.



HANDPASSES

This form of delivery is used to move the ball quickly to nearby teammates and for passing in confined space when under pressure. It is a popular move by midfielders to set up play before kicking the ball into the forward line.



DROP PUNT

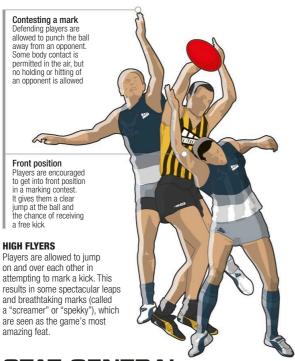
Due to its consistent spin, the drop punt is accurate and easy to control. Players use the drop punt for passing in general play and for most shots on goal. It has become much more common than the punt kick, which does not spin the ball.

BUMPS AND MARKS

Marking and tackling are the main elements of Australian football that make it such an exciting and tough sport. Players catch the ball running at full speed or by launching themselves fearlessly into the air, often using opponents to propel themselves skyward. The main form of defense is tackling. Players run down or charge opponents who have the ball, hitting them hard to jolt the ball free or wrestling them to the ground to halt their progress.

MARKING

The mark is the primary method by which players maintain possession. When a ball has been kicked by a player more than 50 ft (15 m) and is caught by another player, the catching player is awarded a mark. The player can then kick or handpass from that spot without the threat of being tackled or pressured by opposition players.



MARK OF THE CENTURY

Former Geelong player Gary Ablett is considered one of the most exciting players of all time. He kicked more than 100 goals in three consecutive seasons from 1993 to 1995, winning the Coleman Medal for scoring the most goals. Ablett, a high-flying forward, took what is widely touted as "the mark of the century" playing against Collingwood in 1994. He leaped onto his opponent's shoulders and caught the ball with one outstretched hand before crashing to the ground.

TACKLING

A player with the ball can be tackled by being held or wrestled to the ground. A tackle must be applied below the shoulders and above the knees and can be made by more than one player. If a tackled player doesn't dispose of the ball immediately, the opposition is awarded a free kick.



HIPS AND SHOULDERS

A player can legally bump an opponent (called a "hip and shoulder") when the ball is within 15 ft (5 m) of the opponent, as long as the bump is made with the hip or shoulder. Contact to the head is not allowed.

STAT CENTRAL

AFL GRAND FINALS			
YEAR	WINNER	RUNNER-UP	
2018	WEST COAST EAGLES 11.13 (79)	COLLINGWOOD MAGPIES 11.8 (74)	
2017	RICHMOND 16.12 (108)	ADELAIDE 8.12 (60)	
2016	WESTERN BULLDOGS 13.11 (89)	SYDNEY SWANS 10.7 (67)	
2015	HAWTHORN 16.11 (107)	WEST COAST EAGLES 8.13 (61)	
2014	HAWTHORN 21.11 (137)	SYDNEY SWANS 11.8 (74)	
2013	HAWTHORN 11.11 (77)	FREMANTLE 8.14 (62)	
2012	SYDNEY SWANS 14.7 (91)	HAWTHORN 11.15 (81)	
2011	GEELONG 18.11 (119)	COLLINGWOOD 12.9 (81)	
2010	COLLINGWOOD 16.12 (108)	ST. KILDA 7.10 (52)	
2009	GEELONG 12.8 (80)	ST. KILDA 9.14 (68)	
2008	HAWTHORN 18.7 (115)	GEELONG 11.23 (89)	
2007	GEELONG 8.10 (58)	PORT ADELAIDE 6.8 (44)	
2006	WEST COAST EAGLES 12.13 (85)	SYDNEY SWANS 12.12 (84)	
2005	SYDNEY SWANS 8.10 (58)	WEST COAST EAGLES 7.12 (54)	
2004	PORT ADELAIDE 17.11 (113)	BRISBANE LIONS 10.13 (73)	

INSIDE STORY

Australian football was devised in 1857 by sportsman Tom Wills as a fun way for cricketers to keep fit during the winter months. The first recorded match took place in 1858 between Scotch College and Melbourne Grammar School. The first professional league, the Victorian Football League (VFL), was established in 1896, and the following year, the league vas flourishing and became national. It was renamed the Australian Football League in 1994. A Rules Committee manages the laws of the game.

AUSTRALIAN FOOTBALL LEAGUE

The AFL Commission is the official governing body of Australian Rules football. It was formed in 1985 and took over national governance of the sport in 1993. The AFL Commission is responsible for the administration of the competition and regularly updates the laws of the game, with most changes aimed at making the sport faster and more attractive to supporters.

CRICKET







GAME OVERVIEW

To the uninitiated, cricket can appear to be an incomprehensible spectacle acted out by eccentrics in long pants; to millions of devotees the world over, it is the ultimate combination of skill and strategy. Contested by two teams of 11 players, cricket essentially involves a bowler hurling a ball at a batter, who attempts to hit the ball. From this simple premise radiates a multitude of complexities. Once considered genteel, cricket today is as hard-nosed as any professional sport, and the tension that builds over a close five-day Test match is immense.

NEED2KNOW

- The two international forms of cricket are Test matches (which last five days) and limited-overs games, which are usually 50 overs per side (although "20/20" cricket allows only 20 overs per innings). Other forms include first-class, club, indoor, and beach cricket.
- There are over 100 cricket-playing nations, but only the best compete in Tests. Currently the Test-playing nations are: Australia, England, Pakistan, India, Sri Lanka, South Africa, New Zealand, West Indies, Zimbabwe, Bangladesh, Ireland, and Afghanistan.

PLAYER PROFILE

While there is no physical "type" for cricketers, fast bowlers are mostly tall and athletic. Batters require excellent hand-eye coordination and the ability to make rapid decisions. Good fielders are agile and have a strong, accurate throw. All cricketers need fast reactions and the capacity to sustain concentration for long periods.

Tool of the trade

Made of willow and comprising a blade and handle, the bat must not exceed 38 in (96 cm) in length

Head protection

Seldom worn prior to the 1980s, protective helmets are now commonplace

THE BALL

With a leather exterior and an interior of cork, rubber, and tightly wound string, the cricket ball is extremely hard. Although the red ball is traditional, white balls and (sometimes) pink balls are used in limited-overs matches.



Seam A raised, stitched seam encircles the ball

9 in (22.9 cm)

Chest protector Not all batters wear a chest protector, but this piece of equipment is sometimes

used when fast bowlers are operating It is worn beneath the shirt and helps prevent bruising and broken ribs

Padded gloves provide good hand protection while not unduly restricting

hand and finger movemen

A heart-shaped, hard plastic protector, the box is worn inside the pants to shield the genital area

Heavily padded leg guards are worn on both legs to protect from the ankle to above the knee. Modern pads are compact and lightweight, allowing the batter to play strokes and run freely

THE WICKET

The wicket consists of three wooden stumps and two wooden bails. The bails sit on the stumps in shallow grooves cut along the top of each stump. Two wickets are used in a match—one at either end of the pitch.

Stumps

HJJLUMNIS

For a right-handed batsman, viewed from the front, left to right, the stumps are named: off stump, middle stump, and leg stump. The pointed ends are pushed firmly into the pitch

These must be dislodged

to affect certain types of dismissal



THE FIELD OF PLAY

Cricket is played on a large, flat oval or circular field with a pitch in the middle. On the field of play, there is always two umpires, two batters, and all of the fielding team (the bowler, wicketkeeper, and nine other fielders). The fielding team is organized into positions the captain feels will either prevent run scoring or effect a dismissal. At the end of each over, a new bowler bowls from the opposite end of the pitch and all the fielders and umpires are repositioned accordingly.

PASSIONATE SUPPORTERS

CRICKET FOLLOWERS ARE A FERVENT GROUP—ESPECIALLY THE 90,000 OR MORE THAT ASSEMBLE AT EDEN GARDENS, INDIA, WHERE THE NOISE IS OFTEN SO DEAFENING THAT UMPIRES ARE UNABLE TO DETECT FAINT SOUNDS 30-yard circle This field marking divides the infield from the outfield. In limited-overs cricket, a set number of fielders must remain within this circle for a fixed number of overs

FIELDING POSITIONS

Nonstriking batter

3 Striking batter

The image below shows most of the common fielding positions the fielding captain may choose from when a right-handed batter is on strike.

Bowler

5 Slips

6 Gully

8 Point

10 Cover

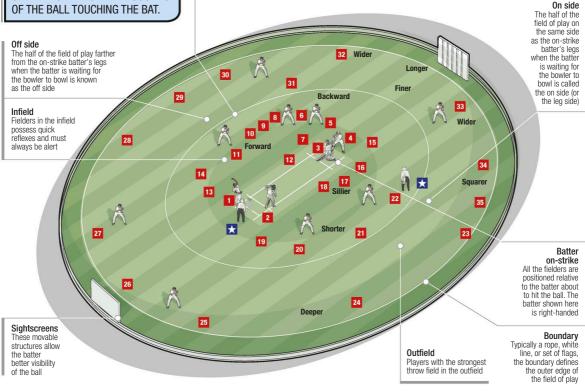
Silly point

9 Cover point

111 Extra cover

- 12 Silly mid-off
 - 13 Mid-off
 - 14 Wide mid-off
- Wicketkeeper 15 Lea slip
 - 16 Short lea
 - 17 Forward short leg
 - 18 Silly mid-on
 - 19 Mid-on
 - 20 Wide mid-on
 - 21 Mid-wicket
 - 22 Square leg

- 23 Deep square leg
- 24 Deep mid-wicket
- Long-on
- 26 Straight hit
- 27 Long-off
- 28 Deep extra cover 29 Deep cover
- 30 Sweeper
- 31 Backward point
- 32 Third man
- 33 Fine leg
- 34 Long leg
- 35 Deep b/w fine leg
- ★ Umpires



GLOSSARY OF FIELDING TERMS

Cricket uses a number of potentially confusing technical terms, and many of these arise in relation to the field and fielding positions.

STRAIGHT Closer to an imaginary line through the center of the field of play and in front of the batter.

WIDE Farther from an imaginary line through the center of the field of play and in front of the batter.

FINE Closer to an imaginary line through the center of the field of play and behind the batter.

SQUARE Farther from an imaginary line through the center of the field of play and behind the batter.

FORWARD In front of the batter's wicket.

BACKWARD Behind the batter's wicket.

SHORT Closer to the batter.

SILLY Very close to the batter.

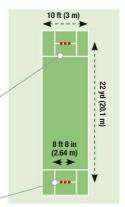
DEEP Farther from the batter.

The closely mown, even surface at the center of the field of play is known as the pitch. Moisture content, grass height, soil type, and degree of soil compaction are among the many pitch-related factors that help determine how the ball will travel after it strikes the pitch.

Popping crease

Unless part of the bowler's front foot is behind this line when the ball is delivered. the umpire will call "no ball"

Bowling crease
The length of a pitch (22 vd/20.1 m) is the distance between the two bowling creases. A wicket is placed on each of the two bowling creases





SIDELINES

99.94 Australian Don Bradman's batting average in Tests. Bradman began his final Test innings with an average over 100 and needed only four runs to maintain a three-figure average. Instead, he was dismissed without scoring. 99.94 is the record highest Test average.

400,000,000

The estimated television audience in India for some of the biggest games. This is nearly 40 percent of India's population.

501* The highest ever individual score in a first-class match, made by West Indies' Brian Lara, for Warwickshire, in 1994. (* denotes "not out")

THE ASHES

WHEN AUSTRALIA DEFEATED ENGLAND IN 1882, A NEWSPAPER PUBLISHED AN "OBITUARY" FOR ENGLISH CRICKET: "THE BODY WILL BE CREMATED AND THE ASHES TAKEN TO AUSTRALIA." THIS IS THE ORIGIN OF THE REGULARLY COMPETED "ASHES" TEST SERIES, ONE OF SPORT'S GREAT RIVALRIES.

PLAYING THE GAME

Before play begins, the two captains toss a coin to see which side will "bat" and which side will "field." All of the fielding side take their positions, but only two batters are on the field at a time. At the start of play, the batter "on strike" assumes a batting stance (usually with the body side on to the bowler but the head facing), ready to receive the first bowl. The other batter (the "nonstriker") stands at the opposite end of the pitch. The bowler bowls the ball (a "delivery") overarm toward the striker's wicket. If the batter does not hit the ball, the wicketkeeper usually catches it. If the striker hits the ball, the two batters then have the choice whether to run or not. If the batter hits the ball inside the field of play and it then crosses the boundary, this counts as four runs. If the ball is propelled directly over the boundary without bouncing in the field of play, six runs are awarded. After six legal deliveries have been bowled, the umpire calls "over." Play then switches to the other end. While the batters attempt to score as many runs as possible, the fielders try to dismiss the batters (see right).

THE END OF AN INNINGS

When a batter is dismissed ("out"), that player leaves the field and the next member of the batting side is "in." When 10 of the 11 members of the batting side are out (there will always be one batter "not out" because batters must operate in pairs), the allocated time is up, or the set number of overs have been bowled, the innings is complete (see Forms of the Game, below). For the next innings, the batting and fielding sides swap roles.

COMPLETING A RUN

One run is completed if the striker and nonstriker can run to the opposite end of the pitch and ground a part of their bat or person behind the popping crease before being "run out."

Bowling angle

When the bowler's bowling arm is closest to the wicket (as shown here), this is bowling "over the wicket." If the bowling arm is the one farther from the wicket, this is bowling "round the wicket,"

Umpire

The bowler's end umpire has several things to watch for as the ball is delivered, including where the bowler's front foot lands and where the ball pitches

FORMS OF THE GAME

Test cricket—which is played over five days—is the sport's flagship event. Each side has two innings, bowlers may bowl an unlimited number of overs, and to win a Test match is not a straightforward proposition. For example, if the two teams competing are X and Y, for side X to win, it must bowl out side Y (by taking all 10 wickets) twice. It must do this before side Y can score more than the total runs side X scored. If neither team can do this in five days, the result is a draw. In limited-overs cricket, each side only has one innings—usually limited to 50 overs. The number of overs allocated to each bowler is restricted (10 each in a 50-over game), and wickets lost do not affect the result—simply the team that scores the most runs wins.

Defending the wicket The batter defends the wicket by ensuring that the ball does not strike it

Wicketkeeper In readiness to catch the ball, the wicketkeeper crouches behind the wicket



Center of the pitch

from fielders and, if

Both batters and bowlers should avoid running on the middle of the pitch so that it does not become damaged

possible, over the boundary

Nonstriker

The batter not facing the delivery must be ready to run and should be partway down the pitch as soon as the ball leaves the bowler's hand

TEAM COMPOSITION

A good cricket team has a balance of different types of players. When batting, the side is organized into a batting order. Although there are many variations on a batting order, numbers one to five are usually the specialist batters, number six is often an all-arounder (a highly skilled batter and bowler), the wicketkeeper regularly occupies the number seven position, and numbers eight to 11 are mostly the specialist bowlers.

GAME CONTROL

There are 42 Laws of Cricket, and three umpires uphold these Laws. On the field, one umpire stands at the bowler's end and another at square leg. The on-field umpires may refer close decisions for runouts, stumpings, catches, or boundaries to the third (off-field) umpire, who adjudicates using television replays.

TELEVISION REVOLUTION

TELEVISION TECHNOLOGIES SUCH AS HAWK-EYE, WHICH TRACKS THE PROJECTED PATH OF THE BALL, HAVE REVOLUTIONIZED THE WAY WE WATCH AND UNDERSTAND CRICKET.

MODES OF DISMISSAL

There are 10 ways in which a batter can be dismissed, although it would be extraordinary if all 10 were seen in a single match. Some dismissals, such as "Timed Out" and "Hit the Ball Twice," are very rare. The most common dismissals are caught (often caught behind by the wicket keeper or slip fielders). LBW, and bowled.

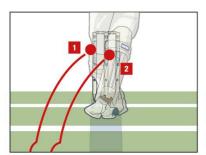
BOWLED When the bowler delivers a ball that breaks the wicket (dislodges at least one bail). **TIMED OUT** If the incoming batsman takes more than three minutes to reach the pitch. **CAUGHT** If a fielder catches the ball after the batter hits it and before it touches the ground. **HANDLED THE BALL** When a batter handles the ball without the consent of the fielding side. **HIT THE BALL TWICE** When the batter strikes the ball twice (unless guarding the wicket). **HIT WICKET** If the bat or any part of the batter's person breaks the wicket.

LBW When part of the batter, other than the bat, intercepts a ball that would have hit the wicket (see below).

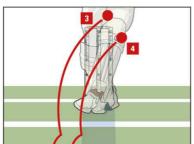
OBSTRUCTING THE FIELD If the batter deliberately obstructs or distracts the fielding side. **RUN OUT** If the wicket is broken and the bat or the batter is not behind the popping crease. **STUMPED** If the wicketkeeper breaks the wicket and the batter is outside the popping crease.

LEG BEFORE WICKET

Law 36—Leg Before Wicket (LBW)—is perhaps the most complex, controversial, and difficult to judge of all the Laws. This is because there is always an element of subjectivity: Would the ball have continued on to hit the wicket?

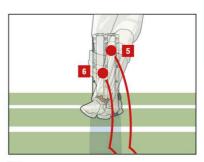


- Not out or out. The ball has hit the batter's pad outside the wicket-to-wicket line on the off side. If playing a shot, the batter is not out. However, if the batter makes no attempt to play the ball and the umpire is sure that the ball would have hit the wicket, the batter can be given out. This part of the Law was introduced to stop batters from protecting their wicket using only their pads.
- 2 Out. The ball has struck the batter's pad in line with the wicket and would have gone on to hit the wicket. It is of no relevance that the ball pitched outside the line of the off stump.



- Not out. The ball has hit the batter's pad in line with the wicket, but its projected flight path is such that it would have gone over the top of the wicket.
- 4 Not out. The ball has hit the pad in line with the wicket, but its projected flight path is such that it would have missed the wicket and continued on a line outside the lea stump.

FOUR RUNS



- Not out. Although this ball would have continued on to hit the stumps, it has pitched outside the wicket-to-wicket line on the leg side. The batter can never be out if the ball pitches outside the line of the leg stump, whether playing a shot or not.
- **Out.** The ball has not pitched outside the leg stump, has hit the pad in line with the wicket, and would have gone on to hit the wicket.

KEEPING SCORE

The scorer uses numbers and a set of symbols entered in a special cricket scorebook to keep a tally of runs scored and associated statistics. To ensure the scorebook is filled in correctly, an umpire signals to the scorer when any one of a set of particular circumstances arises. The scoreboard provides the spectators and players with an ongoing summary of the match situation.

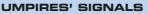
EXTRAS

Runs scored that did not arise from the batter striking the ball are called extras. The most common extras are no balls, byes, leg byes, and wides.

NO BALL When the delivery is deemed illegal, typically if the bowler oversteps the popping crease.

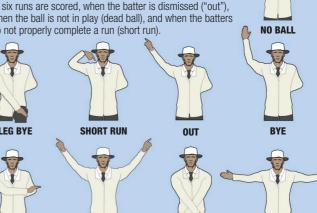
BYE When the batting pair complete a run, but the ball did not touch the bat or the batter. Byes typically arise when the wicketkeeper misfields.

LEG BYE When the batting pair complete a run after the ball struck any part of the batter except the glove or bat. **WIDE** When a delivery passes out of the reach of the batter when in a normal batting stance.



An umpire will signal if certain events occur, including: if the fielding side concedes an extra (see below, left), if four or six runs are scored, when the batter is dismissed ("out"), when the ball is not in play (dead ball), and when the batters do not properly complete a run (short run).

SIX RUNS





CRICKET SKILLS

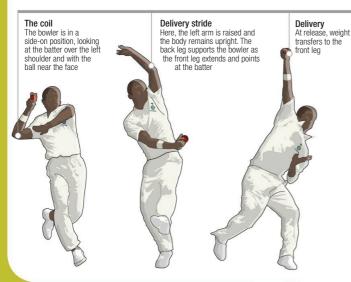
Cricketers must master several skills. Every team member must bat and field, at least four players will be expected to bowl, and there is one specialized wicketkeeper. These disciplines all employ different techniques.

BOWLING

Perhaps more than any other player, the bowler determines how a match progresses. If the bowlers are bowling well, there is often little the batters can do beyond trying not to be dismissed. Broadly speaking, there are two types of bowler: pace bowlers (which includes medium-pacers and fast bowlers), who deliver ball at up to 100 mph (160 kph); and spin bowlers (which includes leg-spinners and off-spinners), who deliver the ball more slowly but have a greater variety of deliveries. Bowlers usually bowl a number of overs (a "spell") from one end of the ground.

PACE BOWLER'S ACTION

To propel the ball at high speed requires great skill and athleticism; pace bowling is less about brute strength and more about rhythm and technique. The illustrations below freeze the three crucial stages in a pace bowler's action the split-second before the ball is released.



WICKETKEEPING

While the wicketkeeper's primary task is to stop the ball, this player must also take catches and effect run outs and stumpings. For a spin bowler, the wicketkeeper will stand directly behind the stumps; for a pace bowler, the wicketkeeper may stand more than 22 yd (20 m) back.



KING OF SPIN

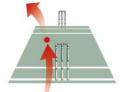
WHEN HE RETIRED IN JANUARY 2007, SHANE WARNE HAD TAKEN A WORLD-RECORD 708 TEST WICKETS, A TOTAL SURPASSED ONLY BY MUTTIAH MURALITHARAN LATER THAT YEAR. ALTHOUGH SOMETIMES A CONTROVERSIAL FIGURE OFF THE FIELD, HE IS PROBABLY THE MOST SIGNIFICANT PLAYER OF RECENT TIMES AND IS GENERALLY REGARDED AS THE FINEST LEG-SPIN BOWLER EVER.

BOWLER'S ROLE

The bowler tries to pitch the ball in an area from which the batter cannot easily score runs and is in danger of being dismissed. This is bowling a "good line and length." The bowler can either attack, in an attempt to take wickets quickly while risking being hit for runs, or bowl defensively, making it difficult for the batter to score. The bowler can also employ several tactical variations, such as changing the line, length, pace, or angle of the delivery.

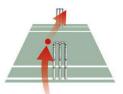
MOVEMENT

Good bowlers are able to make the ball deviate from its expected "normal" flight path. Pace bowlers do this using swing (movement through the air) and seam (movement off the pitch). A delivery from a spin bowler rotates in the air and then spins away from or into the batter after pitching.



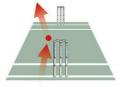
OUT-SWINGER

If the ball moves in the air away from the batter and toward the slips, this is an out-swinger—a very attacking type of delivery.



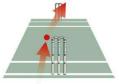
IN-SWINGER

When the delivery moves through the air toward the batter, it is an in-swinger (and can be difficult to score from).



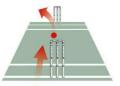
LEG-CUTTER

If a fast delivery moves away from the batter as a result of the way the seam struck the pitch, it is termed a leg-cutter.



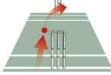
OFF-CUTTER

Another pace bowler's weapon, the off-cutter moves off the seam and into the batter, which can result in an LBW decision.



LEG-SPINNER

Similar to the leg-cutter but slower, the leg-spinner moves mainly because of the bowler's wrist action.

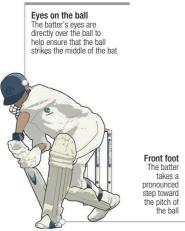


OFF-SPINNER

Usually achieved as a result of spin imparted from the bowler's fingers, an off-spinner deviates toward the batter.

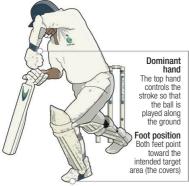
BATTING

The art of batting involves striking the ball with enough technical competence, timing, and placement to score runs (without being dismissed). To achieve this, the batter employs an array of strokes (four of which are illustrated below), each in response to a certain type of delivery. In general, good line and length balls are defended; poor deliveries can be attacked and hit for runs. Balls that pitch closer to the batter are usually played with the weight on the front foot, and balls that land closer to the middle of the pitch are mainly played from the back foot. Most batters try to "build an innings," which usually involves playing more carefully to begin with, then accelerating the scoring rate as the game progresses and the player's confidence increases.



FORWARD DEFENSIVE

This stroke is played to a well-pitched-up delivery that the batter feels is too risky to try to hit for runs. The batter should not leave a gap between the bat and the front leg's pad to avoid being bowled. There is no follow-through—the bat stops level with the pad.



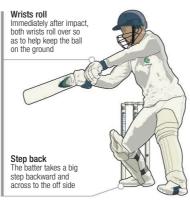
COVER DRIVE

This attacking, front-foot shot is played to a very full delivery that pitches outside the line of the off stump. Although it can yield many runs, if the ball swings away, a catch behind the wicket may result.

Elbow high A high left elbow facilitates a straight bat, which increases the chances of making clean contact with the ball Weight back As this stroke is mostly played to rising deliveries, the weight is on the back foot, which helps direct the ball downward

BACKWARD DEFENSIVE

This stoke is often employed to fast, short-pitched deliveries directed at the batter's body, thereby rendering an attacking shot unwise. As with the forward defensive, there is no follow-through, and the ball should drop safely just in front of the batter.



SQUARE CUT

Among the riskiest shots in cricket, this cross-batted stroke (in which the bat is horizontal) is played to a short-pitched delivery on the off side. The ball should be played into the off side, square of the wicket.

INSIDE STORY

The first official record of a game of "kreckett" was in England in the 16th century. Early matches were very different from those today, with the bat more like a hockey stick and the ball delivered underarm. It was not until the 19th century that overarm bowling and equipment such as batting pads were introduced. Today, cricket is played in over 100 countries, and there is a men's and a women's World Cup.

ICC

The International Cricket Council (ICC) is the sport's international governing body. Its many tasks include organizing the World Cups.

MCC

The Marylebone Cricket Club (MCC) is based at Lord's (the "home of cricket"), London, and administers the Laws and Spirit of Cricket.

HOWZAT?

The familiar and distinctive cry of "howzat?" (officially "how's that?") can be heard at cricket grounds the world over. This is because under Law 27, the fielding team must appeal to the umpire before the umpire can declare the batter "out."

STAT CENTRAL

MOST TEST RUNS				
PLAYER	MATCHES	RUNS		
SACHIN TENDULKAR	194	15,921		
RICKY PONTING	168	13,378		
JACQUES KALLIS	166	13,289		
RAHUL DRAVID	164	13,288		
ALASTAIR COOK	161	12,472		
KUMARA SANGAKKARA	134	12,400		
BRIAN LARA	131	11,953		
SHIVNARINE CHANDERPAUL	164	11,867		
MAHELA JAYAWARDENE	149	11,814		
ALLAN BORDER	156	11,174		

MOST TEST WICKETS				
PLAYER	MATCHES	WICKETS		
MUTTIAH MURALITHARAN	133	800		
SHANE WARNE	145	708		
ANIL KUMBLE	132	619		
JAMES ANDERSON	148	575		
GLENN MCGRATH	124	563		
COURTNEY WALSH	132	519		
DALE STEYN	93	439		
STUART BROAD	126	437		
KAPIL DEV	131	434		
RANGANA HERATH	93	433		

WORLD CUP WINNERS				
YEAR	WINNER			
2019 (MEN)	ENGLAND			
2017 (WOMEN)	ENGLAND			
2015 (MEN)	AUSTRALIA			
2013 (WOMEN)	AUSTRALIA			
2011 (MEN)	INDIA			
2009 (WOMEN)	ENGLAND			
2007 (MEN)	AUSTRALIA			
2005 (WOMEN)	AUSTRALIA			
2003 (MEN)	AUSTRALIA			
2000 (WOMEN)	NEW ZEALAND			
1999 (MEN)	AUSTRALIA			
1997 (WOMEN)	AUSTRALIA			
1996 (MEN)	SRI LANKA			
1993 (WOMEN)	ENGLAND			
1992 (MEN)	PAKISTAN			
1988 (WOMEN)	AUSTRALIA			
1987 (MEN)	AUSTRALIA			







BASEBALL

GAME OVERVIEW

Often seen as the defining American sport, baseball is a bat-and-ball game played by two teams of nine players. A game usually lasts for nine innings, during which both teams take turns at bat to score runs by advancing players around four bases. When the fielding team gets three players out, they bat. The team with the most runs at the end of the game wins.

FIELD OF DREAMS

The baseball field is divided into the infield and the outfield. The infield consists of the "diamond," the corners of which are the four bases, and the pitcher's mound. It is bounded by the infield grass line and two foul lines that extend out from home plate and mark the limits within which the ball must be hit. The outfield is all the fair territory between the infield grass line and the outfield fence.

Bat attack

The baseball bat can measure anywhere between 25 in (63.5 cm) and 40 in (101.6 cm) in length and tapers at the handle. Professional players must use a wooden bat Aluminum bats may be used in amateur baseball

Batting gloves

Batting gloves enhance the hitter's grip on the bat

BASEBALL IN BOOKS

THE NOVELIST JANE AUSTEN TALKS ABOUT A GAME OF "BASE-BALL" IN HER BOOK NORTHANGER ABBEY, WHICH WAS WRITTEN IN 1798. IT IS ONE OF THE EARLIEST WRITTEN REFERENCES TO THE GAME.

PLAYER PROFILE

Baseball is a game of skill, strategy, and athletic ability. Catching, hitting, and throwing all require excellent hand-eye coordination. It also helps to have great reflexes when facing the pitcher. Batters have just a fraction of a second to decide whether or not to swing at a pitch. Fitness is another important part of the game, for sprinting between bases and chasing down fast-moving balls in the field. Physical endurance is also crucial, as the pros endure a grueling 162-game regular season.

NEED2KNOW

- Baseball is a North American adaptation of the British sport rounders. While there is no official birth date for baseball, the first full documentation of a game dates to 1838.
- ➡ Professional baseball is primarily an American sport, but it has also spread to other countries. There are professional leagues in China, Japan, South Korea, Taiwan, Cuba, and Venezuela.

Head protection Some pitchers can deliver

the ball at 100 mph (160 kph) or more, so a helmet is essential for a batter's safety

Player identification Players from all the Major

League teams except the New York Yankees have their names on the back of their jerseys. A number on the front of the jersey also identifies the player

Team stripe

Each player wears a stripe in the distinctive team colors

Shocking stockings

Two Major League clubs are named for their stocking color: the Boston Red Sox and Chicago White Sox

Gripping the dirt Baseball shoes have

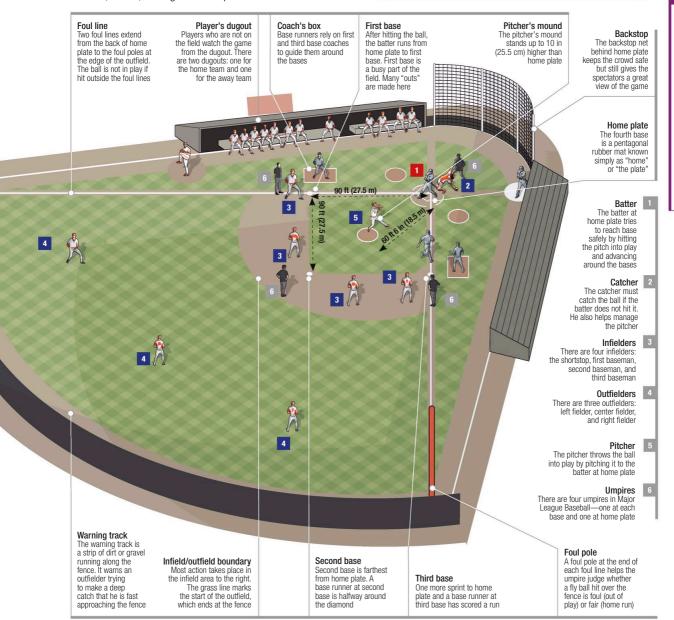
metal or plastic cleats (or studs) on the soles that provide grip when running on dirt

ON THE FIELD

There are nine defensive positions on the field. The pitcher stands on the mound to pitch and the catcher squats behind home plate to catch the ball. The first baseman, second baseman, third baseman, and shortstop cover the infield. The left, center, and right fielders patrol the outfield.

PITCHER'S MOUND

The pitcher's mound is an 18 ft (5.5 m) dirt circle up to 10 in (25.5 cm) high. Just behind the center of the mound is a small pad called the pitcher's rubber. The pitcher must keep one foot touching the rubber during the pitch and so can only take one step back and one forward.



SIDELINES

The highest ever attendance figure for a game in the US was recorded on October 6, 1959, when the LA Dodgers played the Chicago White Sox. The Arizona Diamondbacks hold the record for the highest season attendance with 3,610,290 in 1998.

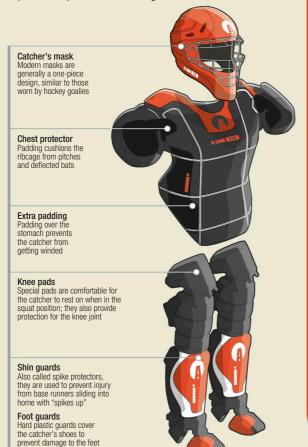
3,562 The record number of games played during a pro career. The record is held by Pete Rose, who played for 24 years.

The age of the oldest ever pro, Satchel Paige, who played his last game for the Kansas City Athletics on September 25, 1969.

4,415,000 in dollars, of the most expensive piece of baseball memorabilia: the New York Yankees jersey worn by Babe Ruth in 1920. It is the earliest known jersey worn by one of the game's earliest stars. It was bought by sports memorabilia collector Joshua Leland Evans in 2017.

CATCHER'S GEAR

Standing right behind the batter, the catcher is exposed to pitches traveling at up to 100 mph (160 kph), so his gear is designed for protection. The mask, knee pads, and shin quards are made from hard plastic and the chest protector is padded to protect the vital organs.



INNINGS AND OUT

Baseball is played in segments called innings. During an inning, each team takes a turn in the field and a turn at bat. The visiting team always bats in the first half, called the top half. The home team bats in the second half, called the bottom half. In most leagues. the team with the most runs at the end of nine innings wins. If the score is tied at the end of nine innings, the teams play extra innings until one team has a lead at the end of an inning. The most innings played in a Major League game is 26. The longest game lasted 8 hours and 40 minutes.

GETTING OUT

Baseball is one of the few team sports in which the defense has the ball. The aim is to get three batters out, which can be achieved in a number of ways. Four are listed here: the umpire calls three strikes against the batter; the batter hits a ball into the air (a fly ball) that is caught by a fielder before it hits the ground in fair territory or foul; a runner who is not standing on a base is tagged by a fielder holding the ball; or a fielder with the ball touches the base to which a runner is forced to go before he gets there.

THE CATCH HE SHOULD HAVE DROPPED

CHICAGO CUBS FAN STEVE BARTMAN WENT INTO HIDING AFTER A 2003 NATIONAL LEAGUE CHAMPIONSHIP GAME AGAINST THE FLORIDA MARLINS. BARTMAN LEANED OVER THE FENCE TO CATCH A BALL—AND PLUCKED IT OUT OF THE HAND OF A CUBS' OUTFIELDER. THE INCIDENT CONTRIBUTED TO THE CUBS' SUBSEQUENT LOSS. BARTMAN BECAME THE SUBJECT OF AN INTERNET HATE CAMPAIGN AFTER THE MARLINS LATER ADVANCED TO THE WORLD SERIES.

VITAL GEAR

The bat and ball are obviously vital to a game of baseball. Other important gear includes the fielders' gloves, which help them catch and field the ball.

STITCHED UP

The ball has a core made from rubber and cork. Red cotton yarn is then wound around the core, and the ball is covered with two strips of leather. The leather is then stitched tightly together with more red cotton yarn.



GLOVES

Leather gloves make it easier for fielders to catch and field the ball. The size of the gloves depends on the fielding position. Infielder gloves have a size limit of 8½ in (21.3 cm). The short pockets of infielder gloves make it easier to remove the ball from the glove and throw it quickly.

Padded protection The gloves of all the fielders are well padded to protect the fingers



Catcher's mitt

The fingerless mitt of the catcher guards the hand and makes it easier to catch pitches



BAT IN HAND

Made from either wood or metal, the smooth bat tapers from the thickest part, called the barrel, to the handle. Bats typically weigh no more than 4 lb (1.8 kg).

Barrel The thickest part of the bat, the barrel, is the part used to

hit the ball

Midpoint The area between the barrel and the handle is the narrowest part of the bat

Tapered bat The barrel tapers to the handle, which has a rubber or cloth covering to help grip the bat

Safe in hand The wider "knob" at the end of the handle keeps the bat from sliding out of the



up to 40 in (101.6 cm)

THREE STRIKES AND YOU'RE OUT

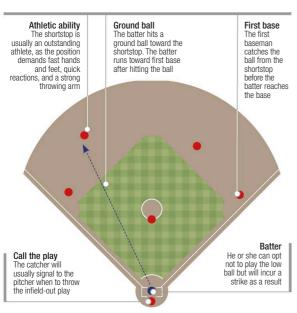
A batter has three attempts to hit a ball pitched into the strike zone above home plate. If he or she swings but misses the ball, the umpire calls a "strike" whether or not the pitch was in the zone. A strike is also called if the batter does not swing at a ball pitched into the strike zone or hits the ball into foul territory. If the batter has two strikes, a foul does not count as the third strike—with one exception. If the batter attempts to hold the bat over the plate, called a bunt, and the ball goes foul on more than two occasions, the batter is out. If the batter swings and hits the ball into fair territory, he or she must try to advance to first base.

THE BABE

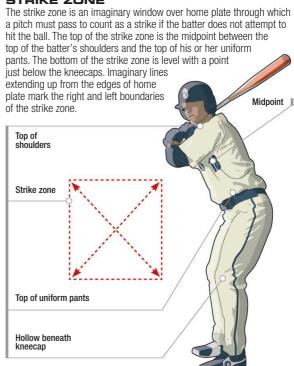
GEORGE HERMAN "BABE" RUTH JR., THE LEGENDARY NEW YORK YANKEES OUTFIELDER, WAS ALSO KNOWN AS "THE GREAT BAMBINO," "THE SULTAN OF SWAT," AND "THE COLOSSUS OF CLOUT."

THE GROUND OUT

If a ball is hit on the ground to an infielder, he must field the ball and throw it to first base before the batter reaches the base. If the fielder does so, the batter is out. If the batter reaches base before the throw, he is safe. In the event of a tie, the batter is deemed safe.



STRIKE ZONE



ON-DECK CIRCLES

A circle is marked on either side of home plate. These circles, called on-deck circles, are areas designated for the next batter, who may take practice swings to loosen up before his or her turn at bat.

Stepping up to plate

The warm-up circle provides the next batter with a final chance to warm up and observe the pitcher

Home plate

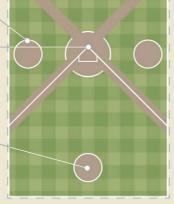
The focus for much of the action on the field

Pitcher's mound

The pitcher's mound lies in the center of the infield diamond

SHAPE OF THE PLATE

Home plate is a five-sided white slab. It has one long side measuring 17 in (42.5 cm), two short parallel sides measuring 8½ in (21.3 cm), and a pointed end, where two 12 in (30 cm) sides meet at right angles.



DESIGNATED HITTER

Traditionally, all members of a baseball team had to be able to take the field. Starting in 1973, however, the American League introduced the designated hitter (DH), a batter who takes the pitcher's turn at bat but does not play a defensive position. The DH allows teams to play a specialized pitcher who may not be particularly good at batting or a specialized batter who may be useless in the field, both of whom were liabilities under the old rules. Most Minor League and amateur baseball also allows use of a DH, but the National League prohibits the DH and requires the pitcher to bat.

BLACK SOX SCANDAL

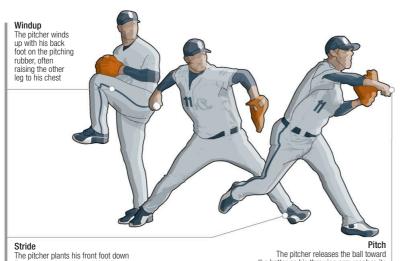
IN 1919, EIGHT MEMBERS OF THE CHICAGO WHITE SOX TEAM WERE BANNED FROM BASEBALL FOR THROWING GAMES IN THAT YEAR'S WORLD SERIES. THE CONSPIRACY WAS THE BRAINCHILD OF WHITE SOX FIRST BASEMAN ARNOLD "CHICK" GANDIL.

HITS AND MISSES

Baseball is a game of strategy, as well as athletic ability. Strong pitching is vital, since it is the most common way to get batters out. The pitchers' ideal situation is a "shutout," where the batting side does not score during the game. Batters do not simply practice hitting. They also spend hours studying throwing styles to try and "read" a pitch by watching the movement of the pitcher's arm or the positioning of the catcher's feet.

PITCHING

The type of pitch a pitcher throws depends on how he grips and releases the ball. Major League pitchers usually master at least two or three types of pitches. The catcher calls for a particular type of pitch using hand signals.



PITCHING STYLES

Pitchers throw a variety of pitches, each of which has a slightly different velocity, trajectory, and/or arm angle. These variations are introduced to confuse the batter in various ways, and ultimately aid the defensive team in getting the batter or baserunners out.

CURVEBALL

The curveball pitch has plenty of topspin, which causes the ball to break, or curve downward, unexpectedly. A well-placed curveball will drop just before it hits the plate, forcing the hitter to swing above it.



Wrist twist
The wrist is twisted inward to add spin to the throw

SLIDER

Halfway between a curveball and a fastball, the slider pitch doesn't break as dramatically as the curveball but travels faster, often tricking the hitter into believing it is a straight fastball.



Slider grip The ball is gripped slightly off center

FASTBALL

The fastball is the most common pitch in baseball. Some fastballs move or break in flight, while some do not—but all of them are delivered at great speed.



Fast fingers
Two fingers are placed
over the top of the ball

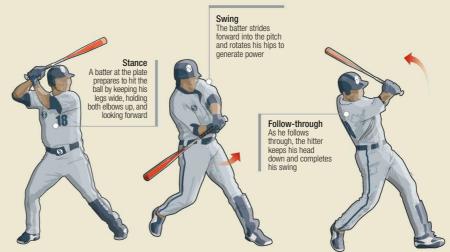
BATTING

Having warmed up in the on-deck circle, the batter steps up to the plate. He grips the bat firmly around the handle, with hands close together and fingers aligned at the knuckles. Then the chess game begins as the batter and pitcher try to outwit and overpower each other. Batting is often cited as one of the most difficult feats in sports. In fact, if a batter can get a hit in three out of 10 pitches faced, giving him a batting average of .300 (pronounced three-hundred), he or she is considered a good hitter. In Major League Baseball, no batter has hit over .400 in a season since Ted Williams in 1941, and no batter has ever hit over .367 in a lifetime.

firmly and swings the hand holding the

ball over his head. A few pitchers,

including some of the hardest to hit, pitch sidearm or nearly underarm



the batter as his throwing arm reaches its

onto his front foot as he releases the ball

full extent. He throws his entire bodyweight

SIDELINES

114,000 The highest ever attendance for a baseball game—an exhibition between Australia and an American services team during the 1956 Olympics.

162 The number of baseball games played by every Major League team during the season, which lasts from April to September.

73 The record number of home runs hit by one player during a MLB season. The record is held by Barry Bonds.

SCORING STATS

Baseball aficionados pore over batting, pitching, and fielding averages to rate their heroes, and scorers record all manner of statistics. Batters, for example, are awarded base hits for getting safely onto a base: a single for first base, double for second, and triple for third.

BASEBALL JARGON

For the uninitiated, baseball may seem to have a language all its own—in fact, there are entire books published on the sport's jargon. The following list of selected terms will help you interpret some of the more common phrases to be heard on the field.

BASES LOADED A situation where there are baserunners on first, second, and third bases. **BEANBALL** A pitch deliberately thrown to hit the batter, usually on the head, if he or she does not move out of the way.

DOUBLE A hit in which the batter gets to second base safely.

DOUBLE PLAY When two players from the batting team are put out on the same play. **HOMER** A "homer" (or home run) is a hit over the outfield fence that allows the batter automatically to run through all the bases and score a run.

LEFT ON BASE A term used to refer to the total number of baserunners who are left waiting on a base when the third out is called by an umpire.

PINCH HITTER A substitute batter who replaces a weak batter during a critical play (a "ninch").

SHUTOUT When one team prevents the other from scoring.

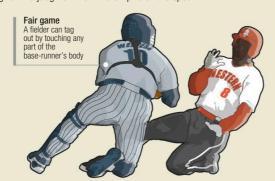
STOLEN BASE A stolen base occurs when a runner successfully advances to the next base.

BASERUNNING

Once the ball is in play, baseball is a contest between the speed of the batter's feet and the speed of the fielder's throwing arm. Baserunners can be tagged or forced out when they are not touching a base. They make desperate and spectacular slides to reach a base beneath the fielder's hands, calling for fine judgment from the umpire on the spot.

TAG OUT

The tag out (or simply a "tag") occurs when a fielder holding a live ball touches the base runner when he or she is not touching a base.



SLIDE

A runner slides into a base to avoid being tagged out or overrunning the base. A runner may slide into the base with enough speed to knock over an infielder attempting a tag out.

The Pete Rose

When a runner slides head-first into a base, it is known as a "Pete Rose," after the gritty player

INSIDE STORY

The Major Leagues consist of two set leagues—the National League (formed 1876) and the American League (formed 1901). Professional baseball has also become popular in other parts of the world, notably Asia and Latin America. Amateur baseball was an official Olympic sport from 1992, but has since been dropped from the program.

INTERNATIONAL BASEBALL FEDERATION (IBAF)

The IBAF is the worldwide governing body for baseball. Founded in 1938, the IBAF manages tournaments such as the Baseball World Cup and the World Baseball Classic. Despite its international authority, the IBAF has little control over professional baseball in North America

MAJOR LEAGUE BASEBALL

Major League Baseball is the dominant force behind professional baseball in North America. There are 30 teams in two major leagues: 16 in the older National League and 14 in the American League. Each league has three divisions grouped by geographical location. At the end of the season, the top teams from each league compete in a best-of-seven game series called the World Series to determine the overall champion.

STEALING THE SHOW

Runners risk being tagged out as they try to reach the next base before the pitcher releases the ball. Second base is behind the mound, and first and third bases are at the edges of the pitcher's vision, so he or she has to be alert to a runner making a sudden dash. Pitchers are allowed to throw the ball to a baseman instead of pitching to the batter, forcing the runner to scurry back to safety or get tagged out.

STAT CENTRAL

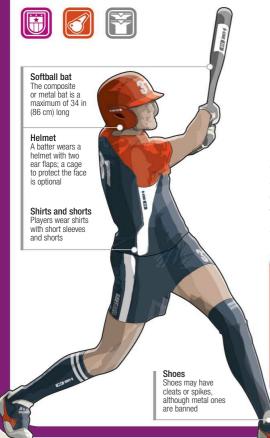
WORLD SERIES LEADING WINNERS		
FRANCHISE	WINS	
NEW YORK YANKEES	27	
ST. LOUIS CARDINALS	11	
OAKLAND ATHLETICS	9	
BOSTON RED SOX	9	
SAN FRANCISCO GIANTS	8	
LOS ANGELES DODGERS	6	
CINCINNATI REDS	5	
PITTSBURGH PIRATES	5	
DETROIT TIGERS	4	
CHICAGO CUBS	3	
ATLANTA BRAVES	3	
BALTIMORE ORIOLES	3	
MINNESOTA TWINS	3	
CHICAGO WHITE SOX	3	
PHILADELPHIA PHILLIES	2	
CLEVELAND INDIANS	2	
NEW YORK METS	2	
KANSAS CITY ROYALS	2	
MIAMI MARLINS	2	
TORONTO BLUE JAYS	2	

TOP MLB CAREER HOMERS		
NAME	HRS	
BARRY BONDS	762	
HANK AARON	755	
BABE RUTH	714	
ALEX RODRIGUEZ	696	
WILLIE MAYS	660	
ALBERT PUJOLS	648	
KEN GRIFFEY JR.	630	
JIM THOME	612	

BASEBALL WORLD CUP		
NATION	WINS	
CUBA	25	
UNITED STATES	4	
VENEZUELA	3	
COLOMBIA	2	
SOUTH KOREA	1	
PUERTO RICO	1	
DOMINICAN REPUBLIC	1	
GREAT BRITAIN	1	
NETHERLANDS	1	



SOFTBALL



NEED2KNOW

- The sport that we know today as "softball" is said to have begun indoors in 1887 on Thanksgiving Day in Chicago.
- One or more onfield umpires monitor the game to make sure the rules are followed.
- The International Softball Federation (ISF) is the governing body and has more than 120 member countries.

GAME OVERVIEW

Softball is a game in which two teams of nine players take turns at bat as they try to score the most runs around four bases laid out on a field of play. A game usually consists of seven innings in which each team bats and fields seven times. Softball has some similarities with baseball, which is also known as hardball.

COMPETITOR PROFILE

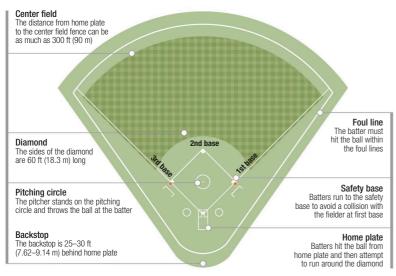
Members of a team may display a range of skills. Those with good hand-eye coordination may excel at batting, while others can pitch the ball cleverly to deceive the batter. All outfielders know how to catch, pick up, and throw accurately from base to base to stop runners from scoring.

FIELDING EQUIPMENT

The catcher standing behind the batter wears a helmet with a face mask and throat protector. Fielders wear a leather glove with webbing between the thumb and forefinger to help them catch and field the ball. They may wear sliding shorts to protect their thighs when sliding toward the bases. The stitched white or yellow leather ball is usually either 12 in (30 cm) or 11 in (28 cm) in circumference.

FIELD OF PLAY

The softball field features a diamond with three bases and a home plate where the batter stands and tries to hit the ball. To score a run, batters run around the diamond, touching the bases and home plate. The outfield can be any size, depending on the space available and the level of play. Slow-pitch softball can be played in larger arenas than fast-pitch softball because the batters hit the ball farther.



GETTING OUT

In each half-inning, the fielding (defensive) team needs to get three of the batting (offensive) team out. A batter may be out in several ways: if three strikes (failure to hit a fair delivery) are called (a strikeout); if a hit ball is caught before bouncing (a flyout); if the batter is touched by the ball or by a glove worn by a fielder holding the ball while the batter is away from a base (tagged); or if a fielder holding the ball touches a base before the batter arrives there (a force out or a force play).

TYPES OF SOFTBALL

Fast-pitch, slow-pitch, and modified pitch are the three types of softball. Fast-pitch softball favors the pitcher who, using a windmill motion, delivers the ball underhand as quickly and skillfully as possible, making it hard to hit. Slow-pitch softball favors the batter, as the ball is lobbed up, making it easier to hit. Modified-pitch softball is like a sloweddown version of fast-pitch softball.

149

ESÄPALLO

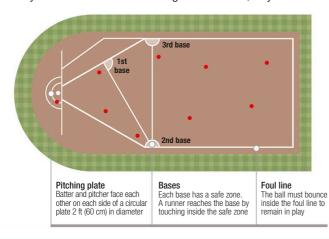






GAME OVERVIEW

Also known as pesis, pesäpallo is Finland's most popular sport after ice hockey. As in baseball, two teams of nine players take turns batting and fielding, and the batting team scores when they advance a player around four bases. When batting, teams may also use three extra designated hitters, or jokers.



SCORING

A full game is played over two periods of four innings, with an extra inning if scores are tied. The ball must bounce within the playing area to count as a legal play. Any ball that is hit past the back line is called a strike, so the batter must be careful not to hit the ball too hard. After three strikes, a batter is out. If a fielder catches the ball inside the playing area, the batter is "wounded" and cannot bat again in the inning unless the team scores. An inning ends when three players are out or all players are either wounded or on a base. The team's plays are directed by a manager, who works out how best to score in this highly tactical game.

FIELD OF PLAY

The game is played on asphalt or other surfaces suitable for running. For men, the field is 302 ft (92 m) long and 138 ft (42 m) across. A strip of grass 33 ft (10 m) wide surrounds it. The bases are laid out in a zigzag, with the distance between each base progressively longer, to a total distance of 413 ft (126 m). For women, the field is 10 percent smaller.

NEED2KNOW

- Pesäpallo was invented in the 1920s by combining the rules of baseball with traditional Finnish games.
- The pitcher delivers the ball by throwing it up vertically to a height of at least 3 ft 3 in (1 m) above the batter's head. This makes hitting the ball easier than in baseball.

ROUNDERS







GAME OVERVIEW

Rounders is a game played by two teams of at least six but no more than 15 players, who take turns to bat and field. The team that scores the most rounders at the end of a number of innings is the winner. The game is mainly played by teams in the UK, Ireland, and Canada. The National Rounders Association (NRA) in the UK and the Gaelic Athletic Association (GAA) in Ireland have developed two sets of rules, although there is some overlap between them and games are played between the two codes.

SCORING

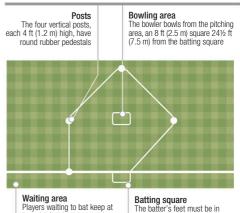
A rounder is scored if a batter hits the ball and runs without stopping around all four posts before the ball can be returned to the bowler. Under NRA rules, a half-rounder is scored if the batter hits the ball and reaches second or third base or if he or she runs all the way around without having hit the ball. A penalty half-rounder is scored if the bowler delivers two consecutive no-balls to a batter.

FIELD OF PLAY

Rounders may be played on grass, asphalt, or any surface suitable for running, but not on mixed surfaces. The hitting area and the first three posts form a square with 39 ft 5 in (12 m) sides. The fourth post is 27 ft 10 in (8.5 m) from the third post.

NEED2KNOW

- Rounders is thought to have originated in Great Britain and Ireland, perhaps as early as the 16th century. It was probably the inspiration for baseball and softball.
- The game is played by men, women, and children. There may be no more than five men on a mixed team.



least 33 ft (10 m) behind the front line of the batting square

The batter's feet must be in the 6½ ft (2 m) square while the ball is being bowled

NEED2KNOW

- Originally developed in Canada, ice hockey is played in 31 countries, mainly in North America and Europe.
- lce hockey is one of the four major North American professional sports.
- The North American-based National Hockey League, known as the NHL, is the sport's premier league.
- Only seven of the 31 NHL franchises are based in Canada, but Canadians outnumber Americans in the league by three to one.

GAME OVERVIEW

Ice hockey, or just "hockey" as it's known in the United States and Canada, is a fast-paced, action-packed sport played on ice. During 60 minutes of regular time, split into three 20-minute periods, each team of six players tries to score by shooting a vulcanized rubber puck into the opposition's goal using their stick or by deflecting it off their skates. Ice hockey is a dynamic and exciting game to play and watch; it attracts huge television audiences and legions of fanatical supporters.

THE RINK

Hockey rinks are specifically designed for the game. They are rectangular with rounded corners and are surrounded by "the boards"—a wall roughly 3 ft 3 in (1 m) high topped with a shatterproof plexiglass screen to protect the crowd. There are two standard sizes for hockey rinks: the one used primarily in North America is narrower than that used in Olympic competition and in most other national leagues. At each end of the ice, there is a goal consisting of a metal frame and a cloth net. The ice is about ¾ in (2 cm) thick and made up of eight to 10 thin layers.

PLAYER PROFILE

Hockey players must think fast, act fast, and be masters of strategy. To reach speeds of up to 25 mph (40 kph), players must be extremely fit and strong, and to turn and maneuver at these speeds, they need supreme control of their bodies. The puck can travel at frightening speeds, so to control and pass it or shoot on goal, players need lightning reflexes.



Divides the rink into two zones—one for each team

75# (23 m)

Neutral zone

Both teams must change players within this zone. Various attack and defense strategies are organized in the neutral zone

Face-off circles and spots

The five circles and nine spots indicate where face-offs take place

Position lines

Located inside and outside the face-off circles, they indicate where players line up for the face-off

Goal line

The puck must be completely over this line for a goal to be scored

GORDIE HOWE HAT TRICK

THE TERM "GORDIE HOWE HAT TRICK," NAMED IN HONOR OF THE LEGENDARY HOCKEY STAR, IS ASCRIBED TO A PLAYER WHO—IN THE COURSE OF A SINGLE MATCH—SCORES A GOAL, PROVIDES AN ASSIST, AND WINS A FIGHT.

Equipment

The gloves, like all hockey gear, are focused on protection—lots of padding is worn to avoid injury during high-speed collisions with other players, the boards, or the puck

Tool of the trade

The main tool of the hockey player's craft, the hockey stick, is used to control and shoot the puck. It also serves as a barrier between a player and the opposition

Bladed boots

Hockey skates feature space-age material technology, all sitting on a razor-sharp blade that carves up the ice—and anything else that gets in its way. Skates can cost up to \$6,000 per pair and are custom-made for the pros











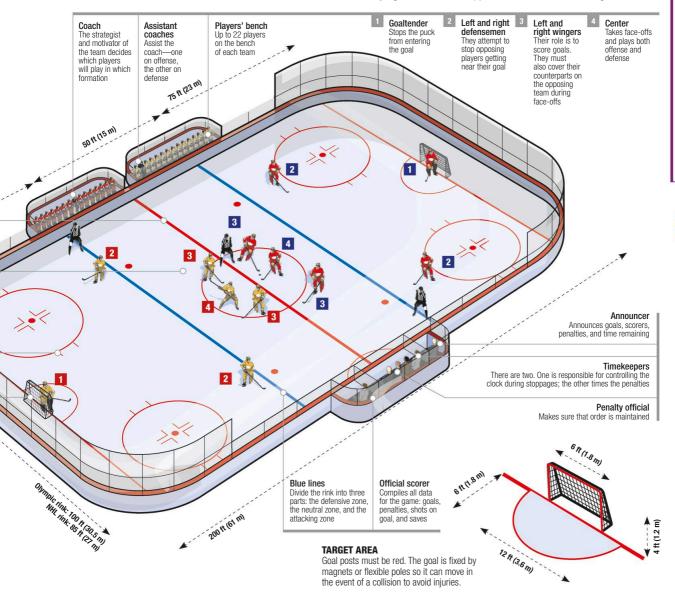


THE FACE-OFF

Each game starts with a face-off in the center circle and restarts in the same way after every goal that's scored. This is not a moment for the faint-hearted. One player from each team squares up, toe-to-toe, their sticks at the ready, and their blades remaining on the ice, poised for action. To start the game, the referee or linesman drops the puck between the two players, then backs out of the way. The players then battle-sticks clashing-to gain possession of the puck and make an assault on the opposition's goal.

WHO PLAYS WHERE?

A team consists of, at most, 22 players, including at least two goaltenders. Six players from each team take the ice at the same time. Usually one of the six is a goaltender, who wears heavy-duty protective clothing and positions himself in front of the goal. He is allowed to stop the puck with his hands, body, or stick. His five teammates are divided into three forwards and two defensemen. The forward positions—the "glamor" players—are the left wing, right wing, and center. In defense, laying in wait for the opposition, are the left and right defense.



SIDELINES

113,411 The largest crowd expacked in the Michigan Stadium to watch The largest crowd ever archrivals Michigan State University and the University of Michigan December 11, 2010.

The record number of consecutive games played by an NHL hockey goaltender, held by Glenn Hall.

The longest winning streak in NHL history, set by the Pittsburgh Penguins in 1992-1993.

"Five goals, five different ways" is known as a quinella. Mario Lemieux scored the only quinella in NHL history in 1988.

The number of American-born goaltenders out of the 35 total enshrined in the Hockey Hall of Fame.



WHAT THEY WEAR

The hard surfaces of the ice and boards, plus pucks flying at up to 120 mph (190 kph)—not to mention other players looking for blood—pose a multitude of safety hazards. Besides ice skates and sticks, hockey players are usually equipped with an array of safety gear to lessen the risk of injury. This includes a helmet, shoulder pads, elbow pads, mouth guard, protective gloves, heavily padded shorts—sometimes known as Breezers—a "jock" athletic protector, shin guards, and sometimes a neck guard. Goaltenders wear masks and much bulkier, specialized equipment designed to protect them from many direct hits from the puck.

08

"THE GREAT ONE"

NICKNAMED "THE GREAT ONE," WAYNE GRETZKY IS REGARDED AS THE BEST PLAYER OF THE 1980s AND 1990s AND IS ACKNOWLEDGED AS THE GREATEST HOCKEY PLAYER EVER BY SPORTSWRITERS. PLAYERS. COACHES. AND FANS. ALONG WITH HIS MANY AWARDS, RECORDS, AND ACHIEVEMENTS, HE IS THE ONLY PLAYER TO HAVE EVER HAD HIS PLAYING NUMBER, 99, OFFICIALLY RETIRED ACROSS THE ENTIRE NATIONAL HOCKEY LEAGUE.

BODY GUARDS

Ice hockey players are among the best protected sports players—and for good reason. Here is the array of equipment worn by most NHL hockey players.

Face protection

Visors are made of steel bars or mesh or of transparent, reinforced plexiglass

Upper body

A hybrid of a wetsuit and an NFL player's shoulder pads, this upper-body suit offers great protection and flexibility

Composite materials

Body padding is made of high-tech materials that are strong yet breathable

The iock

The groin and pelvis protector is one of the most valued items in the lockers of male hockey players

Thigh guards

Breezers protect the hockey players' best developed and most used muscles

FASTER FOOTWEAR

Hockey skates are made of hardened nylon reinforced with leather around the ankle and heel. A hard toe cap provides protection. They are tied up with laces.

Cold comfort

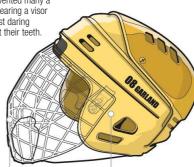
Hockey players spend up to 12 hours a day in their hockey skates, so comfort is high on the list of requirements. Boots are lined with natural. breathable materials such as cotton and silk

Steel blade

The blades on hockey skates are made of hardened steel



GOALTENDER'S HEAD GEAR



Goaltender's visor

Goaltenders wear larger visors that offer more coverage against pucks flying in from all angles

Hard hat

Light but super-strong fiberglass resists the blows of sticks and pucks

GOALTENDER'S GETUP

The ice hockey goaltender inhabits potentially the most vulnerable position in sport. Being bombarded by speeding pucks requires a whole extra level of protection.



Puck-proof vest

The goaltender's vital organs are protected by a vest made of steel mesh and graphite—not quite bulletproof, but almost



Pants protection

Goaltenders wear an extra pair of strengthened pants. Nothing can get in and nothing can escape out

CHOOSE YOUR WEAPON

Hockey players choose their sticks carefully and look after them well. Made of wood reinforced with fiberglass, these flexible lances, 6 ft 6 in (2 m) in length, pack a mighty punch at puck or opponent.

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PLAYING BY THE RULES

Shooting the puck into the opposition's goal is the aim of the game. Getting it there is a task pretty much unhindered by rules and regulations—fighting is all part of the game although offside rules do dictate patterns of play.

STAYING ONSIDE

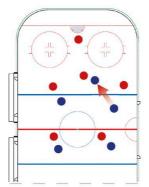
The purpose of the offside rule is to prevent attacking players from goalhanging. The most important offside rule dictates that attacking players must follow the puck into the attacking zone. A player is called offside if both his skates go into the attacking zone before the puck does. The other key offside rules are outlined below.

THE POWER PLAY

The object of a power play is to score a goal while the opposing team is playing shorthanded after a penalty has been awarded. Up to two players per side may be penalized, giving a team a possible five-on-three power play. The coach will then usually put on his best attacking players to try to push home the advantage. From the face-off, they try to gain control of the puck and head for the opposition's goal. The players then pass the puck between them until an opening is created and a player gets to take a shot on goal. A power play lasts the length of a penalty (two, four, or five minutes) or ends when a goal is scored by either team.

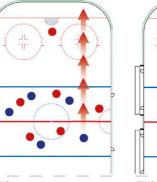
ADVANCING THE PUCK

Players can't pass the puck to a teammate across any two lines. Both skates must be over a line to determine player positions.

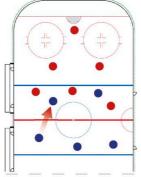


PRECEDING THE PUCK

They can't cross into the attacking zone ahead of the puck and then touch it. Offside is not called if they leave the attacking zone without touching it.



Icing is called when a player hits the puck across the opponent's goal line from his or her own half, unless it goes into the goal. Icing is legal when a team is shorthanded.



TWO-LINE PASS

The two-line pass (also known as an offside pass) occurs when a player passes the puck from his defending zone to a teammate across the red

FISTICUFFS

FIGHTING IN ICE HOCKEY IS A CONTROVERSIAL ASPECT OF THE SPORT. ALTHOUGH IT RESULTS IN A MAJOR PENALTY. PLAYERS WHO ENGAGE IN FIGHTING DO NOT GET EJECTED FROM THE GAME. HOCKEY REMAINS THE ONLY MAJOR PROFESSIONAL SPORT IN NORTH AMERICA THAT DOESN'T EJECT PLAYERS FOR FIGHTING, FIGHTS ARE OFTEN SPONTANEOUS KNEE-JERK REACTIONS TO AN ON-ICE INCIDENT DURING A CRUCIAL PART OF A GAME.

COMMITTING A FOUL

In men's hockey, players use their hips or shoulders to hit other players if the player has the puck or has just passed it. This is called body-checking and is perfectly legal. However, the following are expressly forbidden and incur penalties:

BOARDING Throwing an opponent violently into the boards. BUTT-ENDING Jabbing an opponent with the shaft of one's stick.

CHARGING Taking more than two steps toward an opponent before body-checking him.

CLIPPING Throwing one's body below an opponent's knees. **CROSS-CHECKING** Hitting an opponent with the shaft of the stick while both hands are on the shaft.

ELBOWING Impeding or striking an opponent with one's elbow. **DELAY OF GAME** Failing to keep the puck in motion.

HIGH-STICKING Hitting an opponent above the shoulders.

HOLDING Impeding an opponent with hands or arms.

HOOKING Impeding an opponent with one's stick. **INTERFERENCE** Body-checking an opponent who does not

have the puck or who has not just passed it. **KNEEING** Hitting an opponent with one's knee.

SLASHING Swinging one's stick at an opponent.

SPEARING Jabbing an opponent with the blade of one's stick.

TRIPPING Impeding an opponent around his legs.

OFFICIALS' SIGNALS

There are two categories of officials: on-ice officials are the referees and linesmen that enforce the rules during game play, and off-ice officials have an administrative role rather than an enforcement role. The referee will halt the game using a whistle. then signal when he spots any of the offenses outlined above. The signals used in ice hockey are unique to the game. There are more than a dozen signals used by referees during a game; below are among the ones that are most commonly seen during a game.



DELAYED PENALTY



HOOKING



SLASHING



GOAL DISALLOWED CROSS CHECKING



GOAL SCORED





STAT CENTRAL

ALL-TIME NHL POINT SCORERS		
POINTS	PLAYER	
2,857	WAYNE GRETZKY	
1,888	JAROMIR JAGR	
1,887	MARK MESSIER	
1,850	GORDIE HOWE	
1,798	RON FRANCIS	
1,771	MARCEL DIONNE	
1,755	STEVE YZERMAN	
1,723	MARIO LEMIEUX	
1,658	JAROMIR JAGR	
1,641	JOE SAKIC	
1,590	PHIL ESPOSITO	
1,579	RAY BOURQUE	
1,533	MARK RECCHI	
1,531	PAUL COFFEY	
1,478	JOE THORNTON	

NHL TITLE WINNERS		
NO	TEAM	
24	MONTREAL CANADIENS	
13	TORONTO MAPLE LEAFS	
11	DETROIT RED WINGS	
6	BOSTON BRUINS	
6	CHICAGO BLACKHAWKS	
5	EDMONTON OILERS	
5	PITTSBURGH PENGUINS	
4	OTTAWA SENATORS	
4	NEW YORK RANGERS	
4	NEW YORK ISLANDERS	
3	NEW JERSEY DEVILS	
2	MONTREAL MAROONS	
2	PHILADELPHIA FLYERS	
2	COLORADO AVALANCHE	
1	CALGARY FLAMES	
1	VICTORIA COUGARS	

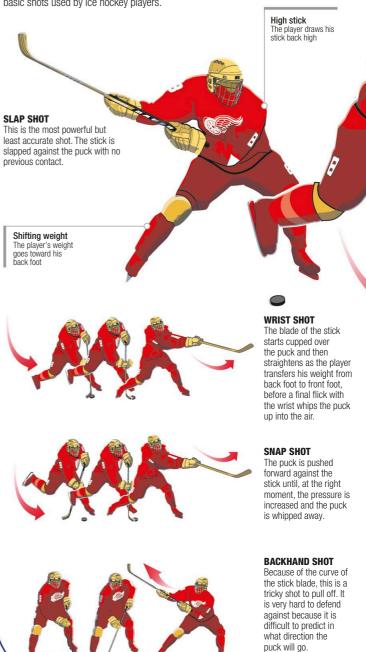
OLYMPIC MEN'S MEDAL WINNERS			
YEAR	GOLD	SILVER	BRONZE
2018	0AR	GERMANY	CANADA
2014	CANADA	SWEDEN	FINLAND
2010	CANADA	USA	FINLAND
2006	SWEDEN	FINLAND	CZECH
2002	CANADA	USA	RUSSIA
1998	CZECH	USSR	FINLAND
1996	SWEDEN	CANADA	FINLAND
1992	USSR	CANADA	CZECH
1988	USSR	FINLAND	SWEDEN
1984	USSR	CZECH	SWEDEN
1980	USA	USSR	SWEDEN
1976	USSR	CZECH	W. GERMANY
1972	USSR	USA	CZECH
1968	USSR	CZECH	CANADA
1964	USSR	SWEDEN	CZECH

PLAYING THE GAME

Ice hockey is a crowd-pleasing, no-nonsense game of attack and defense. When in possession of the puck, players charge up the rink aiming to get into position for a shot on goal. In defense, the players try to intercept the puck and steal it from the opposition by hassling players and blocking their progress up the rink. This high-tempo game relies on players' swift movement across the ice, great passing and shooting techniques, and wily playing strategies.

SLAMMING THE PUCK

Shooting the puck into the net is the aim of the game and what the crowds pay to see. Shooting techniques are more aggressive versions of those used for passing. There are four basic shots used by ice hockey players.



KEEPING IN CHECK

Hockey is a rough sport, and the players are allowed under certain circumstances to smash into each other. When a player is carrying the puck forward, players from the opposing team are allowed to impede his progress by skating into him. This is called checking. They can also check a player who has just received a pass.



PICK A TARGET
Checking is all about anticipation and timing—picking the target, tracking his movement, and approaching at just the right time.



TAKE HIM OUT

The weight and momentum of the attacking player travels through his target, pushing him away from the puck.

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CE HOCKE

Attacking the target Making the shot, the player's weight shifts through the puck and toward the target Stick swoosh
The force of the hand
movement causes the
stick to bend, propelling
the puck into the air

Bottom hand

Top hand
Positioned right
at the top of the
stick, it creates a
pivot against
which to push

Pulls the stick away from the puck, then snaps it through toward the target

PULLING THE GOALTENDER

A team that is losing by a goal or two in the last few minutes of play may decide to "pull" the goaltender. This means that they remove the goaltender and replace him or her with an extra attacker with the aim of using the advantage to score a fast goal. However, this tactic is pretty risky and quite often leads to the opposing team taking advantage of the empty net.

"THE HAMMER"

DAVE "THE HAMMER" SCHULTZ SCORED PLENTY OF GOALS FOR THE PHILADELPHIA FLYERS, BUT MOST OF HIS ACHIEVEMENTS ARE NOW FORGOTTEN. IN HIS ENTIRE PLAYING CAREER OF 14 YEARS (1966–1980), WHAT PEOPLE REMEMBER IS THE TIME HE SPENT IN THE SIN BIN: 259 MINUTES IN HIS ROOKIE YEAR IN 1966–1967, 348 MINUTES THE FOLLOWING SEASON, AND 405 THE NEXT.

SIDELINES

3,123 The distance, in yards (2,856 m), that the average hockey player covers during an NHL game.

The noise level, in decibels, at an Edmonton Oilers match when the team took to the ice.

The height, in inches (168 cm), of the Stanley Cup, one of the largest trophies in professional sports.

637,000 The number of registered Canadian hockey players. That's a staggering 1 in 58 of all Canadians.

INSIDE STORY

Ice hockey originated in Canada in the 19th century and soon grew in popularity, spreading to the United States and then Europe. The North American-based National Hockey League (NHL) was founded in 1917, and ice hockey was included in the Olympic Games in 1920 and the Winter Games in 1924.

The game has since become one of the most popular spectator sports in the world and is shown on TV networks worldwide. Ice hockey is played in over 30 countries—mostly those with some natural ice cover. It is the official national winter sport of Canada, where the game enjoys immense popularity, and it is also the most popular sport in Finland. The most prominent and successful ice hockey nations are Canada, Czech Republic, Finland, Russia, Slovakia, Sweden, and the United States.

GOVERNING BODY

The International Ice Hockey Federation (IIHF) was founded in 1908 and is the worldwide governing body of ice hockey. It is responsible for the management of international ice hockey tournaments and maintains the IIHF World Ranking. Despite its worldwide authority, the IIHF has little control of hockey in North America.

BEST PLAYERS, TOP LEAGUE

The National Hockey League (NHL) is the world's top league, featuring the world's best players. The league's teams are divided into two conferences, each comprising three divisions.

NEED2KNOW

- → Bandy is an ancestor of ice hockey. The sport resembles both field hockey and soccer. Its alternative names include "hockey on ice" and "winter football."
- The leading bandy-playing nations are Sweden, Norway, Finland, and the Baltic states (Estonia, Latvia, and Lithuania). The game is also popular in parts of Canada, Russia, and the United States.

PLAYER PROFILE

Bandy players must be good ice skaters and, because dribbling with the feet is permitted, many also have the ball skills of top soccer players. They need strong lungs—the round ball travels quicker than a flat puck, so bandy is an even faster game than ice hockey. The matches last longer, too (45 minutes each half, as opposed to ice hockey's three 20-minute periods), and stamina is essential. The strategic complexity of the game means that players also need an instinct for positioning.

BANDY



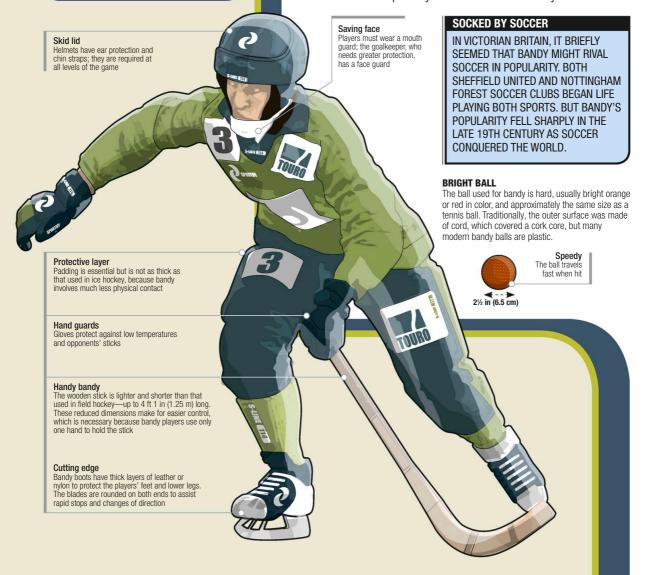




GAME OVERVIEW

Bandy, or "banty," is a winter sport that is usually played on an outdoor ice rink, although there are some indoor rinks. Two teams of 11 players compete over two 45-minute halves to hit a small ball into goals at either end of the rink. Players wear skates and wield curved sticks, known as "bandies." They can control the ball with their feet or bodies but must not use their hands.

The game is fast-moving and high-scoring, averaging seven or eight goals per match. To keep up the tempo, each side can use three substitutes (four in international games) who may come on and off as often as the captain or coach requires. One of bandy's peculiarities—and for some, its attraction—is the paucity of rules: there are only 18 in total.



THE RINK

Bandy was originally played on frozen fields but now usually takes place on all-weather ice rinks similar in size to soccer fields. Low wooden fences along the sidelines keep the ball on the rink. Between matches, the ice is smoothed over by a special motorized vehicle widely known by the name of the leading manufacturer, Zamboni.

Goalkeeper
He is permitted
to use hands
and arms to
play the ball,
but only within
his own

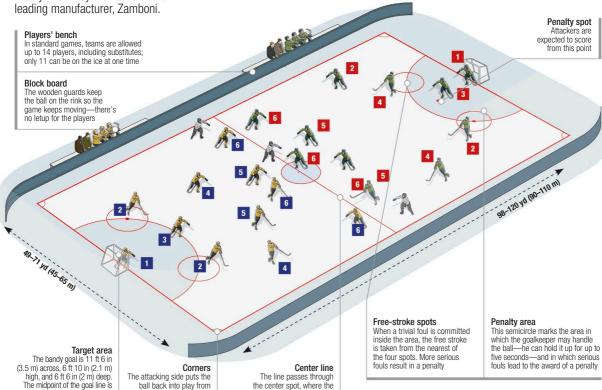
penalty area

Fullbacks
They guard
each side
against
attack from
the wingers

Middle fullback This player marshals the other defenders from a central Half-backs
They are the gene irrst line of defense and the key to getting the ball toward and turning defense

Quarterbacks
The strategic generals: their job is to use the ball to create goal-scoring opportunities for the forwards

Forwards
Two wingers
and a central
striker are
constantly
in motion to
receive their
teammates'
passes



first stroke of each half

of the game is played

BANDY CANS

the center of the semicircle

that marks the penalty area

Many elements of bandy, such as corners and free strokes, are closely related to soccer. If the ball goes out over the side fence, a stroke-in is awarded to the opposition. If the ball goes over the goal line off a defending player, an attacker takes a corner, playing the ball toward the goal. Attackers must be outside the penalty area when the corner is taken; defenders must be on the goal line.

here, after it has been put

out by the defenders

BANDY BANS

Bandy players may not head the ball or control it with their arms or hands, nor can they raise their sticks above head height to control the ball. Although physical contact is allowed, kicking, tripping, pushing, grasping, and slashing are punished by a free stroke or penalty. Players who commit serious or repeated fouls may be sent to a "sin bin" for five or 10 minutes. Free strokes are awarded for fouls. They must be taken within five seconds.

BEST FOOT FORWARD

The best bandy players combine the quick-footed dribbling skills of soccer players with either the kind of spectacular shots familiar from field hockey and ice hockey or delicate lobs that take out the opponent's midfield defenders. Forwards cover miles during a game, since they need to make sure that they're always available for a pass.

STICKLESS WONDERS

Bandy goalkeepers do not have sticks: they catch the ball or block it with their bodies. They wear protective padding on their legs in addition to the clothing worn by outfield players. Having caught the ball, they may hold it for no more than five seconds before throwing or kicking it to an outfield player. When the ball goes out of play behind the goal off an attacker, the goalkeeper restarts the game with the ball in his hand. All other players must be outside the penalty area.

INSIDE STORY

Bandy world championships for men and women have been held in every odd-numbered year since 1957. For the first two decades, they were dominated by the Soviet Union, which won the first 11 titles. Since that nation broke up at the end of the 1980s, Russia (one of its former components) has started as the favorite in most tournaments, with Sweden as its main challenger.

GOVERNING BANDY

The Federation of International Bandy (FIB) was formed in 1955 in Stockholm and is still based in Sweden. There are 28 member nations—including India, a nation not usually associated with winter sports.

- Field hockey is played in more than 130 countries. In India and Pakistan, it is a national sport, together with cricket.
- Hockey rules have changed dramatically in the last 20 years: a contested start (the bully) has been replaced by an uncontested push-off, offside has been abolished, and rolling substitutions are permitted.
- Hockey remains largely an amateur sport, because it has not found large audiences in wealthier nations.







FIELD HOCKEY

GAME OVERVIEW

Field hockey—often just called "hockey" in countries where ice hockey is not a major sport—is a fast-moving, exciting, and potentially tough game in which two 11-a-side teams of men or women try to hit, push, pass, or dribble a small, hard ball into each other's goal using J-shaped sticks. The winner is the team with more goals after two 35-minute halves. Gameplay often resembles soccer with sticks—in some countries, hockey is the more popular of the two games.

PLAYER PROFILE

Outfield players cover a lot of ground during a match, so they need to be fit, with good stamina but also capable of short sprints. Their training involves demanding leg exercises. They also work hard to perfect their touch—the ability to "feel" the ball through their sticks.

Clothing

Both shirt and shorts or skirt are usually made of cotton to allow athletes to perspire. They are in matching team colors; all have numbers, apart from the goalkeepers' shirts

Stick

Although rules limit the size of the head of the crook-shaped stick and the overall weight, there is no specified stick length. Most sticks are about 3 ft 1 in (95 cm) long

Shin guards

Wearing protection from other sticks and the ball is recommended but not required

Boots

Sometimes have studs but now normally have plastic ridges

Ball

Usually plastic over a cork core, sometimes with indentations to reduce drag on a wet field



HOLARI IS A UNIQUE FORM OF HOCKEY PLAYED IN TURKEY. THE GOALS AND FIELD OF PLAY ARE SIMILAR TO THOSE IN REGULAR HOCKEY, BUT A WOODEN CYLINDER REPLACES A BALL AND THERE ARE NO CODIFIED RULES AND NO SET TIMES. GAMES MAY START AT DAWN AND GO ON UNTIL THEY ARE TIMED OUT BY SUNSET.

"Long" corner

When a defending player puts the ball out of play behind his or her back line, the attacking team restarts the game with a free hit from the nearest of these marks

Umpires

Two; each is meant to take charge of one half of the field, with the division along an imaginary line running diagonally from corner to corner. In practice, the game is so fast that they have to work closely together and cooperate throughout the field

Back line

This is the limit of the field at each end. The part of the back line between the posts is known as the goal line

SIDELINES

The highest number of men's World Cups won by a single nation, Pakistan, since the competition began in 1971. Along with India, they dominated hockey in the 1970s.

The number of nations to have won the Women's Hockey World Cup. The Netherlands lead the way with eight titles.

The number of goals scored by German defender Florian Kunz in only 39 games for his national team in the 1990s. He was World Hockey Player of the Year 2001.

166 The record number of international goals, scored by attacking midfielder Alyson Annan in 228 appearances for Australia.

159

ON THE CARPET

As the name suggests, field hockey was originally played on real grass. Today, though, the majority of top-tier matches are played on a type of watered synthetic grass, which is easier to maintain. This speeds up play by providing a flatter surface to help the ball run true. A sand-based field is also sometimes used, but it can cause abrasions if players get knocked over. Synthetic fields also reduce the likelihood of matches being postponed due to adverse weather conditions.

INDOOR HOCKEY

Developed in the 1950s as a way for hockey enthusiasts to play during the winter, indoor hockey takes place in a sports hall on a small field 145 x 72 ft (44 x 22 m) between teams of six players. Most elements of the game are like field hockey, but the ball may only be pushed rather than hit and must stay on the ground except during a shot. Long boards run along the sidelines to keep the ball in play, making the game faster than the outdoor version.

Goalkeeper Inside the circle, the keeper can stop the ball with any part of his or her body and kick it but may not

Fullbacks Two; their main task is to stop opposing wingers from breaking down the sides and crossing the ball

Half-backs Two; they try to control midfield and break up attacks

Center half-back The fulcrum of the defense; marks the opposing center forward

Inside forwards Two; turn defense into attack by feeding the ball to the forwards

Wingers Two; stationed near the sidelines in the attacking half of the field

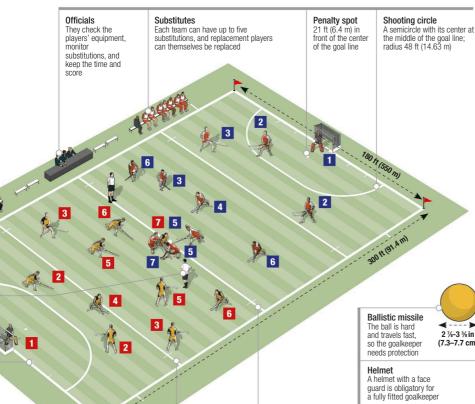
3 ft (90 cm

Center forward Hangs close to the goal; main job is to score, but also harries opposing fullbacks

Net

Hangs outside

the boards



7 ft (2.1 m) 12 # (3.7 m)

GOAL

Along the sides and back of the goal are solid boards 18 in (46 cm) high and dark colored on the inner side. These help referees see and hear if a shot at a penalty corner has risen too high to count. The goal nets are fitted slackly to stop the ball from bouncing back out.

a fully fitted goalkeeper

2 %-3 % in

(7.3-7.7 cm)

Body protector

The optional padding covers the arms, as well as the torso. The shoulders and elbows are particularly well clad

Hand guard Protects the hand

holding the stick and the free hand



Unlike shinpads, goalkeepers' pads are worn externally; they are made of springy foam, so a blocked ball bounces a long way

Flag posts

One in each corner; 4-5 ft (1.2-1.5 m) high and easily bendable to avoid causing injury

23 m line Two; 75 ft (23 m)

in from the back line (the field was originally measured in imperial units)

Center line The opening push-off is taken from the

midpoint along this central marking

GOALKEEPING GEAR

The hockey rule book makes it compulsory for the goalkeeper to wear a protective helmet, preferably one that completely covers the head and throat. It is permissible for the keeper to remove the helmet to take a penalty stroke. Most goalkeepers also wear full body protection against the speeding ball, including padded shorts, hand protectors, and shin pads.



HOCKEY STROKES

Stopping, controlling, or playing a small ball with a thin stick requires great touch and accuracy. The skills required range from perfectly timed tackles that stop the ball without touching the player, dribbling by using the stick both forehand and backhand, and smashing the ball at high speeds. In general play, the ball must not be raised into the air when hit. However, it can be raised using a scooping or long pushing action of the stick. When the ball is in the air, a player must not play if it is above shoulder height.

PUSH

Less powerful than a drive, the push is used for accuracy over short distances; the stroke is controlled mainly by the wrists. It is an effective stroke in the close quarters of the shooting circle, where the attacker has to push the ball accurately between the players defending the goal.

Gentle stroke

The lower hand pushes the stick through the ball

FLICK

Used mainly from dead ball situations, the flick or scoop is a push with a last-minute turn of the wrists to lift the ball off the ground. The stroke can take defenders out of the game but will be penalized if the ball endangers an opponent.

Upward lift A flick of the wrist scoops rather than hits the hall into the air

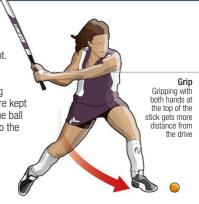


SAFETY FIRST

Hockey has many rules, and they change often. Most are aimed at making the game safer, but they are highly complex. The ball cannot be hit into the air, for example, unless a player is taking a shot or unless it is lifted by a scooping motion and does not endanger another player. In the same way, if the ball is in the air, a player may not raise his or her stick above the shoulder to stop it, unless it is to save a shot. When a player brings a high ball under control, opponents must remain 16½ ft (5 m) away until it is on the ground.

DRIVE

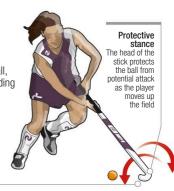
A strong hit along the ground may be either a pass or a shot. The player takes the longest backswing possible before hitting forward. The knees are kept bent to ensure that the ball remains on or close to the plaving surface.



DRIBBLING

Keeping the ball under close control at the end of the stick involves being able to play both forehand and with the stick reversed, or hooked over the ball, so that the stick is always shielding the ball from a potential tackler.

Rapid reverse The stick head flicks back and forth over the ball to keep it under tight control



FOULS

Depending on where on the field they occur, fouls are punished by the award of either a free stroke or a penalty hit to the opposition. Because most goals are scored through penalty hits, this is an effective way of preventing foul play. These are the main offenses:

STICKS Raising the stick above shoulder height.

BACKHANDERS Playing the ball with the rear, rounded surface of the stick. **OBSTRUCTION** Tripping, shoving, charging, or striking an opponent. **FEET** Deliberately kicking the ball.

CARDS

Umpires may show a player a card for dangerous play or an intentional foul. A green card is issued as an official warning. When umpires show a vellow card, the player is sin-binned for five or more minutes. For persistent fouling or serious offenses, a red card is shown and the player is sent off.

PENALTIES

Most goals come from penalty strokes or penalty corners. Penalty corners are awarded against defenders for deliberately playing the ball over their back line; a foul between the 23 m (75½ ft) line and the circle; or an unintentional foul inside the circle.



PENALTY STROKE

These are awarded for deliberate fouls by defenders inside the circle or for any foul that prevents a goal. The taker hits the ball from the penalty spot. Only the opposing goalkeeper may defend, all other players must stand behind the 23 m (751/2 ft) line.



TAKING A PENALTY CORNER

Teams drill to get the ball as quickly as possible from the corner taker to a teammate on the edge of the shooting circle, who either traps it or plays it to another one of their team to slam home before the advancing defense blocks it.

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INSIDE STORY

Games similar to hockey were played in Egypt some 4,000 years ago and by the ancient Romans and Greeks and the Aztecs. The modern game evolved in British schools in the mid-18th century, and hockey became an Olympic sport in 1908 (1980 for women). Until the 1980s, hockey was dominated by the national teams of India and Pakistan, but since then, Australia, Germany, and the Netherlands have been the most successful national teams.

GOVERNING BODY

The International Hockey Federation was founded in 1924 to oversee the development of the game. It has 137 member associations in five continents. Based in Lausanne, Switzerland, it organizes the Men's Hockey World Cup and the Women's Hockey World Cup and is responsible for deciding the rules for the sport.

TACKLING

Players may not make a tackle that will lead to contact with an opponent or use their own body to shield the ball. Likewise, the player with the ball cannot use his or her body to push the other player away.

BLOCK TACKLE

This is one of the most commonly used tackles. The defender drops the stick to the floor, thus impeding the attacker's further progress. In a successful tackle, the stick is dropped at the last possible moment.

Crossed sticks

The tackler

or body before

No swing The object is not to swing the stick, but to keep it low on the ground



Lunges across the attacker toward the ball

The defender comes from the attacker's left with his stick reversed; the reverse tackle risks giving away a foul because the stick must cross the attacker's body.

STAT CENTRAL

MEN'S	MEN'S HOCKEY WORLD CUP			
YEAR	WINNER	RUNNER-UP	SCORE	
2018	BELGIUM	NETHERLANDS	(3-2 PENS) 0-0	
2014	AUSTRALIA	NETHERLANDS	6–1	
2010	AUSTRALIA	GERMANY	2–1	
2006	GERMANY	AUSTRALIA	4–3	
2002	GERMANY	AUSTRALIA	2–1	
1998	NETHERLANDS	SPAIN	3–2	
1994	PAKISTAN	NETHERLANDS	(4-3 PENS) 1-1	

OPEN-SIDE TACKLE

A defender approaching from the right potentially has an easier job-he or she can use his stick the "normal" way around.

Open access

The tackler stands a better chance of taking possession of the ball

Losing control

The attacking player has been forced off the ball



FLOORBALL







GAME OVERVIEW

Often likened to ice hockey without the skates, floorball (also called floor hockey) is a fast-moving game played indoors on a gym floor between two teams of six players. A lightweight plastic ball is used instead of a heavy puck. and body-checking is not allowed. This makes the game less physical and more skill-oriented than its ice-based cousin.

NEED2KNOW

- Floorball was developed in Scandinavia in the 1970s. The best teams are Finland, Sweden, Switzerland, and Czech Republic.
- The sport was officially recognized by the IOC in 2008, but the sport has yet to make its debut at the Olympic Games.

MATCH RULES

A game consists of three 20-minute periods, with extra time and penalties if scores end level. At any one time, five outfield players and one goalie are allowed on the rink, but up to 20 players are allowed in the squad and players may be substituted without stopping play.

LIGHT AND FAST

Outfield players use a lightweight stick with a curved plastic blade to strike a ball that weighs just 1 oz (23 g). Skilled players may propel the ball at speeds of up to 120 mph (190 kph). The goalminder does not

Lightweight stick The stick must weigh no more than 12 oz (350 g)

Floor ball

The plastic ball has 26 holes in it and may be covered in dimples to make it more aerodynamic



carry a stick.

LACROSSE

GAME OVERVIEW

Lacrosse is a fast and furious game where two teams of 10 men or 12 women vie to get a hard ball into the opposition goal. They use crosses—sticks with net pockets—to catch, dribble, tackle, carry, scoop, and throw the ball. The skills of passing the ball huge distances are combined with force: crosses are also used to check opposition sticks and players.

PLAYER PROFILE

Lacrosse players are tough all-around: they have the hand-eye coordination to catch a small ball traveling at high speeds, the stamina of middle-distance runners, and the physical resilience of rugby players.

PLAYING AREA

Lacrosse is played on grass or artificial turf. The women's field is bigger than the men's because female teams have two more players.

Goalkeeper A goalkeeper remains in or near the goal crease (circle) and tries to stop the opposition from scoring

Defenders Three defenders form the penultimate line of protection in front of the goal

Midfielders Three midfielders link the defense and attack. They can move up and down the field to support either as

Sound footing studs or cleated soles for grip

Many players wear rib protectors; goalies must also wear throat

Players usually wear soccer or rugby boots, with

Attackers Their job is to score goals. They may not enter the crease around the opposition goal, but their sticks can

Body armor

and chest protection

NEED2KNOW

Lacrosse is most popular in North America, where it originated. It is the official summer sport in Canada and the fastest-growing sport in the United States.

Helmet Men wear helmets with a face mask and chin pad. All players have mouth quards

Shoulder guards Shoulder guards are required for

all men except the goalie

must wear

Arm pads

Men wear arm pads for

protection when

body-checking

protective gloves

Invented in the 1980s, Intercrosse is a popular noncontact form of the game played by teams made up of men and women.

PLAYING TIME

Matches vary in length depending on the age and sex of the players. Matches of one hour have four quarters, usually with two timeouts permitted per half.

Fnd line Both this and the sideline should be surrounded by a limit line at least 6 yd (5.5 m) back

Officials One timekeeper, two penalty timekeepers, a players' bench official, and two scorers

GOAL CREASE

Mar. So. va. (Eg. 17), Marillet, 19 ha (Eg. 18) The goal is made of wood or plastic and the net is always pyramid-shaped. Around the goal is a circle, called the crease, with a diameter of 6 yd (5.5 m).

1. 120 ya (1 10 m)

Men. 110 vd (100 m); wome

Four players, including the goalie stay in the defensive half of the field and three in the attacking half

Wing area

Although only marked near the halfway line, this line, 10 yd (9 m) in from the sides. is taken to extend

the length of the field

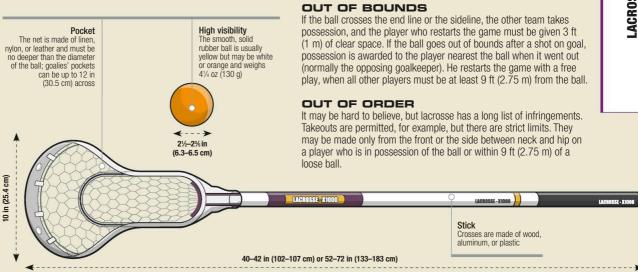
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CUTTING IT DOWN TO SIZE

THE POPULARITY OF LACROSSE HAS INCREASED IN INVERSE PROPORTION TO THE SIZE OF THE FIELD AND THE NUMBER OF PLAYERS. IN ITS ORIGINAL FORM— A TRAINING EXERCISE FOR IROQUOIS WARRIORS KNOWN AS BAGGATAWAY—IT WAS PLAYED ON A FIELD 500 YD (457 M) LONG BETWEEN TEAMS OF 200 PER SIDE.

LONG AND SHORT OF IT

Crosses come in two sizes: at least half of each team—usually midfielders and attackers—must use short crosses, which are easier to manipulate. Only five players—usually the defenders and always the goalie—can use long crosses.



IN CONTROL

The skill of scooping the ball up from the ground is hard to learn but not nearly as difficult as catching an airborne ball in the pocket of the crosse. Another crucial skill is distribution—the ability to propel the ball over a long distance to a teammate running into space.

CROSSE MESSAGES

Stick checking is the method used to try and dislodge the ball from the pocket of the player in possession. The defender tries to strike the attacker's stick with a well-directed but not necessarily forceful blow but may not be successful if the other player has good ball-handling technique or uses his body to shield the stick.

SIDELINES

The number of National Lacrosse League (indoor) teams eight in the United States and five in Canada. The number of times the United States has won the men's World Lacrosse Championship. The event, staged for the first time in 1967, is held every four years. Canada is the only other nation to have lifted the trophy (on three occasions).

THE WOMEN'S GAME

STRUCTURED MAYHEM

the others in the case of a dispute.

FACE-OFF

Lacrosse is one of the fastest of all ball sports, with play

switching from end to end in a couple of throws and players

barging each other off the ball. The game sometimes looks

control the game: a referee, an umpire, and a field judge. All

three perform the same duties, but the referee can override

The men's game begins with a face-off—one player from each team squats low in the middle of the center line on either side of the ball. The

referee calls "Are you ready? Play," then blows his whistle, and both

players try to scoop up and pass the ball. Play is then continuous,

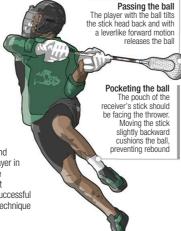
except for stoppages for out of bounds or infringements.

like a free-for-all—which is why it takes up to three officials to

Women's lacrosse differs from the men's game in several ways. The field is larger (see right), and there are two more players on each team. All women players use the short stick, which has a shallower pocket than that of the men's crosses. Women cannot body-check an opponent. They wear less protective clothing, and they can't kick the ball. To shoot at the goal, they must have a clear view of it, whereas men can shoot through a group of players.

INSIDE STORY

The first lacrosse Men's World Championship in 1967 had only four entrants: Australia, Canada, England, and the United States. Since then, the sport has spread to Japan, Korea, Italy, Finland, Denmark, Argentina, Hong Kong, and Tonga. The 2006 tournament had 21 competing nations; Canada beat the US in the final. The most popular form of the sport in Canada is box lacrosse, or boxla. Played indoors, the game was developed in the 1930s by owners of ice-hockey rinks to make use of their rinks during the winter season. The game resembles outdoor lacrosse, but there are only six players per team. It is faster, as attacking players must pass the ball within 30 seconds.



NEED2KNOW

- More than 800 million people across the globe play volleyball at least once a week. It is one of the most played sports in the world.
- The game is particularly popular in eastern and southern Europe, Asia, and North America.
- Invented in 1895, volleyball became an Olympic sport in 1964.

SIDELINES

The maximum number of seconds allowed for a serve—any longer and the ball is given to the opposition.

The number of consecutive Olympic gold medals won by the Cuban women's volleyball team. Their triumphs came at Barcelona in 1992, Atlanta in 1996, and Sydney in 2000.

0.3 The time, in seconds, it typically takes a volleyball to travel from one baseline to the other when served by a top-class player, a speed of 121 mph (194 kph).

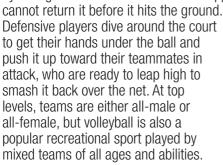
1,100,000,000

According to the Fédération Internationale de Volleyball (FIVB), the number of people who played or watched the game on one or more occasions in 2006—one in six of the world's population.

VOLLEYBALL

GAME OVERVIEW

Volleyball is a high-energy sport played between two teams of six players. The object is to score points by hitting a ball over a net so that the opposition









Headwear

PLAYER PROFILE

Volleyball was initially created as a genteel form of relaxation, but in its first 100 years, it developed into a high-energy game requiring great aerobic ability. Training concentrates on cardiovascular exercises—sprints, long-distance runs, and jumping rope. Jumping is important. Players also work out with dumbbells.





Protective kneepads Often worn to prevent

grazes caused by digging (diving to reach the ball before it hits the ground)

Shod or unshod

Players normally wear flat-soled shoes but may go barefoot with permission

ROUND AND ROUND

The players usually move around clockwise after every point so that they all serve and take turns in every position. Some teams, however, have a dedicated defender, known as a "libero," who always stays in the back zone and is not allowed to serve.

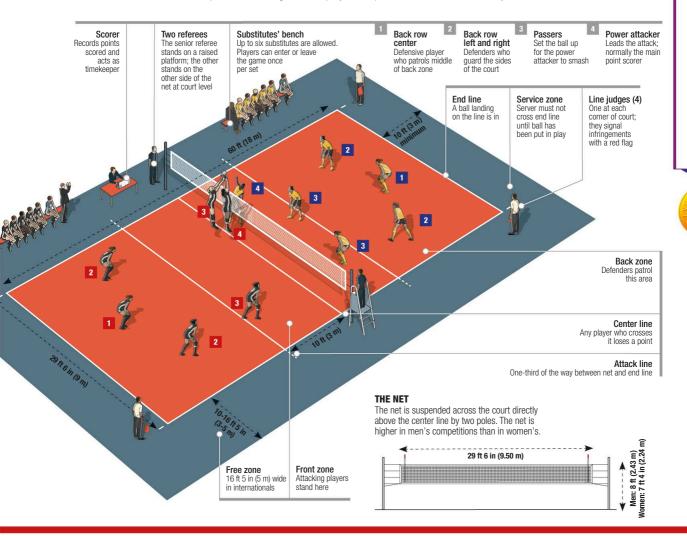
THE COURT

The playing area is usually made of wood or synthetic material, but the game can be played on any surface that does not cause injuries to diving players. Indoor courts must be flat, but outdoor courts can slope for drainage.

Lines on the court show where players may stand at the start of each point: three defenders in the back zone (including the server, who starts anywhere behind the end line) and three attackers in the front zone close to the net. The standards supporting the net are set 3 ft (1 m) at either side of the sidelines and are sometimes padded to safeguard the players.

KEEP IT UP

Once the ball is in play, each team has up to three hits to get it back over the net. As long as they do not catch or carry the ball, players can strike it with any part of their bodies, but in practice they usually use an open hand, wrist, or fist. The team that wins a rally wins a point and, if not serving, wins the right to do so. Matches are usually the best of five sets. In the first four games, the winner is the first to 25 points; in the fifth game, the winner is the first to 15 points. If the score reaches 24-24 or 14-14 respectively, two clear points are needed for victory.



THE BALL

Volleyballs should be inflated to a pressure that keeps them slightly soft so that they have some "give." They are then comfortable to play with using the hands.

Pump action

Bicycle pumps are commonly used to inflate the volleyball to the requisite pressure and weight

INFLATED WEIGHT

The match ball should weigh 9.17-9.87 oz (260-280 g).



KEEP COOL, DON'T GLARE

VOLLEYBALL IS THE ONLY GAME IN THIS BOOK WITH PRECISE RULES ABOUT THE TEMPERATURE AND AMOUNT OF LIGHT REQUIRED FOR PLAY. MATCHES CANNOT START OR CONTINUE IF THE AIR IS COLDER THAN 50°F (10°C). IN WORLD CHAMPIONSHIPS, THE TEMPERATURE MUST BE NO LOWER THAN 61°F (16°C) AND NO HIGHER THAN 77°F (25°C). THE LIGHT ON COURT MUST BE BETWEEN 1.000 AND 1,500 LUX—ABOUT ONE-FIFTH OF WHAT YOU GET ON A CLOUDY DAY—SO THAT PLAYERS DON'T GET DAZZLED.

DIG AND SMASH

Competitive volleyball players master six basic skills: serving, passing, setting, attacking (spike or dink),

blocking, and digging.



SFRVF

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The serve is hit either underarm or (usually) overarm; jumping is allowed. Any serve that reaches the opponents' court is valid, even if it touches the net.





Open palms From this position, the attacker can flip the wrists on contact and thus angle the shot

TIP OR DINK

A light touch by an attack-zone player sends the ball softly over the net into an unquarded area of the opponents' court.



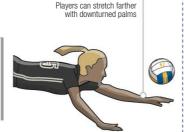
ATTACK (SPIKE)

In this spectacular smash, a player jumps above the net and hits the ball hard toward the ground in the other court.

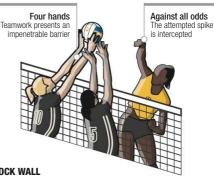




Backhand extremism



Players dive or get down low to stop the ball from touching the ground, trying to get enough height on it to allow teammates to play it.



BLOCK WALL

Blockers crowd the net and stretch above it to return the ball as soon as it has crossed the center line, before it can do any damage in their court.

INSIDE STORY

Volleyball was invented in 1895, and was originally named mintonette. The first recorded competitive game was played at Springfield College, Massachusetts, in 1896. The sport's popularity spread from North America in the early 20th century and, in 1949, volleyball's first World Championship was held in Prague (Czech Republic). The sport was given Olympic status in 1964, although it first featured as a demonstration sport at the Paris Olympics of 1924.

LARGEST BODY

The Fédération Internationale de Volleyball (FIVB) was founded in 1947 as the sport's governing body. It has 221 affiliated national federations, making it the world's largest international sports federation.

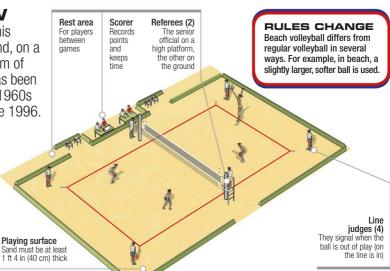


GAME OVERVIEW

Very similar to standard volleyball, this version of the game is played on sand, on a slightly smaller court, and with a team of only two players. Beach volleyball has been played professionally since the late 1960s and has been an Olympic sport since 1996.

NEED2KNOW

- The sport was originally a casual form of volleyball played on the beachfront in Santa Monica, California,
- The US, Brazil, and Australia dominate the sport at the highest level.
- Players wear shorts or swimsuits on court.





FOOTVOLLE







GAME OVERVIEW

Footvolley began as an informal sport on the beaches of Brazil in the 1960s. The modern game combines the rules of beach volleyball with the skills of soccer, as players use any part of their bodies to play the ball except their hands and arms. Teams of two players may touch the ball alternately three times before it is returned over

The standard ball is a size 5 soccer ball

Overhead kick

A winning kick made with both feet off the ground scores two points

HEAD TO TOE

Top soccer players regularly compete in

exhibition footvolley matches in Brazil.

A point is started by one player kicking the ball into the opponent's court. A team will often return the ball with an attacking header, after one player has set up their partner by controlling the ball on the chest. A "super point," worth two points, is scored by making the winning shot with

the foot or leg while both feet are off the ground.

WORLDWIDE APPEAL

Rallies in footvolley tend to be longer than rallies in beach volleyball, and its popularity is spreading. The Pro Footvolley Tour began in 2008 and attracts large crowds. The league attracts some of soccer's biggest stars.

NEED2KNOW

vollevball net.

The net height is set at 6 ft 10 in

(2.1 m)—lower than a beach



the net.





SEPAK TAKRAW

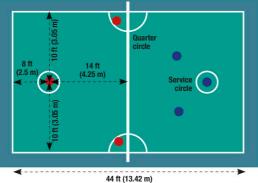
GAME OVERVIEW

Sometimes known as "kick volleyball," sepak takraw is a spectacular three-a-side game in which a ball is propelled over a high net using any part of the body other than the hands—usually the foot, knee, shoulder, or head. Points are scored by getting the ball to hit the ground on the opposition's court. The game combines soccer and gymnastics.

Soft landing

For safety, the court is

covered in deep sand



THE COURT

The game is usually played on a badminton doubles court with two circles and semicircles marked to show players' positions for service. The top edge of the net is set at 5 ft (1.54 m) for men and 4 ft 9 in (1.45 m) for women.

20 ft (6.1 m)

bandages These prevent grazing from inevitable bumps on the floor

Leg and knee

Foot covering Sneakers with smooth soles

NEED2KNOW

- The game began in Malaysia and Thailand. Sepak means "kick" in Malay: takraw is Thai for "woven ball."
- Matches are the best of three games up to 15 points. Different sets of three players contest each game.

MATCH PLAY

Play begins with the server standing in the service circle with his or her teammates in the quarter circles. On the other side, one player has to have a foot in the service circle, but the others can stand anywhere. A player in the quarter circle tosses the ball to the server, who sends it over the net. As in volleyball, each side can strike the ball three times before it returns to the opposition half.



Dress for comfort Loose-fitting shorts and a shirt or blouse in cotton or (less desirable) nylon; may be in team colors

LIKE A **ROCK-HARD BALL OF YARN**

Traditionally hand-woven to create a rigid sphere, the takraw ball is made of rattan stems or very hard plastic. It weighs approximately 8.8 oz (250 g).



1 ft 3¾ in (40 cm)

GAME OVERVIEW

Originally conceived as a version of basketball for women, netball rapidly became a sport in its own right and is today enjoyed by millions of dedicated players all over the world. Netball is an exciting, fast-paced game played by two teams of seven players on a rectangular court. The object is to shoot the ball from within the goal circle into a netted hoop more times than the opposition. The players may neither run with nor dribble the ball and are restricted to set zones (determined by their playing position). This means that accurate, often lightning-guick passes and disciplined teamwork are paramount.

SIDELINES

20.000.000 The approximate number of

players worldwide. In the Commonwealth, netball boasts more participants than any other sport.

The winning margin, in goals, for Australia in the 1963 and 1999 World Championships finals. On both occasions, New Zealand was the opposing team.









Because netball can be played indoors or outdoors, the ball used is durable and waterproof

Shooting

Only two players on each team—the goal shooter and goal attack—are permitted to shoot for goal. To perfect this skill requires good technique and a lot of practice

Player identification

A bib or patch must be worn by players to identify their position. "GA," for example, denotes goal attack. This helps the umpires ensure that the players are within their allocated playing zones



Although players must maintain a distance of 3 ft (0.91 m) from the person with the ball, a defender with outstretched arms reaching high, makes life difficult for the shooter

NEED2KNOW

- Netball evolved directly from basketball and was originally known as "women's
- Only seven players from each team are permitted on court, but both sides are allowed an additional five substitute players.
- The Netball World Cup is held every four years. Sixteen teams took part in the 2019 tournament.
- Although netball is traditionally a women's sport, there are also a number of mixed and men's leagues.

or defending the goal. Confident footwork, sharp reflexes, secure balance, and excellent team play are common attributes.

Injury danger Knee and ankle injuries are common in netball. This is because the game requires very swift stops, starts, and changes in direction. Good technique and an adequate warm-up reduce the risk of injury



Goal shooter (GS) The team's primary goal scorer, the goal shooter has an accurate shot. The blue team's goal shooter (below) is restricted to areas A

Goal attack (GA) The team's secondary goal scorer, the goal attack also feeds the goal shooter. The blue team's goal attack plays in areas A. B. and C Wing attack (WA) These players use precise passes to provide possession for the team shooters. The blue team's wing attack is restricted to areas B

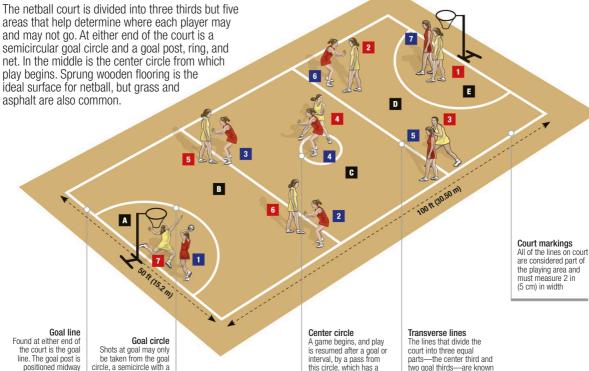
Center (C) This player workhorse-provides the link between attack and defense The blue team's center is allowed in areas B, C, and D

Wing defense (WD) This player marks the opposition wing attack and tries to intercept passes into the goal circle. The blue team's wing defense is restricted to zones C and D

Goal defense (GD) This player marks the goal attack and works to restrict the opposition's scoring opportunities. The blue team's goal defense plays in areas C. D. and E

Goal keeper (GK) The last line of defense, the goal keeper marks the goal shooter and protects the goal The blue team's goal keeper works in areas D and E

THE COURT



diameter of 3 ft (1 m)

PLAYING THE GAME

along the goal line

Play begins with a pass from the center circle. The team in possession then attempts to pass the ball into their goal circle so that either the goal shooter or goal attack may shoot for goal. After each goal scored, play is restarted with a center pass. A match is played over four quarters, each of which is 15 minutes long. A team consists of 12 players, but only seven are allowed on court at a time. Unlimited substitutions are permitted between the quarters or during injury breaks.

radius of 16 ft (4.90 m)

CONTROLLING THE GAME

Two umpires officiate over infringements of the rules of netball. Major infringements include contact (a player must not come into contact with another if this interferes with play) and obstruction (a player must not be closer than 3 ft [0.91 m] to the player with the ball). Common minor infringements include: held ball (the player with the ball must pass or shoot within three seconds), offside (players must not move outside their playing zones), and footwork (the player with the ball must not reground the first landed foot until the ball is passed). For a minor infringement, the infringed team is awarded a free pass but may not shoot for goal. Major infringements incur a penalty pass or shot, during the taking of which the offending player stands out of play. Furthermore, if the penalty occurs inside the goal circle, the goal shooter or goal attack may shoot for goal

Standing still Umpire's job Face off The players must remain The umpire throws the The players must be at still, arms at their side, until ball from just below least 3 ft (0.91 m) apart the umpire blows the whistle the level of the shorter and each face their and tosses up the ball player's shoulders goal end TOSS-UP

as the transverse lines

When two infringements occur simultaneously, or if the umpire is unsure which team last had contact with a ball out of play, a toss-up results. The two players adopt positions across from each other, the umpire—standing between them— tosses the ball into the air, and the players compete for possession.

NETBALL TECHNIQUES

Netball is a fast-moving game in which players must make decisions and precisely execute a variety of techniques in a very short space of time. All players must be able to catch and pass effectively, and the goal shooter and goal attack must also master the art of shooting for goal. All players constantly use solid and decisive footwork throughout the course of a game.

DEFENDING

Sound defense often wins games. It is the job of the defense to gain possession of the ball, which is mainly achieved by pressuring the opposition into making mistakes. Good defenders are determined and persistent, with the ability to predict the flight of and then intercept passes.



Netball is a noncontact sport, and the rules stipulate that the defender must maintain a distance of at least 3 ft (1 m) from the player holding the ball. This makes defending a challenging but vital task. Agility, anticipation, and timing are all essential.

FOOTWORK

In a fast-moving game such as netball—where players are required to stop, start, and change directions very quickly—good footwork is essential. Without it, a player can easily lose balance and body control, therefore becoming slow and cumbersome on court. In particular, netball's "one-step" rule necessitates specialized footwork skills.



After catching the ball, the player may not reground the foot that first touched the ground until the ball is passed. However, the player may step with the other foot any number of times. This is particularly useful when the ball carrier lands facing one direction but wishes to pass in another. The player pivots on the landed foot and steps in the direction of the intended pass with the other.

OUTSTANDING ANTIPODEANS

THE MOST SUCCESSFUL NATIONAL TEAM IN THE HISTORY OF NETBALL, AUSTRALIA WON THE INAUGURAL NETBALL WORLD CUP IN 1963. ALTHOUGH AUSTRALIA HOLDS THE MOST CHAMPIONSHIP TITLES, ITS CLOSEST CHALLENGER IS LOCAL RIVAL NEW ZEALAND.

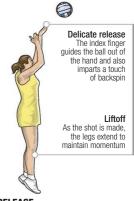
SHOOTING

The shooting skills of the goal shooter and goal attack must be finely tuned. In the past, the ball was released low; today, it is usually held high, making interception more difficult. The shot is normally taken from a stationary position. The game "freezes" as the player shoots, and attention focuses on the shooter. Steady nerves are essential.



PREPARATION

In preparing to shoot for goal, the player stands with the knees slightly bent, eyes fixed on the target, and the ball rests on the fingers of the shooting hand.



RELEASE

The ball is released with a flick of the wrist so that it travels in a high arc upward and then down into the ring. The knees extend slightly to aid momentum.

PASSING

Because players cannot run with or dribble the ball, netball is a passing game. Professional teams can move the ball from one end of the court to the other with impressive speed. Passes fall into two categories: two-handed (which generally give the player more control and are easier to execute) and one-handed (which generate more power).

CHEST PASS

This easily controlled, two-handed pass is useful when a swift, accurate offload is required. It is commonly utilized when passing to a player who is positioned in front of a defender. The chest pass is effective over short or long distances.

SHOULDER PASS

The most frequently used one-handed pass, the shoulder pass is a good option when the player requires a long, direct transfer. It is often employed when defenders wish to clear the ball from their goal third.

BOUNCE PASS

This pass is perfect when the player is "crowded" and is often used by an attacker wishing to outmaneuver defenders. The two-handed pass offers disguise, while the one-handed pass allows the player to reach around defenders.

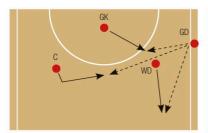


STRATEGIES

Because the players are restricted to set areas, teamwork is vital: simply to move the ball from end to end, the team must cooperate effectively. And with 14 people on a relatively small court, efficient use of space is also important. Preplanned strategies are one way in which to work effectively as a team and to best utilize the available court space.

THREE-OPTION ATTACK

This strategy gives the ball holder three passing options. First is to pass to a player who has moved into space and is in front of the defenders. However, if this alternative becomes unsafe, the second option is to pass to another player who has made a definite move. The third choice is a safety option—often a back pass to allow the attack time to regroup.

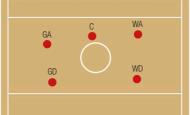


THREE-WAY TIE

THE 1979 WORLD CHAMPIONSHIPS, HELD IN TRINIDAD AND TOBAGO, FAMOUSLY DID NOT FEATURE A FINAL. AS A RESULT, THREE TEAMS—NEW ZEALAND, TRINIDAD AND TOBAGO, AND AUSTRALIA—SHARED THE TITLE.

DEFENSIVE PRESS

Defenders must apply constant pressure, anticipate attackers' movements, and close down the available space. One strategy that achieves all of these aims is the defensive press, which involves a group of defenders moving into a specific court area to force an error and secure a turnover. This move can effectively break up free-flowing attacking play.



INSIDE STORY

In 1895, "women's basketball" was introduced to England, and it was here that the game was developed. There were no court markings then. and the players wore long skirts and sleeves. In 1901, the first recorded rules of netball were published. Traveling teachers and others propagated netball throughout the British Empire, and the sport became especially popular in New Zealand and Australia. In 1960, the International Federation of Women's Basketball and Netball was founded. and the Netball World Cup has been held every four years since 1963.

GOVERNING BODY

The International Netball Federation (INF), which is based in Manchester, England, is the governing body for netball. It is responsible for the rules of netball and has 49 member nations and 25 associated member nations. These countries are organized into five groups, each of which has a Regional Federation, which aids the implementation of INF policies.

KORFBALL









GAME OVERVIEW

Korfball claims to be the world's only truly mixedgender team sport. It is played between two teams of four male and four female players who pass a ball between each other by hand, with the ultimate goal of shooting it through the opposition's basket, or "korf." Korfball is played in more than 50 countries and is especially popular in Belgium and the Netherlands, where it originated.



IN THE ZONE

The game is played on a rectangular court divided into two halves, or zones. Each zone features a post, with a korf at the top, surrounded by a shaded penalty area.

NEED2KNOW

- Korfball was developed in the Netherlands, and the game takes its name from the Dutch word for basket, "korf."
- Men and women play side by side, although defenders may only oppose players of their own sex.

GAME OF TWO HALVES

A korfball match consists of two halves of 30 minutes. Two men and two women from each team are positioned in each zone and take up the role of attackers or defenders, depending on whether they are in their own or the opposition's half. Once there have been two goals scored in the game, each player's role reverses—defenders become attackers, and vice versa—and the teams attack the opposite ends.

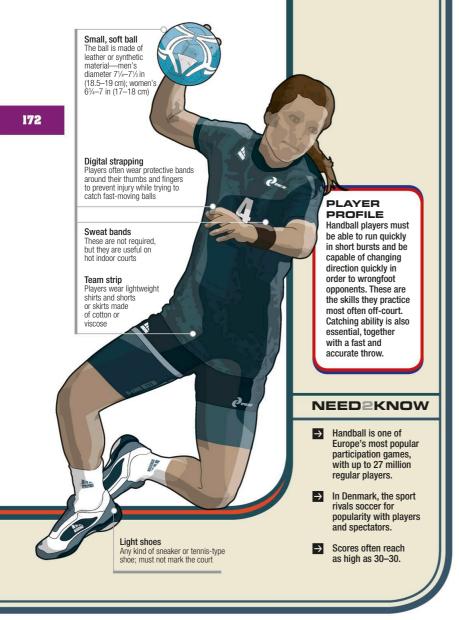
Defenders may only oppose attackers of their own sex. They "defend" the attacker by standing between them and the korf, with one arm raised to block a shot. As goals may only be scored by an attacker when they are not being defended, they must take a shot before the opponent takes up their position. Taking a shot while being defended results in a free pass to the opposition, while defending an attacker of the opposite sex is a penalty offense.

DUTCH BASKET

Usually made of cane or synthetic material, the korf is attached to the post, with its top edge 11 ft 6 in (3.5 m) above the ground.

Synthetic korf This molded korf is slotted onto the top of the post





GAME OVERVIEW

Handball developed in the late 19th century in Germany and Scandinavia. It is a fast and sometimes furious contact sport for men and women in which two teams of seven players (plus up to seven substitutes) bounce and pass a ball toward and ultimately into each other's goal. Players commonly bump into each other—deliberately, as well as accidentally. But they are allowed to do so only with their torsos; any attempt to grab or trip an opponent is a foul.

HANDBALL









WHO PLAYS WHERE

In addition to the goalkeeper, teams usually comprise two wing players, a center-left, a center-right, and two centers, one of whom is primarily defensive and the other the playmaker. The outfielders' roles are fluid and change according to the state of the game: references to 6-0, 5-1, and 4-2 (the number of attackers is always stated first) relate to the players' positions at a given moment of play rather than throughout a match. The classic line-up is the 4-2 formation: four attackers and two defenders.

Keeper

Can touch the ball with any part of the body as long as one foot is in the area

Wingers

Two; tend to operate along the touch lines, but cut inside on demand

Outlying centers
One is on the left, the other on the right. but they may alternate

Attackers
Two: a.k.a. "centers." they focus on the opponents' goal but do not do all the scoring

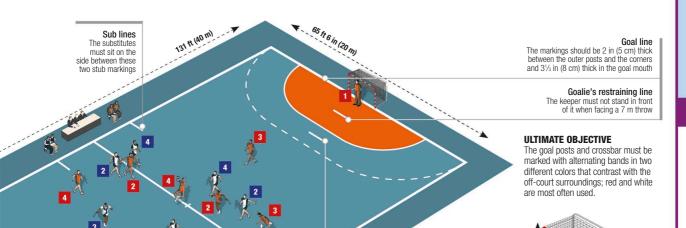
COURT IN THE ACT

Because demand for handball courts exceeds supply, in many parts of the world, the game is played on basketball courts, which are much more numerous. The two games are similar, with the same aim of scoring more goals than the other side. However, with an area of 502 sq vd (420 sq m), the basketball court is only slightly more than half the size of a dedicated handball arena, which is 957 sq yd (800 sq m). While organized competitive events are played indoors on designated courts, many informal games of team handball are played outdoors on flat areas of grass, pavement, or a beach with a makeshift goal.

REICHS AND WRONGS

HANDBALL MADE ITS OLYMPIC DEBUT IN 1936 IN BERLIN AT THE INSISTENCE OF ADOLF HITLER, WHO LOVED THE GAME. BECAUSE OF THIS UNHAPPY ASSOCIATION WITH THE NAZI DICTATOR, IT WAS DROPPED AFTER WORLD WAR II, BUT IT WAS REINTRODUCED AT MUNICH IN 1972.





This is 3 ft 3 in (1 m) long, parallel to the goal throws are taken from here

line, and centered on the middle of it; penalty

Sidelines

Anything on the line

in handball

counts as

in play: the

ball and the

players have

it completely

to cross

to be out

This is 10 yd (9 m) from the center of the goal line and runs parallel to it for 9 ft 9 in (3 m) before curving in two 9 ft 9 in (3 m) radius circles, each centered on the nearer goal post. Infringements inside it lead to a direct free throw at goal

Free-throw line

RIGHTS AND WRONGS

Games are normally two 30-minute periods, with 10 minutes' extra time and a sudden-death shootout from the 7 m line if the scores are still even. Play begins with a throw-off—one player stands within 5 ft (1.5 m) of the center of the court and passes the ball to a teammate in the same half of the court. In open play, players may normally hold the ball for only three seconds and take only three steps with it in the hand, although there are many local variations to this rule. If the ball goes out of play, it is put back in with a throw-in at the spot where it crossed the line. Penalty throws—awarded for serious infringements, such as tripping are taken from the 7 m line; only the goalkeeper may defend them.

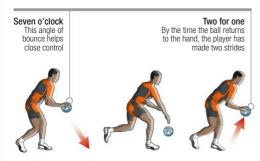
Clear swing

Both arms are

held away from

MANUAL METHODS

Speed of movement and passing are important, but when both teams are comparably fast, other skills come into play. One of the most important of these is faking—making opponents think you're going to do one thing and then, having wrongfooted them, doing another.



DRIBBLE

6 m line

This marks the outer edge of

the goal area. The curves on

those of the free-throw line

either side are concentric with

The player bounces the ball as he advances, and redirects it at the top of its upward flight with the downturned palm of his hand. Only he knows if he will go left, right, or forward. (If he takes too many steps though, possession is given to the other side.)

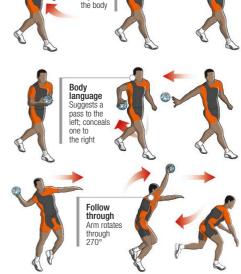
FIST

One basic passing movement is a punch with the fist clenched in the "thumbs-up" position. The leg on the same side as the hand holding the ball is thrust forward to make room for the swinging arm.

The player creates the impression that he is either going to keep ahold of the ball or pass to one side, but then, with an upward flick of the wrist, passes it from below his downturned palm in the opposite direction.

OVERHEAD PASS

Made on the run, this move requires the nonthrowing arm to be outstretched (for balance and to provide a directional sighter). The left foot hits the ground at the moment the right hand releases the ball.



NEED2KNOW

- Gaelic football is an exclusively amateur game played mainly in Ireland. It is also popular in Canada, the United States, and other countries with large populations of Irish descent.
- Matches are played in two 30-minute halves at club level and for women and in two 35-minute halves at county level.

SIDELINES

The highest number of wins in the annual All-Ireland Gaelic football competition, first held in 1887. The holder of the record is Kerry County.

The number of counties
(out of 32) that have won the All-Ireland
competition. Two—Armagh and Derry—
have won it once only. An unlucky 13
have yet to win the trophy.

TROUBLED HISTORY

DURING IRELAND'S TROUBLES, GAELIC FOOTBALL WAS CLOSELY LINKED WITH NATIONALISM. ON NOVEMBER 21, 1920, 14 FANS WERE KILLED WHEN BRITISH TROOPS OPENED FIRE AT A GAME IN CROKE PARK, DUBLIN.



OBJECT OF ATTENTION

The ball is somewhat smaller than a soccer ball and thus easier to handle. The permitted weight range is 16–17 oz (450–485 g).

PLAYER PROFILE

Gaelic football players need to be fit, athletic, muscular, and tough. They must have good speed and stamina, a sharp turn of pace, and finely honed throwing and kicking skills. Players regularly undertake weight training, sprints, and long-distance runs. Preparation for games involves work on tactics with other members of the team.

GAELIC FOOTBALL







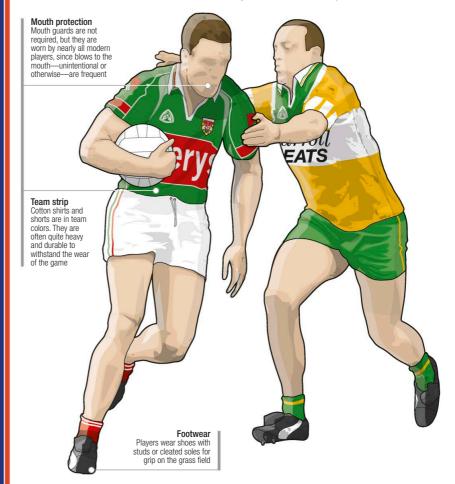


GAME OVERVIEW

Played by both men and women, Gaelic football is a fast-moving, physically punishing cross between soccer and rugby. Two teams of 15 players—and up to 15 substitutes, of whom five may be used—aim to get a round ball under or over the crossbar of their opponents' H-shaped goal. Players may kick or hand pass the ball to each other. Once in possession of the ball, they may take no more than four steps before either bouncing the ball or kicking it into their own hands in an action known as soloing.

FIELD OF PLAY

The field and goals are the same as those used in hurling, but some of the field markings for hurling are covered over or disregarded during Gaelic football matches. Traditionally, the game was played only on grass, but artificial surfaces were introduced in the second half of the 20th century and are now widespread.

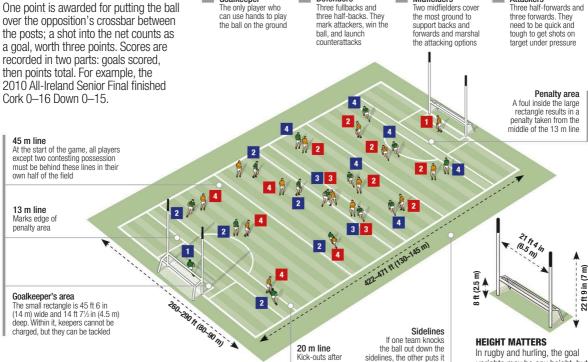


Attackers Three half-forwards and

175

TELLING SCORES

One point is awarded for putting the ball over the opposition's crossbar between



Defenders

Three fullbacks and

Midfielders

Two midfielders cover

Goalkeeper

THE BALL IN PLAY

Play begins with the referee throwing the ball up the center of the field between two midfielders from each team. After a goal is scored, the keeper restarts play with a placekick from the edge of his or her area. If a defender knocks the ball out at the end, an attacker takes a kick from the nearest point on the 45 m line.

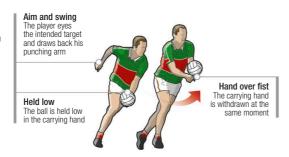
CROUCH LIFT

Aside from the goalkeeper, no one may play the ball on the ground with the hands. In the crouch lift, the player stoops down and uses a foot to scoop the ball into cupped hands facing backward. The ball can then be pulled up to the body.

Ground work Quick uptake Player supports He uses other ball with foot foot to lift ball Got it With cupped hands, he pulls ball up to his body

HAND PASS

One of the most common passes is to hit the ball with the side of the closed fist, using the knuckle of the thumb; a regular punch with the knuckles or forefingers is forbidden.



HANDS AND FEET

Kick-outs after

from this line

scores are taken

Many of the skills are the same as those required in soccer and rugby, but there are three actions in Gaelic football not used in the other sports: crouch lift, hand pass, and solo.

GAINING POSSESSION

The ball may be won by tackling or by using both hands to block a kick

A move unique to Gaelic football, soloing is a

In rugby and hurling, the goal

Gaelic football rules stipulate

the vertical dimensions shown.

Hand reaction

opponent thrusts

both arms in the

path of the ball

, but his

uprights may be any height, but

INSIDE STORY

Gaelic football is ancient in origin but was first codified in 1885. It developed in part as Ireland's rejection of the "English" games of soccer and rugby. Today, the game is played at club and county levels by male and female teams. The men's county final is broadcast live and attracts crowds of up to 80,000.

GOVERNING BODY

The Gaelic Athletic Association (GAA) was founded in 1884. Its main concerns are with the laws of Gaelic football and hurling.

SOLOING

Foot action

The player in

for a kick ...

possession ages

sidelines, the other puts it

back with a kick from the

ground or from the hands

way of dribbling without committing a foul by taking more than four consecutive steps in possession of the ball. Players alternately bounce the ball on the ground and then "solo," which means dropping the ball onto one foot.

GAME OVERVIEW

One of the fastest-moving of all team games, hurling is virtually a national sport in Ireland. Second only to soccer in popularity among players and spectators, more than half the country's population watch the annual county hurling competition. The 15-man teams aim to get the ball, or sliotar, into the opposition's goal or over the crossbar using a curved stick known as a camán or hurley. Hurling, called *iománaíocht* or *iomáint* in Irish, is not quite the free-for-all it may appear: body-checks and deliberate obstruction are banned.

HURLING











PLAYER PROFILE

The game of hurling requires immense stamina, great physical strength, and a wide range of ball skills. The best players are often also good at other moving-ball games, such as soccer, and stationary ball games, such as golf.

RULES

A game has two halves of 30 minutes each (35 minutes for senior inter-county matches). When knock-out matches are drawn, a replay is followed by extra time of 10 minutes each way. Players use their hurley to pass or shoot or to dribble the ball by bouncing it off the end of the stick and catching it. They can kick the ball, but they cannot pick it up off the ground, throw it, travel five steps holding it, catch it three times in a row without it touching the ground, or pass it from hand to hand.

OFFICIALS

Hurling has a number of officials: a referee on the field, two linesmen who indicate when the sliotar leaves the field of play, and four umpires to assist the referee and linesmen and to signal the scores.



FOULS

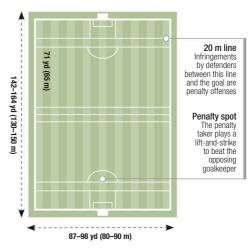
Technical infringements and dangerous tackles are punished by a "free"; a player uses his hurley to lift and strike the ball at the point where the offense occurred. If the referee is unsure of the culprit, he stops play and restarts it by throwing the ball between two opponents on the halfway line. A foul inside the large rectangle in front of the goal is punished with a penalty stroke taken from the 20 m line.

NEED2KNOW

- The sliotar can be hit as far as 325 ft (100 m) and as fast as 93 mph (150 kph).
- Hurling is played in some countries other than Ireland, such as the United States.
- There are no hurling internationals. An Irish hurling team regularly plays a Scottish shinty team using modified rules.
- The 12-a-side women's version of the game is known as camogie.

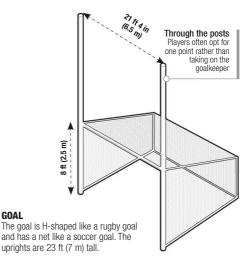
ON THE FIELD

A hurling field is the same as the field for Gaelic football. The two 15-member teams take up positions on the field of play, although these may change with coaches' tactics. Up to five substitutes are allowed.



SCORING

Teams score a point for putting the sliotar over the crossbar and three for a goal (into the net). Scores are recorded in two parts: goals scored followed by the points total. So a 3-4 score equals 13 points.









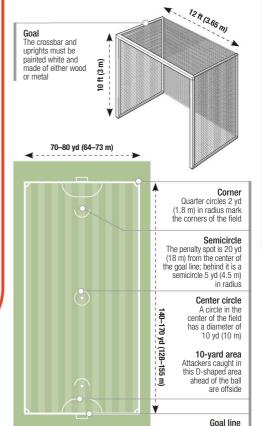


GAME OVERVIEW

Shinty originated in the Highlands of Scotland, where it is known by Gaelic-speakers as *camanachd* or *iomain*. Two teams of 12 players (men or women) use hooked or curved sticks, called camán, to hit a ball toward and into each other's goal, or hail. Shinty is a rough and lightning-fast game that resembles field hockey and lacrosse. A shinty match is played in two halves; a 12-a-side game lasts 90 minutes, while a 6-a-side game lasts 30 minutes.

ON THE FIELD

The long edge of the field is called the sideline and the short edge is called the byline. The main on-field features are a center circle, two semicircles, and two D-shaped areas around the goal.



ORGANIZED CHAOS

Shinty has relatively few rules. To start the game, two opposing players cross sticks above their heads and the referee throws the ball into the air above them. Players usually stay in their positions so defense quickly turns to attack. Players can hit the ball while it is in the air and use both sides of the stick; they can use their sticks to block and tackle opponents. Only the goalkeeper may handle the ball but may only slap it with the flat of the hand.

INSIDE STORY

Shinty's major competition, the Camanachd Cup, is a knockout tournament that has been held every year since 1896, except during the two World Wars. There is also a league in Scotland, which is divided into North and South sections; the winners play each other in a grand final playoff for the national championship.

CAMANACHD ASSOCIATION

The Camanachd Association was formed as shinty's governing body in 1893. It oversees the game in Scotland and elsewhere, stressing its Celtic traditions and encouraging indoor versions to bring children into the sport.

NEED2KNOW

- Shinty is played almost entirely in Scotland.
 There are three clubs in England and a
 handful in the United States.
- Traditionally a winter game, in 2003, the shinty clubs of Scotland added a summer season from March to October.
- Despite the best efforts of the governing body—the Camanachd Association—to codify the game internationally, there are still many local shinty rules.

Dodgeball ball The ball is a low-pressure bladder covered by a polyester fabric. Under this is a layer of foam to ensure shape retention and durability. The ball is 9 in (25 cm) in diameter Sneakers Any lightweight training shoe that does not leave marks on the court

NEED2KNOW

- If teams have the same number of players left in after five minutes, they play one-minute periods of sudden-death overtime.
- The popularity of the game increased thanks to *Dodgeball: A True Underdog Story*, a 2004 film starring Ben Stiller.

GAME OVERVIEW

Dodgeball is a thrilling six-a-side mixed or single-sex ball game where the object is to get opponents "out" by either hitting an opponent with a ball before it bounces or by catching a thrown ball cleanly before it bounces. A game is over if one team's players are "out" or if the game-playing time expires, and matches consist of five games. If overtime is required, the number of players on each team is equal, and one additional minute is played. Overtime continues until there is a winner.





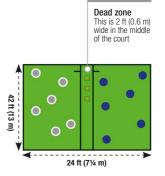




DODGEBALL

RUSH RULES

The referee starts play by placing 3 balls into the dead zone. Only three players can run to collect the balls to begin the game. Players then try to hit opponents below the shoulders with the ball to get them out. Play is continuous as each team tries to hit opponents, but a player can rejoin the game if a teammate catches a thrown ball. The ball can be passed three times between teammates before being thrown, but it must be thrown within five seconds. The winner is the team with the most hits.



DOUBLE TEAMING

Dodgeball players are so good at ducking and weaving that cunning teamwork is needed to get them out. Strategies include the targeting of one opponent by a number of players on the other team to get them out.

TUG-OF-WAR







EVENT OVERVIEW

In this trial of strength, two teams of eight men or women (and sometimes mixed teams) face each other and pull on opposite ends of a rope. The winner is the side that pulls the other team 13 ft (4 m), so that a central mark on the rope crosses a marked line. All matches are the best of three pulls.

PULLING TOGETHER

The judge gives three commands: "Pick up the rope," "Take the strain," and after gesturing clearly that he is about to give the final order, "Pull!" The teams then tug on the rope with all their might and throw their weight backward as far as they can. But deliberately sitting on the ground or failure to return immediately to the pulling position results in a caution. Two cautions are given prior to disqualification; however, a team can be disqualified without caution for any offense.

ROPE MARKS

The rope is at least 115 ft (35 m) long. A red mark is in the center, directly above an equivalent line on the ground at the start. On either side of the rope's midpoint, and 13 ft (4 m) from it, are two white marks; the event is won by the team that pulls the other's white mark across the center line on the ground. Another 3 ft 3 in (1 m) toward the ends of the rope in both directions are blue marks—these are the first points that the pullers can grip.

THE WEIGH-IN

To ensure even contests, tugs-of-war has strict weight divisions. In men's events, there are normally five categories: up to 1,234 lb (560 kg); 1,323 lb (600 kg); 1,411 lb (640 kg); 1,500 lb (680 kg); and 1,587 lb (720 kg) per team. For women, the dividing lines are 1,058 lb (480 kg); 1,146 lb (520 kg); and 1,234 lb (560 kg). There is a weigh-in before each contest, and tuggers have their weight stamped on an easily visible part of their bodies—this is to help prevent illicit midevent substitutions.

NEED2KNOW

- The discs used in this sport are made by several manufacturers, but the trade name Frisbee® has become generic, in the same way "Kleenex" is used to describe facial tissues.
- → The main governing body is the World Flying Disc Federation (WFDF). In the United States, the most important organization is the Ultimate Players Association (UPA).
- Ultimate is most popular in the United States but is also played in more than 40 other countries.

GAME OVERVIEW

Ultimate is a seven-a-side game in which teams float a plastic disc, known as a Frisbee, to teammates. A team scores a point every time one of them catches the disc inside the end zone that they are attacking—the first to 15 points wins. A thrower may pass the disc in any direction to any teammate. Ultimate is self-refereed, and the Spirit of the GameTM guides how players referee the game and how the players conduct themselves.



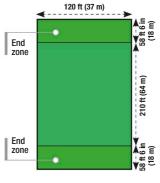






FLICKING RULES

One member of a team throwing the disc to the opposition (called the pull) starts the game. To score a point, the Frisbee must be caught in the opponent's end zone. Players must establish a pivot foot when in possession of the disc and can only move the disc by passing it to a teammate. Failure to release the disc within 10 seconds, any incomplete pass, or an interception turns the disc over to the opposition.



TO HAVE AND HAVE NOT

Because Ultimate is a noncontact sport, the team in possession has a huge advantage. The best that opponents can hope for is to force an error. To do this, they close down the stronger side of the player with the Frisbee so that he or she can pass it only from the less favored side. Below are three basic grips. Most backhands are mirror images played with bent elbows from the opposite side of the chest.

BASIC BACKHAND

This is the default grip for a right-handed player passing the Frisbee from his or her off-side.



CONTROL FOREHAND

Index and middle fingers make a V-sign; the thumb (hidden) points upward like a hitchhiker's.



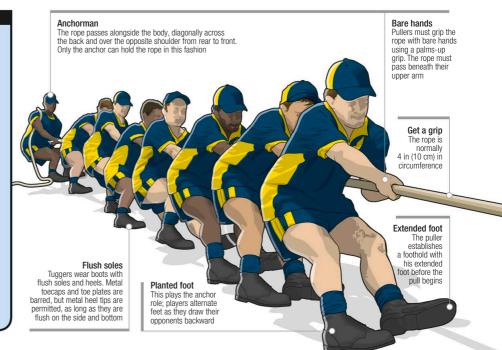
POWER FOREHAND

This is one of the holds used for passes that sacrifice directional control for speed and/or distance.



ARMY AT (TUG OF) WAR

THE TUG-OF-WAR IS HOTLY CONTESTED IN THE BRITISH ARMY, WHICH FIRST HELD INTERREGIMENTAL CONTESTS IN INDIA IN THE MID-19TH CENTURY AND, SINCE THEN, VARIOUS PERIODICAL TRIALS OF STRENGTH AGAINST TEAMS FROM THE ROYAL NAVY AND THE ROYAL AIR FORCE. WHILE YOU MIGHT REASONABLY EXPECT THE CHAMPION ARMY TEAM TO BE MADE UP OF PARATROOPERS. IN FACT. THE PARACHUTE SQUADRON IS ONLY THE SECOND-BEST TEAM. PERHAPS SURPRISINGLY. THE TEAMS TO BEAT ARE THE MEDICAL REGIMENTS.



RACKET SPORTS











TENNIS

GAME OVERVIEW

Tennis in its modern form dates from 1874, when the game was codified by Major Walter Clopton Wingfield. Its basic principles. however, date back to the French jeu de paume (game of the palm), which came to prominence in the 12th and 13th centuries. It is now strictly known as "lawn tennis" to distinguish it from court (royal) tennis, but because the game is played on a variety of surfaces—grass, clay, cement, coated asphalt, carpet—"tennis" is the term most widely used. Both the men's and women's tours are split into different categories. The men's tour is made up of four categories: Grand Slams (also known as Majors). ATP. Challenger Series, and Futures tournaments.

NEED2KNOW

- The Open Era of tennis began in 1968, when most world-class tournaments allowed professional players to enter the most prestigious tournaments.
- The four Grand Slam competitions, or Majors, are the Australian, French, and US Opens and Wimbledon. They are played on three different surfaces: hard-courts, clay, and grass.
- The term "Grand Slam" describes the act of winning all four Majors in the same calendar year.



Racket strings

The racket handle has eight sides that help the player The best players use strings made from animal gut. Synthetic gut strings will find the correct grip offer a combination of good control and durability

THE COURT

Although a tennis court is made of materials ranging from concrete, which is a fast playing surface, to clay, which plays slower, its dimensions are invariable. Most courts are laid out for both singles and doubles, as shown opposite. Some, however, are marked only for singles. Before the start of play, the officials or players must check to see that the net is the correct height and that its tension is acceptable. Many courts have now been fitted with electronic devices and large television screens to determine line calls and net cords, which increases the level of spectator involvement in matches.

SIDELINES

Unseeded outsider Boris Becker, aged 17 years, 7 months, became the youngest-ever Wimbledon champion. Becker was also the first German to ever to win the title and the first unseeded player to do so.

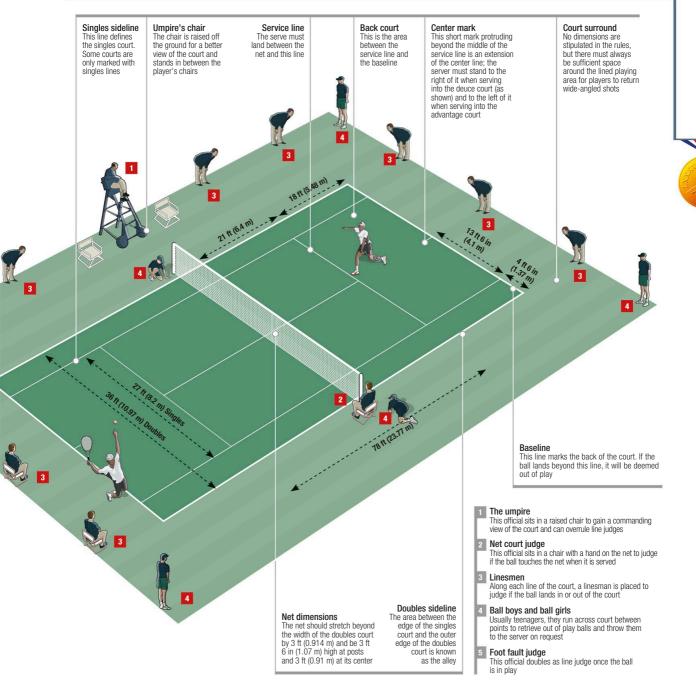
The number of Grand Slam titles won by Martina Navratilova during her career. Her titles were made up of 18 singles, 31 doubles, and 10 mixed doubles titles.

1,337 The number of matches won by Jimmy Connors of the United States between 1972 and 1993, more than any other player in modern times. Of these victories, 109 were in title-winning finals.

The fastest serve, in miles per hour (263 kph), recognized by the ATP was delivered by Samuel Groth during an ATP Challenger event in Busan, South Korea, in 2012.

665 The duration in minutes of the longest-ever top-rank match, more than twice as long as the previous record. John Isner (USA) beat Nicolas Mahut (France) 6-4, 3-6, 6-7, 7-6, 70-68 over three days at Wimbledon in 2010.

The number of consecutive matches that Rafael Nadal won on clay between April 2005 and May 2007. Nadal's 81-match winning streak was an all-surface record.





TENNIS ESSENTIALS

The International Tennis Federation (ITF) rules on which balls can be used for competition and on which surface they can be used. There are three different ball specifications. Type 1 is a fast ball and must be used on a slow court; Type 2 is a medium-paced ball and is used on a medium- to fast-paced court; and the Type 3 ball is slow and is used on a fast-paced court. The altitude also determines the choice of ball. The specifications of the tennis racket are also governed by the ITF; therefore, manufacturers must produce rackets to a maximum length, width, and thickness. They must also be free from any device that can change the shape or physical property of the racket during a rally.

TENNIS BALL

Certain specifications must be met before a ball will be judged legal by the ITF. The ball shall have an outer surface of a fabric cover that should be white or yellow in color. The ball's weight and size will also be manufactured to a required specification. During a match, the balls are replaced with new ones after an agreed odd number of games—usually after five, and then after seven.



THE RACKET

Whereas the ITF can govern the overall size of the racket, it cannot determine its construction. Tennis racket frames have changed a lot in recent years, as stiffer carbon materials have replaced wood and metal. Carbon rackets generate a lot of power because they are not flexible, so choosing the right strings and stringing tension is crucial to aid ball control.

RULES & REGULATIONS

Before a match, a coin is tossed and the winner chooses whether to serve or receive first or the end that they want to start the match from. Players stand on opposite sides of the net; the server (the player who puts the ball into play) begins the rally by hitting the ball over the net, into the service court directly opposite, from the right of the center line and from behind the baseline. The server plays the ball from alternate sides of the center line throughout the game, starting from the right. The receiver may stand anywhere on their own side of the net but may not return the ball before it has bounced. After the ball is served, play continues until one player hits the ball out of play.

GAMES

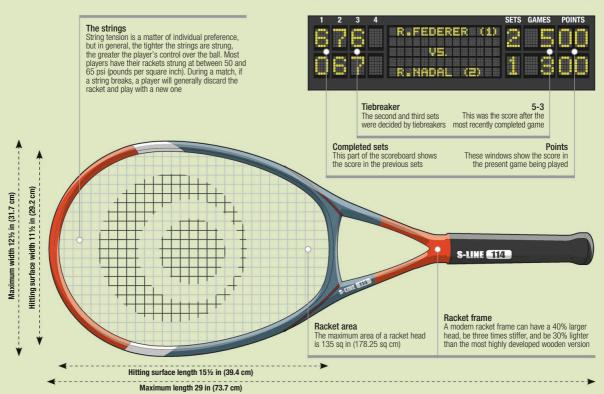
Each player starts with "love" (zero); one point is called "15," two points are "30," and three points are "40." 40-all is known as "deuce." After deuce, the player who wins the next point is said to have "advantage"; if they win the next point, the game is over. If they don't, the score goes back to "deuce." At this point, the game will only be won when one player has won two successive points, the "advantage" point, and the "game" point. Players change ends at the end of every odd-numbered game.

WINNING A SET

Matches are the best of three or five sets. (Women only ever play the best of three sets.) The first player to win six games wins the set, but if the games go to 5-all, the set is extended to see if a two-game margin can be achieved (7-5, for example). If, however, the score reaches six games apiece, a tiebreaker might come into operation.

TIEBREAKER

During a tiebreaker, points are scored "0" to "7." The first player to win seven points, provided there is a margin of two points, wins the game and set. The player whose turn it is to serve, serves the first point, and the following two points are served by the opponent.



Tossing the ball

upward and extend

your toss arm up as high as you

shoulders turned

sideways before starting the swing

Hitting the ball

Raise the racket and start the

swing. Bend the

the ball

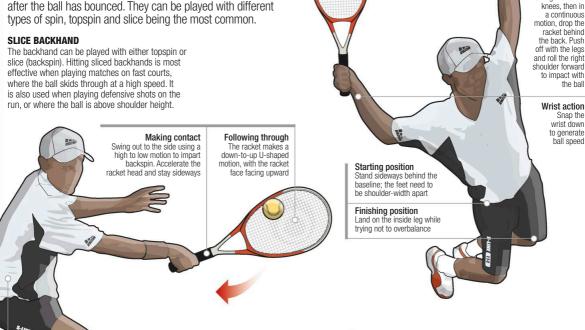
Snap the wrist down to generate

ball speed

can. Keep the

185

The most important and most used shots in modern tennis are the serve, the forehand, and the backhand (the latter are known as groundstrokes). Until these strokes are mastered, the player will struggle to win points and compete in matches. The serve starts every point in a match, and a good server is considered to have an advantage. This is partly because this player has two chances to get the ball into play and partly because the opponent doesn't necessarily know where the ball will go. Groundstrokes are the basic shots you make once the point has begun and are usually played from near the baseline and after the ball has bounced. They can be played with different



THE SERVE

for consistency.

A good serve will help the player win their service

games easily, so the more force there is behind

it, the better. Practice it as much as possible

On the move Move forward to play the low forehand.

Make a half-turn sideways, then begin the backswing, keeping the arm bent. Slightly lift the racket and make a circular swing by rotating the shoulders and trunk of the body

Racket speed

Continue to swing, placing the racket below the level of the oncoming ball. Swing from low to high and accelerate the racket to the ball while lifting it when contact has been made to get topspin on the ball

THE FOREHAND

Shot preparation

Turn sideways with the racket arm slightly bent. Turn the

shoulders while making the backswing. Holding the racket with the free hand helps turn the shoulders. Raise the racket above the height of the ball

The forehand is the most used shot in tennis and the one that most people learn first. This major groundstroke, for both the beginner and the advanced player, will allow a player to control a rally from the back of the court. The shot is usually hit with topspin, but backspin and sidespin can both be applied to the ball.

Shifting the weight forward Bend the knees and hit the ball at the highest point possible. As you swing upward, transfer

bodyweight to the front leg to get power into the swing

THE LOB

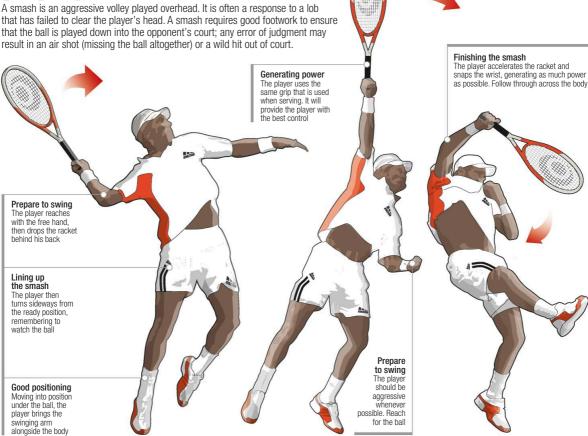
The lob—a shot that goes high in the air—may be played defensively or aggressively. Offensive lobs are hit with topspin from around the baseline. The more topspin the player is able to get on the ball, the faster the ball will drop into the court, which means the player can hit a deeper lob. Volleying players often close in after hitting their first volley, and this is an ideal time to use the lob. Defensive lobs are usually hit with backspin or very little spin, as they are used when the ball is low, or wide, when little or no topspin is possible.

JUST A GAME

ON APRIL 30, 1993, MONICA SELES WAS STABBED BY GUNTHER PARCHE WHILE SEATED DURING A CHANGEOVER. WHY DID HE DO THIS? PARCHE WANTED TO INJURE SELES SO THAT HIS IDOL, STEFFI GRAF, COULD REGAIN THE TOP SPOT IN THE WORLD RANKINGS.

SMASHING TIME

A smash is an aggressive volley played overhead. It is often a response to a lob that has failed to clear the player's head. A smash requires good footwork to ensure that the ball is played down into the opponent's court; any error of judgment may



LOB SCENARIO

intention to lob until the last possible

moment, as this will put the

opponent on the back

foot in future

exchanges.

Player A has advanced to the net but has played the ball too short.

a passing shot, or he can play a lob. It is best, whenever possible,

to play the lob over the opponent's backhand side, as it produces

the weaker shot if attempted. When in control of the rally, hide the

Hitting the lob

topspin to control the ball and to keep the ball in court

Player B plays an offensive lob with

Because of this, Player B has two options: he can either play

SIDELINES

Serena and Venus Williams have both won the US Open title without losing a set. To achieve this feat, they won 14 sets without conceding one, from the first round to the final. This has happened only 24 times in the history of the Open.

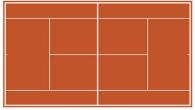
The number of left-handed players to have won a Wimbledon singles title during the Open era-the most recent being Petra Kvitové in 2014.

130.5 The record for the fastest serve by a woman, held by Sabine Lisicki, who achieved a speed of 130.5 mph (210 kph) in 2009.

EXHIBITION MATCHES

On May 2, 2007, at the Palma Arena, Rafael Nadal, the king of clay, played grass champion Roger Federer on a half-clay half-grass court in an exhibition match dubbed "the battle of the surfaces." Playing on a court that cost \$1.6 million to construct, Nadal prevailed 7-5, 4-6, 7-6 (12-10). The organizers had to lav a brand-new surface on the grass side of the court a few days before the event because an infestation of worms made the original turf unusable. During the match, the changeovers were extended to two minutes to give the players a chance to change their footwear for each surface.

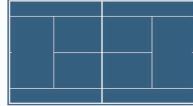
The governing body of tennis, the ITF (International Tennis Federation), has identified three different categories of court surfaces. The categories are based on the speed of the ball after the bounce; the amount of spin on the ball after contact with the surface; the height of the bounce; and the level of traction the court gives the player. Category 1 courts are slow-paced; Category 2 surfaces are medium or medium-fast-paced hard-courts; and Category 3 courts are fast-paced surfaces.



COURT SURFACES

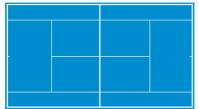
CLAY COURT: CATEGORY 1

Examples include most clay courts. Rallies on this surface tend to last a long time, as the speed of the ball after the bounce is relatively slow. Players can also slide on clay, increasing their reach.



HARD-COURT (DECOTURF): CATEGORY 2

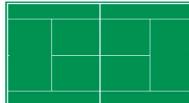
This surface has the same characteristics as the Rebound Ace court. Its top surface uses a different type of sand. Aggressive groundstroke play is the most dominant style of play on category 2 surfaces.



HARD-COURT (REBOUND ACE): CATEGORY 2

These are hard courts, which are concrete or asphalt coated with synthetic rubber. The top layer is reinforced acrylic paint mixed with sand. The ball bounces true, at a medium height.

USING



GRASS COURT: CATEGORY 3

Natural grass and artificial turf surfaces fall into this category and are characterized by their low, skidding, and often irregular bounce. Players look to finish points as soon as possible.



Electronic review technology, a high-speed multicamera system that tracks the trajectory of a moving ball, was first used in a grand slam during the 2006 US Open at Flushing Meadows. Its success has led other grand slams to adopt this system, with both the Australian Open and Wimbledon first using the system in 2007. At the US and Australian Ópens, each player is allowed to make two challenges per set and one during a tiebreaker. If proved right, the player retains their quota of challenges.



An instant replay of the contested point is shown on large screens, allowing both the players and the crowd to see whether the ball was judged in or out by review technology called Hawk-Eye.

INSIDE STORY

The most common view is that it was a crude courtyard ball game invented by 11th- or 12th-century French monks. The name tennis is said to come from the French word "tenez," from the verb tenir, meaning "to take." It means "take this," which the monks would yell as they served the ball with their hand.

The International Tennis Federation (ITF) is the rulemaker and governing body of world tennis. Its membership comprises more than 200 national associations.

The Association of Tennis Professionals (ATP) was formed in 1972 to protect the interests of male professional tennis players. The Women's Tennis Association (WTA) launched in 1973.

STAT CENTRAL

GRAND SLAM SINGLES WINNERS (MEN)

NAME	WON/LOST
ROGER FEDERER (SUI)	20/11
RAFAEL NADAL (ESP)	18/10
NOVAK DJOKOVIC	16/9
PETE SAMPRAS (USA)	14/4
ROY EMERSON (AUS)	12/3
ROD LAVER (AUS)	11/6
BJORN BORG (SWE)	11/5
BILL TILDEN (USA)	10/5
IVAN LENDL (CZE/USA)	8/11

GRAND SLAM SINGLES WINNERS (WOMEN)

NAME W	ON/LOST
MARGARET SMITH COURT (AUS)	24/5
SERENA WILLIAMS (USA)	23/9
STEFFI GRAF (GER)	22/9
HELEN WILLS MOODY (USA)	19/3
CHRIS EVERT (USA)	18/16
MARTINA NAVRATILOVA (CZE/USA)	18/14
BILLIE JEAN KING (USA)	12/6
MONICA SELES (YUG/USA)	9/4
MAUREEN CONNOLLY BRINKER (USA)	9/0

GRAND SLAM WINNERS (MEN)

NAME	YEAR
ROD LAVER (AUS)	1962, 1969
DON BUDGE (USA)	1938

GRAND SLAM WINNERS (WOMEN)

NAME	YEAR
STEFFI GRAF (GER)	1988
MARGARET SMITH COURT (AUS)	1970
MAUREEN CONNOLLY (USA)	1953

ATP PRIZE MONEY LEADERS (S)

	ATT THIZE MONET EE	ADEIIO (4)	
	NAME CA	AREER EARNINGS	
	NOVAK DJOKOVIC (SRB)	\$125,772,589	
	ROGER FEDERER (SUI)	\$120,514,916	
	RAFAEL NADAL (ESP)	\$103,251,975	
	ANDY MURRAY (GBR)	\$61,046,255	
	PETE SAMPRAS (USA)	\$43,280,489	
	ANDRE AGASSI (USA)	\$31,152,975	
	BORIS BECKER (GER)	\$25,080,956	
Ī	YEVGENY KAFELNIKOV (RUS)	\$23,883,797	
	IVAN LENDL (USA)	\$21,262,417	
	ANDY RODDICK (USA)	\$20,637,390	
	STEFAN EDBERG (GER)	\$20,630,941	
	GORAN IVANISEVIC (CRO)	\$19,878,007	
	LLEYTON HEWITT (AUS)	\$19,425,179	
	MICHAEL CHANG (USA)	\$19,145,632	
	DAVID FERRER (SPA)	\$17,705,519	

PLAYER PROFILE

Court tennis requires many of the same skills needed to play lawn tennis, although the service depends much more on spin and placement than raw power. The court tennis court is hard, and as many shots involve "digging" low-bouncing balls, the game's greatest physical demands are on the legs and knees.



THE COURT

No two court tennis courts are the same, but they all have certain features in common. The playing area is enclosed by four walls and a ceiling. Three of the walls have sloping roofs, known as penthouses. There is a service end and a receiving, or "hazard," end. The wall on the server's left has various windows, which are both viewing galleries and openings into which the ball can be played. The wall behind the server has a similar window that is both a viewing point for spectators and the "dedans," into which the receiver tries to drive shots beyond the server in order to gain the serve. On the receiver's side of the net are a buttress, known as a "tambour," and a grille.

Match ball The ball has a vellow a core of cork

or white covering of hand-sewn felt around wrapped in fabric tape, and has a diameter of 21/2 in (6.4 cm). It is heavier and less bouncy than a lawn tennis ball

Court racket

This is made of wood and has very tight strings. The head is angled slightly to one side to make it possible to play shots off the floor or in the corners. Its overall length is about 27 in (70 cm)

Winning gallery service end into

these windows is a winner

Service penthouse

The server must send the ball along this roof to the hazard end

Spectators viewing through the dedans behind the server are protected by a net

Floor chase line

Lines painted on the playing floor are used to measure where the ball drops during a "chase," when players strive to gain the

NEED2KNOW

- There are only about 43 courts in the world, so court tennis is one of the most exclusive of all sports.
- > Professionals compete in annual court tennis Grand Slam events-the Australian, British, French, and US Opens-and a biennial World Championship.
- The outstanding player in the history of court tennis is Robert Fahev of Australia. who won his 13th world title in 2012five more than Pierre Etchebaster of France, who won eight titles between 1928 and 1952.

GAME OVERVIEW

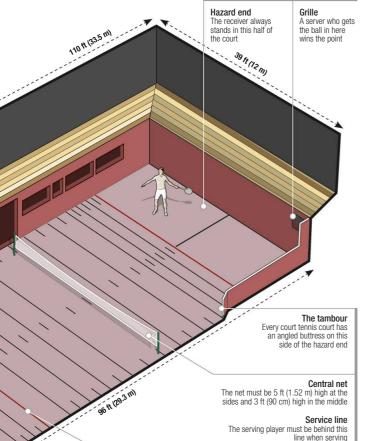
The precursor of modern lawn tennis, court tennis is an indoor racket sport played by two people (singles) or two teams of two (doubles). The object is to hit the ball over a central net so that it cannot be returned. With a history going back hundreds of years, the game reached the height of its popularity in the 16th and 17th centuries. Although court tennis now has an elitist image, any tennis club with a court tennis court will welcome members who wish to give it a try. Many leading court tennis professionals were formerly lawn tennis players.

COURT ENNIS









CHASING THE GAME

The server (usually chosen by spinning a racket) plays from one end of the court only. In a service, the ball must bounce at least once on the left-hand penthouse on the receiver's side of the court (the hazard end).

Service does not alternate between the players as in lawn tennis; the receiver has to gain the right to serve. It takes four points to win a game and six games to win a set (even if the score reaches five-all; there is no tiebreaker). Matches are the best of three or five sets.

The server has two areas in which to place the ball to win a point. These are the winning gallery and the grille. The receiver has a large area, called the "dedans," behind the server, into which he or she can hit a clean winner.

Players do not automatically lose a rally if the ball bounces twice in their half of the court. Instead, the score remains the same, but the players change ends and replay the rally. The player who originally failed to get to the ball then has to try and send a shot that bounces twice farther back from the net than the first missed shot. This part of the game is known as a "chase" if it results from the server's failure to return the ball and a "hazard chase" if it stems from the receiver's error.

Measurement of distance is aided by the lines drawn 3 ft (90 cm) apart from side to side of the court.

LOOKING FOR ANGLES

Spin is a major feature of court tennis—because of it, some of the slowest shots can be the hardest to return. However, the main aim of the game is to produce forcing strokes off or into the court's architectural features. A shot onto or off the tambour is often hard to reach because the ball rebounds off it unpredictably. Strokes played into the "nick" (the corner of the floor and the wall) and aggressive drives into the dedans, the winning gallery, or the grille are unreturnable, so these areas are often targeted by players.

SOFT TENNIS









GAME OVERVIEW

This is a form of regular lawn tennis that can be played on indoor or outdoor courts. What makes it different is the soft, squishy ball, which means that the game is characterized by long rallies rather than by powerhouse shots.

NEED2KNOW

- The game's greatest strongholds are in Japan and Taiwan, but its appeal is spreading among people who have grown tired of serve-and-volley "big gun" tennis.
- Due to its popularity in Asia, soft tennis has been an official sport at the Asian Games since 1994.

RULE RÉSUMÉ

Serves can be played either underarm or overarm; scoring in games is the same as in lawn tennis. Singles matches are the best of seven games, while doubles are the best of nine. Tiebreaks come into operation at 3–3 and 4–4. Grunting is expressly forbidden!

Any racket you like The surface must be the same on both sides, but

The surrace must be the same on both sides, but apart from that, almost anything goes. Rackets can be any shape or size, be made of any material, and weigh as much or as little as players want. The strings are similarly unrestricted, as long as they do not make the ball fly off completely unpredictably





Ball requirements

Should be made of rubber, filled with air, and be 2½ in (6.6 cm) in diameter. The International Soft Tennis Federation stipulates that the balls should be "white in principle," but in practice, they are often yellow and sometimes red



TABLE TENNIS









GAME OVERVIEW

Also known as ping-pong, table tennis is a fast-moving and physically demanding racket sport. Players play as individuals or in pairs and win points by hitting a lightweight ball over a net so that their opponents either cannot return it or are forced into an error. Most matches are short and sharp, and the rules have ways of dealing with games that go on too long.

PLAYER PROFILE

Table tennis players need fast reactions, exceptional hand-eye coordination, and strong and flexible leg muscles. They need to be able to move quickly over short distances and to change direction in an instant. They must take particular care of their shoulders, lower backs, and knees; these are the areas that are most commonly injured. Away from the table, players typically practice with jumping sessions, squats, short sprints, and at least three 20-minute runs per week.

TABLE TERRAIN

Tables are made of Masonite or a similar manufactured hardwood and are layered with a smooth, low-friction coating. They are usually dark green. The net should extend 6 in (15.25 cm) beyond the edge of the table on both sides. The white center line indicates where the service must land in doubles: it should bounce in the right-hand courts of both server and receiver. (In singles matches, it can land anywhere on the table.)

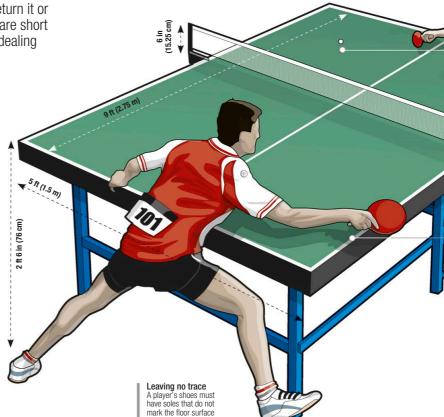
PLAYING A MATCH

Matches are the best of five or seven games. Each game is won by the first side to reach 11 points or, from 10–10, two points. Play begins when one player serves the ball by throwing it up at least as high as the net and then striking it with the paddle. The ball must be thrown from an open palm to rule out finger spin. The ball must bounce twice—once on each side of the net—before being returned by the other player. Thereafter, in open play, the ball may bounce only once per shot, on the receiver's side of the net.

If the ball touches the net during service but then lands on the receiver's side, a let is played, and the server serves again. A player serves for two points, after which it is the opponent's turn. Players swap ends after each game.

NEED2KNOW

- Table tennis became an Olympic event in 1988; the medal table has since been dominated by China.
- The ball may travel at speeds of more than 100 mph (160 kph).
- Table tennis claims to be the most played racket sport, with 300 million players worldwide. It is particularly popular in Asian countries such as China and Korea.
- The game is so fast that, in 1973, a women's rally produced 173 hits in only 60 seconds.



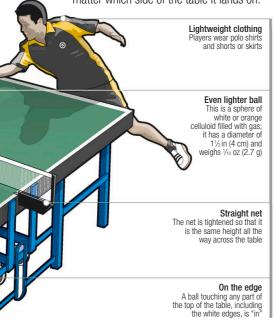
THAT WAY WE CAN ALL GO HOME

THE FINAL OF THE 1936 SWAYTHLING CUP—THE MEN'S TEAM TABLE TENNIS WORLD CHAMPIONSHIP—WAS BETWEEN HUNGARY AND AUSTRIA, AND THE MATCH DEVELOPED INTO A MARATHON THAT LASTED FOR THREE DAYS. IN ORDER TO PREVENT FURTHER STALEMATES, WHICH RISKED KILLING THE GAME AS A SPECTATOR SPORT, THE LAWMAKERS BROUGHT IN WHAT IS KNOWN AS THE EXPEDITE RULE: IF A GAME GOES ON FOR LONGER THAN 10 MINUTES, SERVERS THEN LOSE POINTS IF THEY CANNOT BEAT THEIR OPPONENTS IN LESS THAN 13 SHOTS FOLLOWING EACH SERVICE.

TABLE MANNERS

It is legal to hit the ball around the side of the net to land on the opponent's side. Volleying is not allowed—the ball has to touch the table. A player who touches the playing surface with his or her free hand during a rally loses the point.

In doubles matches, players strike the ball in turn—no one may make two consecutive shots. As a result, doubles players must switch positions quickly so that the next receiver is standing in front of the center line. That location gives the player the best chance of hitting the ball, no matter which side of the table it lands on.



SPEED RESTRICTIONS

One form of table tennis aims to slow the game down. The "hardbat" game is seen as a return to classic table tennis. Sponge-faced bats are not permitted, making it harder to spin the ball. Instead, players concentrate on ways to draw their opponents out of position before they can hit a winner.

INSIDE STORY

The game was inspired by a 19th-century lawn tennis players who, in bad weather, practiced indoors using cigar-box lids as rackets, the rounded tops of champagne corks as balls, and a row of books for a net. This early game had a number of names, including whiff-whaff.

INTERNATIONAL TABLE TENNIS FEDERATION

This was founded in 1926 by Austria, England, Germany, and Hungary. It now has 226 member associations.

GETTING A GRIP ON IT

There are many ways of holding a table tennis paddle, but most grips fall into one of two categories: the orthodox or shakehand grip and the penholder. There is also a V-grip, in which the blade is held between the index and middle fingers.

WOODEN PADDLE

Also known as a bat or a racket, the paddle has a blade that is made mainly of 5-ply wood. It may be any weight or size, and the shape may be square, oval, or round. The rubber coverings on both sides must be no more than \(\frac{\psi_6}{16} \) in (4 mm) thick.





Rubber surface

Table tennis is the only racket sport in which the front and back surfaces of the racket may be different, and so suited to particular shots.



BACK VIEW



This is the most natural, and hence the most popular, way of holding a table tennis paddle.

PENHOLDER GRIP

The handle is clasped between thumb and forefinger in the same way as holding a pen.

SHOTS AND SPINS

Strength of shot plays an important role in table tennis, but the key in the modern game is spin. The ball is so light that almost anyone can make it rotate in the air and therefore bounce in an unpredictable way on the receiver's side; the skill is to conceal the amount and type of spin used.

BACKSPIN

Backspin is applied by hitting through and under the ball with the lower part of the paddle angled ahead of the upper section. The goal is to make the ball slow down and "die" (bounce as little as possible) on contact with the table.





FOREHAND SMASH

This is one of the most devastating shots in any player's armory, in which the ball is hit at high speed. In addition to adding topspin, the player can conceal in which direction the ball will travel by flicking his or her wrist to direct the ball across the table.



BACKHAND TOPSPIN

The basic technique is the reverse of the backspin shot: the paddle is slanted so that the top is farther ahead of the player than the bottom. Topspin stops the ball from rising too high into the air. Instead, it dips quickly onto the receiver's side and has a low bounce, making it harder to return.













Badminton is a game for singles and doubles. Players win points by hitting a conical shuttlecock over a high net so that it lands on the other side of the court before the opposition can return it. The shuttlecock's lightness and aerodynamic shape means that badminton can be a game of great delicacy or sudden bursts of power featuring spectacular smashes.

PLAYER PROFILE

A top badminton player covers about 1 mile (1.6 km) per game, so strong thigh and calf muscles are essential. Sprinting is a key element of training. Another essential skill is footwork: athletes practice sudden changes of direction and sharp acceleration over short distances. The shuttle moves through the air quite differently from a ball, so strokeplay is unlike that of any other racket sport. It can only be improved by playing the game.

THE COURT

What a racket

Pro-level rackets

composite, which is stiff, strong, and

light, weighing as little as 2½ oz (75 g).

Modern strings are

usually synthetic

are made from

carbon fiber

The surface of a badminton court consists of a sprung, often plywood, floor beneath a vinyl covering or strips of treated hardwood. The surface is marked with lines that define the playing areas for both singles and doubles games. The shuttle travels very fast but not very far, so the playing area is compact and suitable for venues with limited space.

Light clothing

Lightweight cotton shirts and shorts or skirts keep the players cool

All in the legs Covering the court and leaping for high shots demands powerful thigh muscles

NEED2KNOW

- → After soccer, badminton is one of the most popular participation sports in the world. It is particularly popular in Malaysia and Indonesia.
- With the shuttlecock traveling at up to 206 mph (330 kph), badminton is the fastest racket game in the world.

Leave no trace

Badminton players wear nonmarking rubber-soled shoes and almost always have socks to prevent blisters

Supporting role

Bandages are often worn to support the knees, which can jar as a player lands and

SIDELINES

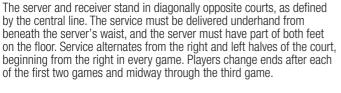
The number of goose feathers on an Olympic shuttlecock.

206 The highest recorded speed, in mph (332 kph), of a shuttlecock during a competitive match.

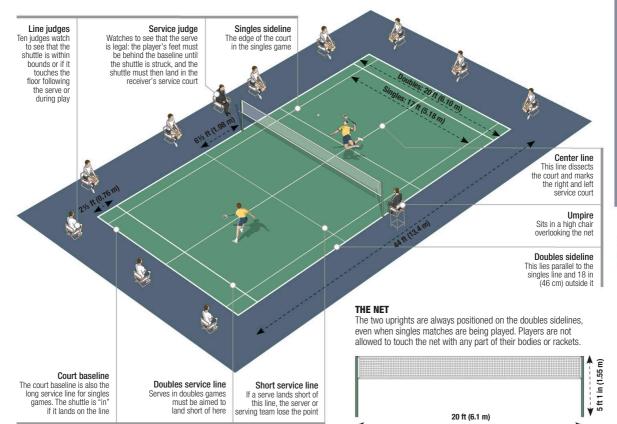
The average number of shots per rally in a game of badminton. Tennis rallies are comparatively short, with an average of 3.4 shots per rally.

The percentage of badminton gold medals won by Chinafor men's and women's singles and doubles and mixed doubles since the sport became an Olympic event in 1992.

IN 1873. THE DUKE OF BEAUFORT BROUGHT THE INDIAN GAME OF POONA TO ENGLAND AND BEGAN TO PLAY IT ON HIS COUNTRY ESTATE IN BADMINTON, GLOUCESTERSHIRE.



AT YOUR SERVICE



COURTLY CONDUCT

Matches are the best of three games. If the server wins a rally, he or she scores a point and serves again from the other service court. If the serving player or side loses the rally, the opposing player or team scores a point. (This differs from the old system, changed in 2006, where players could only win a point on their own serve.) The service then passes to the next player in turn, who in singles would be the opponent but in doubles could be either the server's partner or, if both players have served, would be one of the opposing players. In badminton, 21 points win a game unless the score reaches 20-20. In that case, the first player or team to gain a two-point advantage wins. If the score reaches 29–29, the winner is the first player or team to get 30.

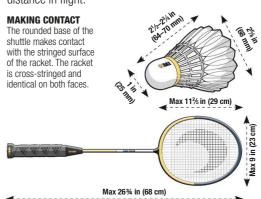
SCORING POINTS

A point is won by hitting the shuttle over the net so that it lands on the court before the opponent can return it or so that the opponent makes an error in returning it.

A point is lost if the shuttle is hit into or under the net, if it lands outside the opponent's court, if the shuttle touches a player or his or her clothing, or if a player hits the shuttle before it crosses the net.

SHUTTLE AND RACKET

Shuttlecocks used in competitions weigh around \(\frac{1}{2} \) oz (5 g), have 16 goose feathers in a cork base, and are notoriously fragile: top players often get through 10 in the course of a match. By contrast, rackets are strong and designed to transfer the maximum energy from the player to the shuttle, giving it greater speed and distance in flight.

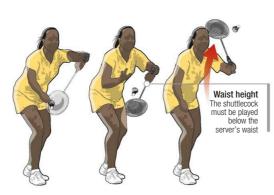


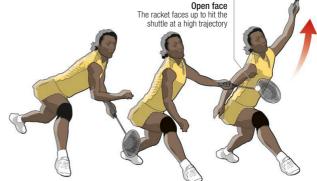
SUBTLETY AND STRENGTH

Shots range from drops over the net to high lobs and unreturnable smashes. Players use disguise or power to get their opponent out of position and create an opening. Once a serve has been played from behind the short service line, other shots are made from anywhere on the court or surrounds.

CENTRAL PLAY

The best tactical position is near the center line in the middle of the court, from where players can get to any shot. Players return here between shots, sometimes playing high lobs to give them time to return to the central position.



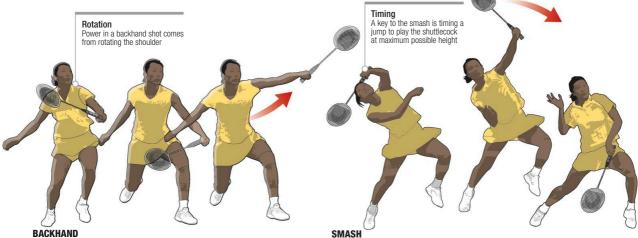


SERVE

The arm must remain below shoulder height and both feet must be on the ground throughout the stroke. Overarm "tennis-style" serves are illegal—the racket must remain beneath the server's wrist.

UNDERARM CLEAR

This high lob, played powerfully off the forehand, aims to pass above the opponent and drop steeply inside the back of the court for a winning shot. Clears can also be played off the backhand.



Backhand strokes tend to be less powerful than shots played off a player's forehand side, so they are often defensive shots to move an opponent out of position. Cross-court drives or drop shots, however, can be winners if they catch an opponent unawares.

Badminton's most spectacular stroke is a powerful smash that drives the shuttle steeply down into the opponent's court. It is often played with one or both feet off the ground to get a better angle above the net.

INSIDE STORY

First held in 1977, the World Badminton Championships became an annual event in 2006. The All-England Championships date from 1899; this prestigious event is widely seen as the unofficial world championship.

GOVERNING BODY

Founded as the International Badminton Federation in 1934, the Badminton World Federation now has 176 members and organizes six major competitions around the world. After more than 70 years in England, the headquarters moved to Malaysia in 2005.

MOST ALL-ENGLAND BADMINTON SINGLES TITLES				
PLAYER (COUNTRY)	M/F	YEARS	WINS	
JUDY HASHMAN (NÉE DEVLIN) (USA)	F	1954–1967	10	
RUDY HARTONO (INA)	M	1968-1976	8	
ERLAND KOPS (DEN)	M	1958-1967	7	
MERIEL LUCAS (GBR)	F	1902–1910	6	
FRANK DEVLIN (IRE)	M	1925–1931	6	
LIN DAN (CHN)	M	2004-2016	6	
ETHEL B THOMSON (GBR)	F	1900–1910	5	
F. G. BARRETT (GBR)	F	1926-1931	5	
RALPH NICHOLLS (GBR)	M	1932–1938	5	
SUSI SUSANTI (INA)	F	1990–1994	4	

JIANZI









GAME OVERVIEW

Jianzi, or shuttlecock, is played indoors and outdoors by individuals, pairs, or teams of men and women who propel a jianzi or chapteh (shuttle) to each other using any part of their body but their arms or hands. Points are won for successful passes and lost for letting the shuttle touch the ground.

ANY AREA

Some forms of jianzi are played on badminton courts, and competitors have to get the chapteh over the net every time they play it. In other versions, there is a line instead of a net. It is also possible to play without a defined playing area. Such casual games, which resemble hacky sack, are a familiar sight in parks in many Asian countries, where they are a popular form of exercise for all ages.

TEAM GAME

In individual matches, players may have two successive hits of the chapteh. In the team game, each side has a total of four hits. Teams may contain any number of players but usually have six, of whom three are on the court at any one time; the others are substitutes. The winning score is usually 21 points.

FANCY FOOTWORK

Players can do anything with the chapteh except touch it with their hands or arms, but in matches, they mainly use their feet. A player usually takes a first touch to bring the shuttle under control and a second to pass to a teammate or hit it back over the net. They most often use their insteps but might also flick the shuttle up with the tops of their toes or slam it over the net with the sole of the foot in a "snake kick." Receivers sometimes block the chapteh at the net with their chest, playing it down onto the floor on the opponent's side to win a point.

Feather ball In Europe, players may use a badminton shuttlecock rather than a chapteh

LEOPARD HEAD

The first touch is very important. When the chapteh drops from a height, players may use a knee to knock it into the air—a move known as the leopard head—to get the right height for a kicked return.



SITTING TIGER

Playing the chapteh with the instep requires great flexibility and balance. Players practice repeatedly knocking the chapteh up with first one foot and then the other—a basic technique that underlies much match play.



C

Jianzi wear The normal gear is lightweight (usually

cotton) shirts and

shorts or skirts in uniform color or

colors if the match

is between two or

more teams

Sensitive footwear

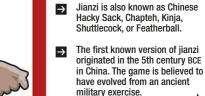
Players wear

the chanteh

flat-soled shoes

with very thin uppers

so they can "feel"



NEED2KNOW

Flying feather The jianzi or chapteh is

made from feathers that are attached to a plastic or rubber disc base

PLAYER PROFILE

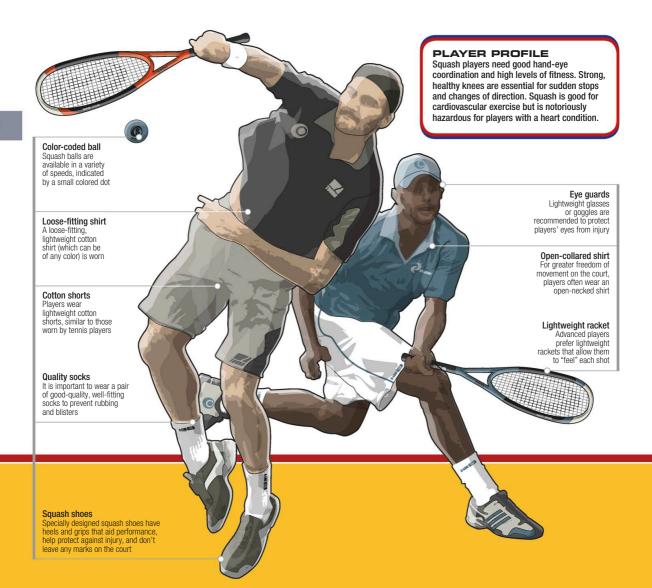
Excellence at jianzi requires the skills of a juggler-with the feet. High levels of coordination as well as muscular and aerobic fitness are essential, as is the ability to make long stretches. Top-grade players work out with weights and do circuit training and flexibility exercises as a matter of routine. But iianzi gameplay can only really be improved by hours of practice or actual competition—not even a badminton shuttlecock has the same shape and aerodynamic peculiarities of the chapteh.

INSIDE STORY

Originally from ancient China, jianzi has spread across the world. The leading playing nations are China and Vietnam, but the sport is growing in Europe, especially Finland, France, Germany, Greece, Hungary, the Netherlands, Romania, and Serbia.

GOVERNING BODY

Taking the anglicized name for the sport, the International Shuttlecock Federation (ISF) was founded in 1999 in Vietnam and now has 19 members. The ISF staged the first world championships in Hungary in 2000, where Vietnam took most of the medals. The Shuttlecock Federation of Europe was founded in 2003, and the first European Cup was contested that year in Germany.



NEED2KNOW

- Squash—or squash rackets, as it was originally known—was first played at Harrow School, England, in the early 1800s and derived from an earlier game called rackets.
- Squash is played in more than 185 nations. There are approximately 50,000 courts worldwide, and at the start of the 21st century, their number was increasing by 2,000 a year.
- Most of the big names in squash have come from relatively few countries: Egypt, Pakistan, Great Britain, Australia, New Zealand, France, and Malaysia.

SQUASH









GAME OVERVIEW

Squash is normally a game for two players, although doubles matches are played on larger courts. Matches are the best of three or, at international level, five games. A player wins a game by being the first to score either nine points or 11 points, depending on which scoring system—points or rally—is being played. Opponents take turns hitting the ball, which may touch the ground only once between each stroke. The ball may hit the side and back walls below the out lines and must bounce off the front wall above a metal strip known as the tin. Because of the small size of the squash court, players often get in each other's way during matches—collisions can happen, and lets are commonplace.

SIDELINES

The number of times Jahangir Khan of Pakistan beat the same opponent— Australian Chris Dittmar—in the finals of major world squash tournaments. The run began in 1987 and Khan, who retired in 2001, is regarded as one of the greatest squash players of all time. The speed, in mph (281.6 kph), of the highest recorded speed of the ball off the racket. It was achieved by the Australian Cameron Pilley in 2014.

700-1,000 The number of calories a player can expend during a game of squash, which is one of the healthiest sports.

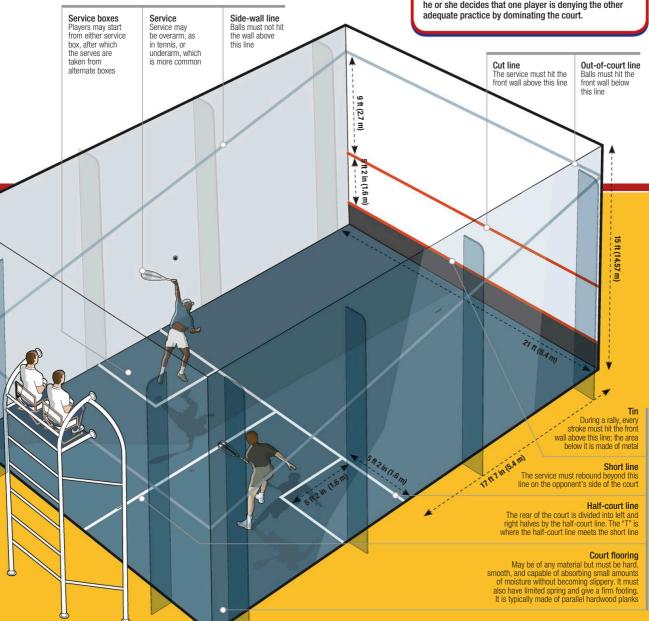
2,666 The highest number of strokes recorded in a single squash rally. The exchange—which took place in 2004 in Jersey, Channel Islands, Great Britain—was a deliberate bid for a world record rather than part of a competitive game. It ended when the players reached the previously agreed 60-minute time limit. There was no winner, and they could have played on....

COURT PROCEDURE

The diagram below shows the standard dimensions for a singles squash court. At the highest level, clear-sided courts are used to allow for better TV broadcasting. The ball may be bounced off any of the walls below the out-of-court lines, including the back wall. The tin is marked with a metal strip; the noise made when a ball hits it tells the players (and officials, if there are any) that the shot is not "up."

PREMATCH PREPARATIONS

Before any match, the players warm up themselves and—just as importantly—the ball for five minutes by stroking the ball to each other. The players swap sides after exactly two and a half minutes. If there is a referee, he or she will call "half-time" and then "time" when the full five minutes have elapsed. The referee carefully observes the warm-up session and may intervene if he or she decides that one player is denying the other adequate practice by dominating the court.

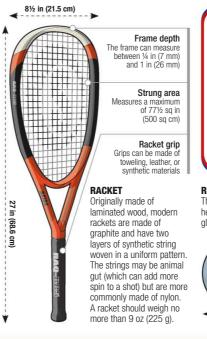


KEY EQUIPMENT

Most squash rackets are made of graphite with the addition of a small amount of another material, such as Kevlar or titanium, which makes them stiff, light, strong, and powerful. String tension is an important factor in producing a good on-court performance. Generally, harder hitters have their rackets strung more tightly than lighter hitters. String width, or gauge, can also vary. Thin strings are more powerful than thick strings, since they stretch more and launch the ball farther. Beginners should use a fast ball with plenty of bounce, while professional players use much slower balls.

EYE PROTECTION

During rallies, squash players risk being hit by their opponent's racket or the ball; many facial injuries are sustained in this way. The World Squash Federation recommends that all players wear appropriate eye guards at every level of the game. Eye protection is essential if a player has a history of medical problems with their eyes or has had surgery. Few professionals wear eye protection, however, although eye guards are now required in the doubles game and for juniors.



BALL SPEED A colored dot indicates the level of bounce and speed of a squash ball. The standard competition ball is the yellow. Double yellow—extra super slow Yellow—super slow Green or white—slow Red—medium Blue—fast

RIIRRER RALI

The ball is formed of two hollow hemispheres of rubber compound glued together.



SERVING

The right to serve first is determined by a "racket spin." The server continues to serve until he or she loses a rally, after which the opponent takes service and the procedure continues. Part of the server's foot must be completely inside the service box (not touching the box lines) and in contact with the floor when the ball is put in to play. The ball must hit the front wall between the cut line and the out-of-court line and then bounce on the floor in the opposite half of the court beyond the short line. If a serve fails to satisfy these criteria, service immediately passes to the other player.

At the start of each game or after service has passed to an opponent, the server may begin play from either service box. Serves then alternate between the two boxes, regardless of which player is serving, except when a let has been called, in which case the ball is hit back into play from the same box as the previous serve. If the players are unsure of which box to serve from, the marker (the referee's assistant) announces the correct box.

RALLYING

Alternate players must hit the ball against the front wall between the out-of-court line and the tin. It may be deflected off any of the other three walls, but it may hit the floor only once per stroke. The ceiling of the court is out of bounds.

DOMINATING THE "T"

A game of squash revolves around the "T," the point where the half-court line and the short line meet. The player who dominates the "T" also dominates the game, since they are in the best possible position to place winning shots and are perfectly balanced to go in any direction to return their opponent's shots.

USING THE WALLS

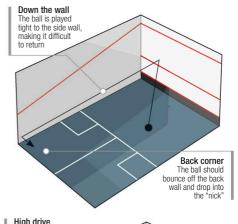
During a rally, the striker may play off one or more of the three walls to deceive the opponent through rapid changes of angle or to draw them to the forecourt. With the opponent in a weak position at the front, the attacker may try to win the point with a hard drive into the vacant back court. Alternatively, a ball played to hug the wall is extremely awkward to return.

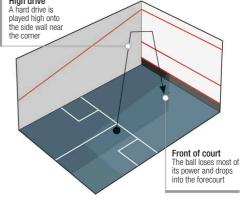
STRAIGHT DRIVE

The straight drive or "rail" is one of the most effective shots in the game. The first bounce should land on the front wall above the service line, followed by a second bounce off the back wall near the floor. If left, the ball will drop into the "nick" between the back wall and the floor-virtually impossible to retrieve. A good drive has length (to reach the back court) and is tight to the wall.

FORECOURT SHOT

Squash players aim to draw their opponents away from the "T" at the center of the court, the most advantageous position. In this diagram, for example, a drive played high onto the side wall near the corner loses most of its power on making contact with the wall, falls onto the front wall, and then drops away into the forecourt. The chasing player has to run and fetch to keep the rally alive.





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SCORING SYSTEM

Points are won at the end of a rally of "good" balls, which occurs either when one player fails to return the opponent's shot or plays a "bad" ball. A good ball is one that reaches the front wall below the out line and above the tin before touching the floor. Bad balls include those that bounce twice on the floor, hit the tin, or hit the wall above the out-of-court lines.

POINT-A-RALLY (PARS) SYSTEM

In the point-a-rally or PARS system, either the server or receiver may score a point at the end of each rally. The winner of each game is the first to 11 points. However, when the score reaches 10-all, the game must be won by two clear points. The rally system is used in international and doubles matches, and also in the men's professional singles tour.

POINT SYSTEM

Only the server can score in the point system, and the winner of each game is normally the first player to reach nine points. An exception is made when the score reaches eight-all for the first time. In this situation, the receiver may choose to continue that game to nine or 10 points. The former is known as "set one": the latter is called "set two."

PLAYING A LET

A let is played when one player obstructs another during a rally. If the striker hits their opponent with the ball before it reaches the front wall, or the striker's racket hits the opponent, play is paused, and the referee decides whether the ball would have been good. If the referee decides it would have been good, or if the opponent deliberately intercepted the ball, the stroke is awarded to the striker. If the ball would not have been good, the stroke is awarded to the player who was hit.

STAT CENTRAL

MEN'S WORLD OPEN CHAMPIONS PLAYER (COUNTRY) YEAR

2018

2011

ALI FARAG (EGY) 2017 MOHAMED EL SHORBAGY (EGY) 2016 KARIM ABDEL GAWAD (EGY) 2015 GRÉGORY GAULTIER (FRA) 2014 RAMY ASHOUR (EGY) 2013 NICK MATTHEW (ENG) 2012 RAMY ASHOUR (EGY)

NICK MATTHEW (ENG)

WOMEN'S WORLD OPEN CHAMPIONS

YEAR	PLAYER (COUNTRY)	
2018	NOUR EL SHERBINI (EGY)	
2017	RANEEM EL WELEILY (EGY)	
2016	NOUR EL SHERBINI (EGY)	
2015	NOUR EL SHERBINI (EGY)	
2014	NICOL DAVID (MYS)	
2013	LAURA MASSARO (ENG)	
2012	NICOL DAVID (MVS)	

OFFENSIVE SHOTS

The volley (hitting the ball before it bounces on the floor) is a key attacking shot that allows a player to interrupt the rhythm of play. A lob that sails over an opponent's head and drops into the back corner is an equally effective offensive shot.

DEFENSIVE SHOTS

The drop shot, which can be played from anywhere on the court, will force an opponent that is dominating the "T" out of position. The "boast" (a shot played with pace against a side wall first) may be necessary to retrieve a ball played into the back corner.

FOREHAND GROUND STROKE The forehand is a versatile stroke that is vital for both offensive and defensive play. The stroke allows a player to hit both hard drives and delicate drop shots with accuracy Backswing Keeping the racket back and the arm Strike high on the Swinging hackswing the racket Followadds power through a through smooth curve A proper helps ensure follow-through the shot is means the accurate player is in control of the ball throughout

MEN'S BRITISH OPEN CHAMPIONS

YEAR	PLAYER (COUNTRY)
2018	MIGUEL ÁNGEL RODRÍGUEZ (COL)
2017	GRÉGORY GAULTIER (FRA)
2016	MOHAMED EL SHORBAGY (EGY)
2015	MOHAMED EL SHORBAGY (EGY)
2014	GRÉGORY GAULTIER (FRA)
2013	RAMY ASHOUR (EGY)
2012	NICK MATTHEW (ENG)

WOMEN'S BRITISH OPEN CHAMPIONS

YEAR	PLAYER (COUNTRY)
2018	NOUR EL SHERBINI (EGY)
2017	LAURA MASSARO (ENG)
2016	NOUR EL SHERBINI (EGY)
2015	CAMILLE SERME
2014	NICOL DAVID (MYS)
2013	LAURA MASSARO (ENG)
2012	NICOL DAVID (MYS)
2011	NO COMPETITION

INSIDE STORY

Squash has its origins in the UK, and the British Open Championships was one of the first major squash tournaments. Prior to the creation of the World Open, it was effectively considered to be the world championships. The first women's contest was held in 1922, and the men's in 1930. It is still regarded highly by many on the circuit despite its lower prize money. The World Open Championships have been held since the 1970s, and are played annually by the world's best men and women.

GOVERNING BODY

The World Squash Federation (WSF) has more than 145 member nations. It organizes the sport's world championships for men, women, boys, girls, and masters (over 35s) at individual and team levels in both singles and doubles. The men's professional game is governed by the Professional Squash Association (PSA) and the women's by the Women's International Squash Players Association (WISPA).

AND KHAN TAKES IT...

BETWEEN 1951 AND 1997, THE WORLD CHAMPIONSHIP WAS WON 30 TIMES BY PLAYERS FROM A SINGLE VILLAGE IN PAKISTAN. THE VICTORS WERE NOT ALL RELATED. BUT THEY WERE ALL NAMED KHAN: AZAM, HASHIM, JAHANGIR, JANSHER, MOHIBULLAH, AND ROSHAN.

NEED2KNOW

→ Most sports evolve, but racquetball was invented in 1950 by Joe Sobek, an American handball player who was dissatisfied with the range of indoor games then available.

→ Racquetball caught on fast because it could be played on the handball courts that already existed in most US high schools and colleges.

→ Confusingly, racketball is not just an alternative spelling-it's a completely different game played on a squash court with a smaller and less bouncy ball.

Nonmarking

The sneakers worn

are similar to those used in other court

sports; they must not mark the surface



Arm extension

RACQUETBALL

GAME OVERVIEW

Racquetball is a fast game played on indoor or outdoor courts by two, three, or four players. It is a combination of handball and squash with several exciting features that are all its own. At the start of the 21st century, there were 8.5 million racquetball players worldwide.

Small and secured to the wrist, the racket feels much more a part of the player's body than the equipment used in many other racket games Bouncy rubber Match balls are made of rubber, are 2¼ in (5.7 cm) in diameter, and weigh about 1½ oz (40 g) Light and absorbent Polo or T-shirts and shorts or skirts: given the heat of the indoor court and the strenuous nature of the game, it is important that the clothing is light and breathable Padded support Often worn to support the knee joints, which have to withstand great pressure during aroundstrokes PLAYER **PROFILE** For top players, a strong heart and physical fitness are vital to sustain the necessary stamina and speed across the court. One of the main reasons for the popularity of racquetball is that almost anyone can play it, and the nature of the sport means it is a good way of staying fit.

IN PLAY

Players take turns hitting a ball against a wall. Points are scored only by the server, and only if they serve an ace or win a rally. A rally is won when the opposition is unable to prevent the ball from hitting the floor twice, or when they cannot return it so that it touches the front wall before it touches the floor.

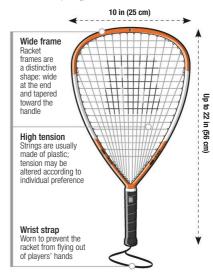
The server must stand in the service zone, bounce the ball on the floor once. and then hit it directly onto the front wall, making it rebound and touch the floor beyond the short line without touching a side wall. In rallies, the ball may hit the side walls or the roof, as long as it also hits the front wall and bounces only once between opponents' strokes.

THE GEAR

The racket and ball are similar to those used in squash, but larger. The game is fast-paced and furious, and players often wear protective safety goggles.

LIGHT FRAME

Modern rackets are often constructed with a light graphite-titanium composite frame and weigh only about 6 1/2 oz (184 g).



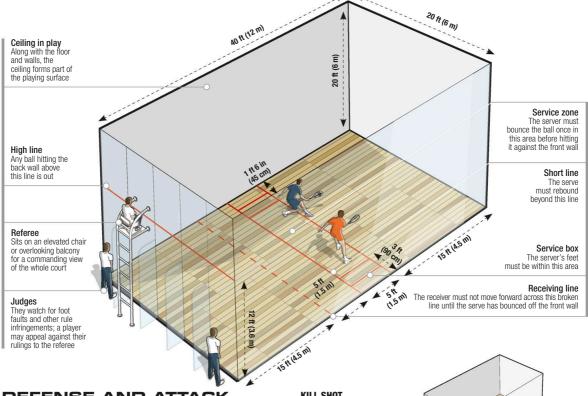
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COURTSHIP

Apart from the top of the back wall, all surfaces are in play, including the ceiling. The floor surface is usually made of planks of polished wood or similar material. The back wall (and sometimes the side walls) is made of transparent plexiglass. The court is a confined space that retains heat and may quickly render players in need of refreshment.

POINT FOR POINT

Professionals play the best of five games; the winning player or team is the first to reach 11 points with at least a two-point margin of victory. Amateurs play two games, with the winning player being the first to 15 points. If each player wins one game, a tiebreaker is required. It is not necessary to win by two clear points in amateur racquetball. In addition to singles and doubles, three-player variants include "ironman" (two against one) and "cutthroat," in which players take turns opposing the other two.



DEFENSE AND ATTACK

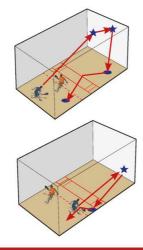
If a player does not think they are in a position to finish a rally, they may play a defensive shot to lure their opponent away from the center of the court. If successful, they can go for the kill with their next shot. Some of the key rally strokes are as follows:

CEILING SHOT

Because the roof is in bounds, players often take advantage of it. This stroke aims to make the ball bounce for the second time in the back court

DOWN THE LINE PASS

A player standing near the side wall sends a forcing shot back past him even closer to the side of the court. The strokemaker must be careful not to obstruct the opponent.



KILL SHOT

This stroke is normally played with bent knees when the ball is already close to the ground. The idea is to keep it as low as possible when it hits the front wall.

PINCH SHOT

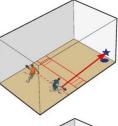
This is the name for any stroke that hits the side wall first, then the front wall, and "dies" near the side wall on the opposite side of the court. The aim is to get the ball to bounce twice before it reaches the side.

INSIDE STORY

The International Racquetball Federation organizes World Championships every two years, with competitors from more than 40 countries. The IRF regularly updates the world rankings.

GOVERNING BODIES

Professional racquetball is run by two organizations: the International Racquetball Tournament (IRT) and the Women's Professional Racquetball Association (WPRA).









ETON FIVES

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GAME OVERVIEW

This little-known ball game is played by two teams of two men or women on an unusual court that is enclosed on three sides, features a buttress on the left-hand side, and is about 6 in (15 cm) higher at the front than the back. The players can strike the ball only with their hands or wrists and must hit the ball "up" against the front wall to stay in a rally.

Server The server throws the hall so that it bounces off the front and right walls, landing roughly in the middle of the lower court

Blackguard line This vertical black line is about 30 in (75 cm) from the right wall

"Up"

The area above

the upper ledge

on the front wall

is known as "up"

NEED2KNOW

- The game originated at Eton College and spread to other private schools in England, but it is still played by only a few thousand athletes.
- Although there are a few courts in Europe, Eton fives is played mainly in its native Britain and in Nigeria, where a version of the game flourishes in the northern states and there are at least 30 courts

if his or her partne cannot reach it

Server's partner This player tries to return any shots that the server misses

Cutter's partner This player hits the ball

SCORING

Matches are the best of five games, and each game is won by the first pair to reach 12 points. Only the serving pair can score. Points are won if the ball hits the ground more than once, hits the front wall under the line or ledge, or leaves the court completely.

Column **Buttress** It is difficult At the base of this feature on the front court to return a side is the "hole." If the shot that hits one of ball goes into the hole, it the columns is virtually unplayable Key step Vertical, and about 6 in (12 cm) high This player can choose when to return a serve and can leave any number of serves

A STRANGE CONVERSION

THE ORGAN ROOM AT THE OPERA HOUSE IN GLYNDEBOURNE, EAST SUSSEX, IS NOW ONE OF ENGLAND'S **GRANDEST SITTING** ROOMS. STRANGELY, IT BEGAN LIFE AS AN **ETON FIVES COURT** BEFORE CONVERSION TO A MORE SEDATE USE.

THE COURT

The Eton fives court is based on an area of the chapel at Eton College where the game was first played. Every court differs slightly, but a number of features are universal. A step divides the court into front and back sections. The court is enclosed on three sides by irregular walls. There is a buttress on the left of the court where the upper and lower courts meet, brick columns on either side of the open end, and a ledge on all three sides. These features ensure that, after hitting a wall, the ball's trajectory is almost impossible to predict. The home team, however, is usually at an advantage, as they are familiar with the court's unique elements.

Hard ball

The ball is a little larger than a golf ball and is made of rubber and cork. It loses little of its pace when bouncing off the walls and floor of the court

unhit. Should he or she decide to return it,

the hall will be smashed hard against the right wall and the front wall to the right of

the blackguard line and above the ledge



Soft gloves

Padded leather gloves protect the hands. Reversed rough leather on the palm side gives added grip. Inner gloves absorb sweat and give further protection







RACKETS

NEED2KNOW

- First played in Fleet Prison, London, rackets did not gain respectability until introduced to Harrow School in 1822.
- → English players have dominated world rackets.

SCORING

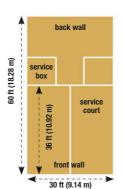
Only the server can score. He or she must serve from the service box so the ball strikes the front wall above the service line and rebounds into the service court on the other side. Players must return the ball before it bounces twice: shots must strike the front wall above the play line. Missing a shot results in the server's side winning a point or the service switching. The first side to reach 15 points wins the game.

GAME OVERVIEW

Rackets has many similarities with squash, but it is played on a larger court with a harder ball. Rackets can be played as singles or doubles. Play is fast and furious.

THE COURT

The court is enclosed, and the floor and walls are hard and smooth. The front and side walls are 30 ft (9 m) high, and the back wall is half that height. There is a fixed wooden board on the front wall, the upper edge of which is the play line, 2 ft 3 in (0.68 m) from the floor. Another line, 9 ft 6 in (2.93 m) from the floor, is the service line.



Catgut racket This averages 27 in

Heavy ball

This is heavy,

weighing 1 oz (28 g), but small, just 1 in (2.5 cm)

in diameter

(76 cm) long and weighs 9 oz (255 g). It is strung with catgut



NEED2KNOW

- Paddleball originated in the United States, where it is still most popular.
- The governing body of one-wall paddleball is the United States Paddleball Association.

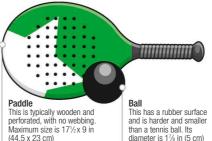












diameter is 1% in (5 cm)

TIME-OUTS

For a 15-point game, two one-minute time-outs are allowed. For 21-point and 25-point games, the rules allow for three one-minute breathers. Tournament committees allow substitutes in some competitions. Unusually, a player can switch the paddle from hand to hand during a game.

PADDLEBAL

GAME OVERVIEW

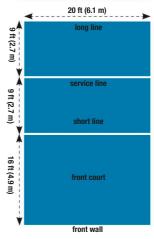
Players hit a ball against the wall or walls of a court with a paddle while their opponents attempt to hit it on the rebound. There are one-, three-, and four-wall games, both singles and doubles. In one- and three-wall games, play is to 11, 15, 21, or 25 points. Four-wall is a 21-point game.

RULES OF SERVICE

The server must remain inside the service zone, between the short and service lines. A serve is illegal if the ball hits the floor before crossing the short line or if it rebounds from the front wall and hits two or more walls before striking the floor. The server loses the right to serve if he or she makes two illegal serves in a row.

THE COURTS

The most popular version of paddleball is played on a court 20 ft (6.1 m) wide and 34 ft (10.3 m) long, with a single wall 16 ft (4.9 m) high, topped with a fence. The short line, 16 ft (4.9 m) from the wall, defines the front court. The long line, 18 ft (5.4 m) behind the short line, defines the back court. The front court of a three-wall court has side walls 12-16 ft (3.7-4.9 m) high. A four-wall court has a ceiling, front and side walls 20 ft high (6.1 m), and a back wall at least 12 ft (3.7 m) high.



ONE-WALL COURT

The server must not cross either the service line or the short line. Served balls should hit the wall and rebound to land in the receiving area, which is between the short and long lines.

NEED2KNOW

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- Often regarded as a Basque and Catalan sport, pelota is also played in other parts of France and Spain, as well as in Argentina, Ireland, Italy, and Mexico.
- In its native Spain and France, pelota is known as "jai-alai," which is the Basque for "happy festival."
- A ball that is well hit by a highly skilled pelota player may reach speeds of 188 mph (300 kph).

PELOTA









GAME OVERVIEW

This is the fastest ball game in the world. Standard pelota, known as "cesta punta," is a game for two players, but other versions can be played as doubles. Using bizarrely shaped racketlike baskets, which are strapped to their wrists, players aim to sling a ball against a wall in such a way that their opponents cannot return it before it bounces twice. There are numerous variants, including a bare-handed game, "pelota a mano," that may be single combat or two against one. The form known as "frontenis" is played with tennis rackets with reinforced strings; "xare" also uses tennis rackets, but with loosened strings; and "leather paleta" and "pala corta" are played with solid wooden bats.

Cesta Pelota The racket is made The ball is hard, with a latex of braided willow twigs core wrapped in wool and an mounted on a curved outer casing of two leather 2 in (5 cm) arm of chestnut or ash strips sewn together Safety lid On hand The helmet is vital safety The glove is attached to wear. No pelotari (player) the cesta and held in would be seen alive for place on the player's long without one wrist by a strap (cinta) **PLAYER PROFILE** Pelota players need to be wealthy (or at least have sponsorship) just to afford the rackets, which are handmade and often last less than a single match. The arms, legs, and back must all be in good condition, but the critical area is the hip, which is heavily involved Waistband ribbon in every stroke. Elderly May be colored to denote the player's players often suffer from

PLAYING PELOTA

The score required to win a match can be anything between 25 and 50 points. In doubles, both players can score, regardless of whether they have the serve. At the start of each point, the server throws the ball in play with the cesta from behind the service line; a legal serve must go straight to the front wall above the low horizontal metal strip and land on the floor in the area between lines 4 and 7. The side and back walls may be used only once the ball is in play. Rallies continue until the ball goes out or is not returned. If one player obstructs another, a let is normally played unless it is clear what would have happened.

ONE TO WATCH

One of the sport's most important requirements is that rallies should be continuous, and the judges keep a close eye on every stroke to ensure that they are all one fluid movement. If it looks as if the player has cradled the pelota in the cesta—even for a moment—he or she loses the point.

GAME FOR A FLUTTER

team or status

Court dress

Players wear polo shirts

and long pants. Shorts

are not

generally considered

suitable attire

Leave no trace

nonmarking soles

prevent damage to

allow quick movement and

the court

Running shoes with

IN PELOTA DE GOMA, THE BALL IS PRESSURIZED AND FILLED WITH GAS, MAKING IT FLY EVEN FASTER THROUGH THE AIR THAN THE STANDARD PELOTA. THE GAME IS SO FAST THAT IT'S HARD TO APPRECIATE WITHOUT SLOW-MOTION REPLAYS. DESPITE THIS, IT'S STILL A BIG CROWD-PLEASER AND ONE OF THE MOST WAGERED SPORTS IN SPAIN.

DYNAMIC ACTION

arthritis in the hip joints.

The cesta punta player (pelotari) catches the speeding ball, or pelota, with his cesta. Once the ball is safely snared, he will draw back his throwing arm, then whip it forward again, launching the pelota toward the front wall of the court at a blistering speed.

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COURTING RITUAL Pasa line Falta line Front court Most variants of pelota are played on indoor courts known as Marked with the Marked with the players frontons. The overall length may vary, but the marked areas are number 7 on the number 4 on the Try to intercept wall; any serve must hit the frontis and wall: any serve the pelota always in proportion. The front, back, and left-hand walls are parts during rallies must bounce then bounce before it beyond this mark of the playing area. The flooring (cancha) is made of polished reaches this mark cement, but beyond the sideline, the surface changes to wood so that any ball that lands on it makes a recognizably different sound. To the right, a glass or plexiglass panel covers the whole wall area; behind it is elevated seating for spectators. WALLCRAFT Some players overpower their opponents by force of stroke, but most rely on subtle and deceptive spin. Among the most effective shots are the chula, in which the ball lands in the crack between the back wall and the floor, and the carom, which hits the side wall, front wall, and then floor, falling away toward the right-hand screen. The dejada is a drop shot that hits the front wall just above the foul line. The arrimada is a forcing drive that goes as close as possible to the side wall, making it almost unplayable. 98-177 H 30-54 m Service line The server (left) must put the pelota into play from behind this mark Sons in Strain Back court players Note how in doubles the nonserver covers the right of the court, leaving the left to his teammate **FRONTONS** Metal strip **Frontis** There are three standard courts. Frontenis and pelota de goma The front wall of This extends across the

TRINQUET COURT

are played on a 98 ft (30 m) court; pelota a mano and leather

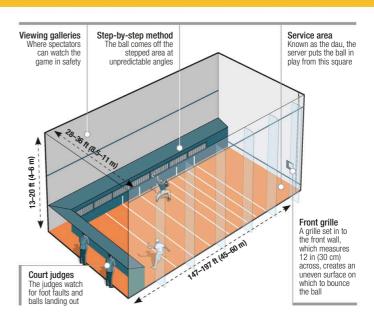
is a game for a court that measures 177 ft (54 m) in length.

pelota are contested on a 118 ft (36 m) fronton; and cesta punta

The most unusual pelota court is called the tringuet, and this gives a whole new meaning to the term "spectator sport." The steps on the side are part of the playing area, but members of the audience can sit on them at their own risk. (There are also upstairs viewing galleries for those who value their safety.)

KNOWING THE ROPES

In the traditional Valencian tringuet game known as "pelota vasca," opponents face each other on either side of a rope hung across the middle of the fronton. Other variant forms of pelota contested on a tringuet are played off the front wall using cestas or gloved hands. These include leather and rubber pelota, pelota a mano, and xare. The ball—known as pilota de vaqueta ("little cow ball")—is 1¾ in (4.2 cm) in diameter.



front wall and is 2 ft-3 ft

3 in (0.6-1 m) in height

the court is made

of granite

COMBAT









BOXING

SPORT OVERVIEW

Boxing is a sport of great skill and physical toughness. Two combatants endeavor to punch one another to score points from the judges or referee while avoiding being hit themselves. Almost all areas of the head and body above the waist are designated scoring areas. Contests are won on points or by knockout.

There is a major disparity between the amateur and professional ranks in boxing. Leading professional fighters are among the biggest earners in the sports world.

FIGHTER PROFILE

Boxers require good upper body strengthparticularly a strong punch—and a high resilience to being hit (a "good chin"). Boxing is a really tough aerobic workout, so fighters need to display a fanatical training ethic and great stamina. Speed, agility, and quick reflexes are beneficial, particularly for those fighting at lower weight levels.

Bob and weave Head movement is vitally important for fighters; it is more difficult for opponents to hit a moving target

Trunks

Cotton shorts have nadded waisthands to provide some protection from low body shots

SIDELINES

The total amount, in millions of dollars, generated from pay-per-view sales of the world title fight between Floyd Mayweather Jr. and Conor McGregor in August 2017.

Solid base

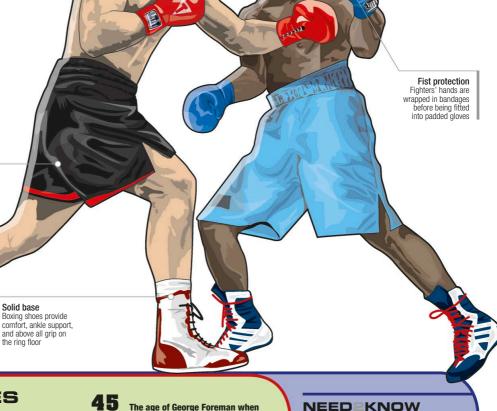
the ring floor

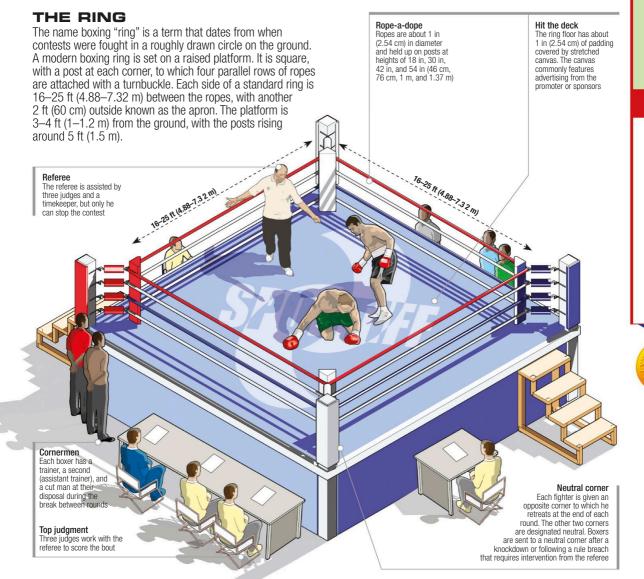
The highest live attendance for a boxing contest—Tony Zale versus Billy Pryor in August 1941.

The age of George Foreman when he regained the world heavyweight title, knocking out Michael Moorer for the IBF and WBA titles in November 1994. Foreman had first won the world heavyweight title

Number of fights fought by American featherweight Willie Pep during a 26-year career (1940-1966).

- → Modern boxing was first codified in 1867 by a set of 12 rules written by John Graham Chambers and endorsed by the 9th Marquis of Queensberry.
- Amateur boxing differs in various ways from the professional arm of the sport.





EQUIPMENT

Fighters wear shorts, boxing shoes, and padded gloves, which come in two sizes—8 oz (227 g) and 10 oz (283 g)—depending on the weight of the boxer. Mouth guards are required and groin guards are optional in professional boxing. In amateur bouts, fighters additionally wear head guards and vests and have larger, softer gloves. This is the only equipment fighters wear and use in the ring, but in training, boxers additionally use free weights, punching bags, jump ropes, speed bags, and other items to hone themselves into fighting shape.



GROIN GUARD

Protects fighters' groins from injuries resulting from illegal low blows.



MOUTH GUARD

Plastic mouth guards guard the top teeth from being knocked out.



GLOVE

Gloves are specially padded to protect only the wearer.

AMBLING ALP

ITALIAN BOXER PRIMO CARNERA, HEAVYWEIGHT CHAMPION IN 1933, WAS A GIANT OF A MAN—STANDING 6 FT 5 IN (197 CM) TALL AND WEIGHING 276 LB (125 KG). HE HAD A PRODIGIOUS APPETITE. FOR BREAKFAST, IT IS CLAIMED HE ATE 19 PIECES OF TOAST, 14 EGGS, A LOAF OF BREAD, HALF A POUND OF VIRGINIA HAM, A QUART OF ORANGE JUICE, AND TWO QUARTS OF MILK.

Cushions blows

Usually made of leather with a foam interior

Side hole

The headwear does not fully cover ears to enable fighter to hear referee's instructions

HEAD GUARD

Worn for amateur contests and professional sparring only, they offer protection but limit peripheral vision.



RULES AND REGULATIONS

The basic rules of boxing are that two fighters of a similar weight, under the supervision of a referee, attempt to strike one another above the waist with clenched fists with the intention of scoring more points than the opponent (to win rounds) or by knocking the opponent to the canvas for a period of 10 seconds. Blows to the back of the head or kidneys are illegal, as are blows with the open, laced part of the gloves. Beyond that, rules differ between the amateur and professional arms of the sport.

AMATEUR

Amateur fighters wear shorts, tank tops, and shoes. For protection, they wear a mouth guard, groin guard, and leather headguard. Contests are held over three two-minute rounds. Points are scored for every legal punch landed with the knuckle portion of the glove (painted white) and the totals run for the whole fight, not for individual rounds.

PROFESSIONAL

Pro fighters, in contrast, fight stripped to the waist and without headguards. Contests are much longer, too—world championship fights consist of 10 three-minute rounds, with a one-minute break in between. Individual rounds are scored out of 10 by a panel of three judges. The fighter that wins the round is awarded 10 points, the loser nine. If a round is particularly one-sided—in other words, a knockdown occurs—the scores are given as 10/8. Points are deducted by the referee for indiscretions.

THE COUNT

Following a knockdown, the referee first escorts the aggressor to a neutral corner and then starts counting to 10. The prostrate fighter has 10 seconds to both regain his feet and present himself in an acceptable condition to continue or the fight is over.

STAT CENTRAL

WEIGHT LIMITS (10 OZ GLOVES)

 TITLE
 WEIGHT

 HEAVYWEIGHT
 201+ lb (91+ kg)

 CRUISERWEIGHT
 176-200 lb (79.7-90.6 kg)

 LT. HEAVYWEIGHT
 169-175 lb (76.5-79.2 kg)

 SPR. MIDDLEWEIGHT
 161-168 lb (72.9-76.1 kg)

 MIDDLEWEIGHT
 155-160 lb (70.2-72.5 kg)

 SPR. WELTERWEIGHT
 148-154 lb (67-69.7 kg)

WEIGHT LIMITS (8 OZ GLOVES)

TITLE	WEIGHT
WELTERWEIGHT	141-147 lb (63.8-66.6 kg)
SPR. LIGHTWEIGHT	136-140 lb (61.6-63.4 kg)
SPR. FEATHERWEIGH	HT 127–130 lb (57.5–58.9 kg)
FEATHERWEIGHT	123-126 lb (55.7-57 kg)
SPR. BANTAMWEIG	HT 119–122 lb (53.9–55.2 kg)
BANTAMWEIGHT	116-118 lb (52.5-53.4 kg)
SPR. FLYWEIGHT	113-115 lb (51.2-52.1 kg)
FLYWEIGHT	109-112 lb (49.3-50.7 kg)

TECHNIQUES AND TACTICS

Basic boxing training centers around physical fitness, speed of movement, throwing jabs, and footwork. Good punches can only be thrown from a solid base. The techniques of throwing different punches is taught later. Top boxers work with their trainers for weeks at a time leading up to championship fights working on their overall conditioning and on a fighting style tailored to their upcoming opponent. They will practice key punches and spar with fighters of a similar build and fighting style to their opponent in an attempt to gain some advantage.

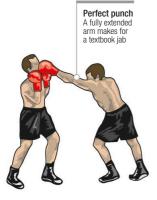
ATTACK

Boxers must show aggression and throw punches in order to win fights, so attacks—either as single punches or more commonly two- or three-punch combinations—are essential. In order to launch a flurry of punches, the boxer must first contain their opponent—a moving target is hard to strike. Therefore, good, quick footwork with the intention of cutting off the ring and trapping the opponent in a corner is important.



SOUTHPAW

A boxer's stance and method of fighting is either described as orthodox (left arm and foot forward) or southpaw (right arm and foot forward). A southpaw is usually someone who is left-handed, using their right hand for jabs and their left for power punches and hooks. Some particularly dextrous fighters are able to switch between styles during bouts. Because most fighters are orthodox, a southpaw opponent can be a tricky proposition, requiring an altered set of tactics.



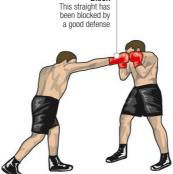
JAB

The staple punch of any boxer, a stiff jab keeps an opponent at bay and sets up attacks. Jabs are usually the first punch in any combination.



ноок

Hooks are delivered to the side of the head or body. Because of the angle of delivery, the receiving fighter will often not see a hook coming.



Block

STRAIGHT

Thrown with the "second" arm (right arm for orthodox boxers), the straight has a greater distance to travel, leaving the aggressor open to a counterpunch.

A tight defense is sometimes no equal to an uppercut



UPPERCUT

The most devastating punch in boxing, the uppercut is delivered from a crouching position onto the opponent's chin from below with great force.

DEFENSE

The ability to keep from being hit, something the great Muhammad Ali was a master at, is probably more important than landing your own punches. The sheer speed of movement of some fighters can make them difficult to hit. However, the best means of repelling an attack is by covering up the head and body with the arms and hands with elbows tucked into the waist.

COMBINATIONS

A series of punches thrown in quick succession with both hands and from different angles is far more likely to achieve results than single shots, however hard they are thrown. These attacks often cause the opponent to lower or raise his guard, enabling the oncoming boxer to score hits in unprotected areas. A typical sequence might start with a 1-2 combination to the head. When the opponent raises his hands to defend, the boxer uses the opportunity to sidestep and throw hooks to the body to finish off.



Thrown with the "second" hand, the cross punch is delivered right-to-left or left-to-right across the opponent's head or body.

TYPES OF FIGHTERS

The style of fighting that a boxer chooses will be designed around his physical stature and strengths and weaknesses. For instance, former heavyweight champion Mike Tyson had a bullying, forward style and a fearsome punch. Floyd Mayweather Jr.'s style, in contrast, is about grace and poise. He is often able to outclass opponents with quile rather than brute force.

OUT-FIGHTER

Boxers who fight at a distance are usually tall with a long reach. They do not need to get close to an opponent to inflict damage and will resist all attempts to be drawn into a brawl. Top out-fighters, such as former heavyweight champion Lennox Lewis, typically have a strong jab, too.

IN-FIGHTER

Conversely, in-fighters are often shorter in height and with a short reach. Because they cannot win contests from a distance, they use their lower center of gravity to muscle in close, spoiling the work of their opponent and inflicting their own damaging punches. A fight between two in-fighters is always dramatic, since neither will back down.

BRAWLER

Also known as the "slugger" or "one puncher," the brawler often stands for everything that's most brutal in the sport. Sluggers tend to lack finesse in the ring but make up for it in raw power, often able to knock almost any opponent out with a single punch. This makes them exciting to watch.

ROPE-A-DOPE

A phrase coined by Muhammad Ali, the rope-a-dope is the technique of willingly lying on the ropes in a tight defensive stance and inviting the opponent to throw punches until they tire. Although considered a sin in boxing circles. All used this style to great effect on several occasions, most notably during the Rumble in the Jungle in Zaire in 1974. Reigning champion George Foreman threw hundreds of punches at his apparently helpless opponent before, in the eighth round, Ali came off the ropes and knocked out a visibly exhausted Foreman.

STAT CENTRAL

MOST CONSECUTIVE TITLE DEFENSES WEIGHT NAME JOE LOUIS 26 (HEAVYWEIGHT) DARIUSZ MICHALCZEWSKI 23 (LT. HEAVYWEIGHT) RICARDO LOPEZ 21 (STRAWWEIGHT) JOE CALZAGHE 21 (SPR. MIDDLEWEIGHT) **SVEN OTTKE** 21 (SPR. MIDDLEWEIGHT) BERNARD HOPKINS 20 (MIDDLEWEIGHT) HENRY ARMSTRONG 19 (WELTERWEIGHT) EUSEBIO PEDROZA 19 (FEATHERWEIGHT) KHAOSAI GALAXY 19 (JR. BANTAMWEIGHT) LARRY HOLMES 19 (HEAVYWEIGHT)

OLYMPIC HEAVYWEIGHT GOLDS		
YEAR	NAME	COUNTRY
2016	EVGENY TISHCHENKO	RUS
2012	OLEKSANDR USYK	UKR
2008	RAKHIM CHAKKHIEV	RUS
2004	ODLANIER SOLIS FONTE	CUB
2000	FELIX SAVON	CUB
1996	FELIX SAVON	CUB
1992	FELIX SAVON	CUB
1988	RAY MERCER	USA
1984	HENRY TILLMAN	USA
1980	TEOFILO STEVENSON	CUB

MOST CAREER FIGHTS			
NAME	WEIGHT	FIGHTS	
LEN WICKWAR	LT. HEAVY	463	
JACK BRITTON	WELTER	350	
JOHNNY DUNDEE	FEATHER	333	
BILLY BIRD	WELTER	318	
GEORGE MARSDEN	N/A	311	
MAXIE ROSENBLOOM	LT. HEAVY	299	
HARRY GREB	MIDDLE	298	
YOUNG STRIBLING	LT. HEAVY	286	
BATTLING LEVINSKY	LT. HEAVY	282	
TED (KID) LEWIS	WELTER	279	

INSIDE STORY

Amateur boxing has been governed around the world since 1946 by the Association Internationale de Boxe Amateur (AIBA). The organization oversees the rules and regulations of the sport, governs boxing at the Olympic Games, and has organized a world championship since 1974. The professional sport is marred by disagreement and corruption at governing level. A series of governing bodies recognizes their own world champions at different weights. It is rare in modern professional boxing for a fighter to be acknowledged as an undisputed world champion.

PROFESSIONAL GOVERNING BODIES

In the complex world of professional boxing, there are currently more than 10 organizations that purport to be world governing bodies. The four most credible are as follows: The World Boxing Association (WBA) dates from 1921 and is the longest-standing professional governing body but did not have global coverage. In 1963, the World Boxing Council (WBC) was created in the interests of achieving the first truly international body to control the sport. In 1983, the International Boxing Federation (IBF)—formerly the United States Boxing Association—was formed by breakaway members of the WBA. It is based in New Jersey. Then, in 1988, the World Boxing Organization (WBO) was created in Puerto Rico by further disillusioned members of the WBA.

BIRTH NAMES OF SOME GREATS

EIGHTING NAME

DICK TIGER

DIRTH NAME

RICHARD IHETU

DINTH NAME	FIGHTING NAME
WALKER SMITH	SUGAR RAY ROBINSON
ANTHONY ZESKI	TONY ZALE
ROCCO BARBELLA	ROCKY GRAZIANO
ARNOLD CREAM	JERSEY JOE WALCOTT
JOSEPH BARROW	JOE LOUIS
ROCCO MARCHEGIANO	ROCKY MARCIANO
GERARDO GONZALEZ	KID GAVILAN
JUDAH BERGMAN	JACKIE (KID) BERG
WILLIAM GUIGLERMO PA	APALEO WILLIE PEP
ELIGIO SARDINIAS MONT	TALBO KID CHOCOLATE
ARCHIBALD LEEWRIGHT	ARCHIE MOORE



NEED2KNOW

- → The term "fencing" is derived from the word "defense," which recalls the time when sword fighting was a vital skill on the hattlefield
- There are three types of fencing distinguished by the type of sword used in contests: the foil. the épée, and the saber.
- Fencing is primarily a European tradition. It was particularly associated with France and Italy, which is why so many fencing terms still in use are French.

SIDELINES

Number of fencers competing in the 1896 Olympic Games. Fencing is one of only four sports to have appeared in every modern Olympic Games.

Fencing is one of the five modern pentathlon events in the Olympics, along with shooting, swimming, equestrian show jumping, and running.

Number of Olympic medals (including six gold) won by Italy's **Edoardo Mangiarotti. He holds the record** for winning the most fencing medals.

Number of hours a Masters Championship bout lasted in New York in the 1930s-after which bouts were limited to 30 minutes. Today, a bout lasts for just three minutes.











ENCING

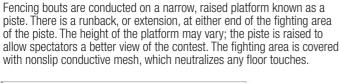
SPORT OVERVIEW

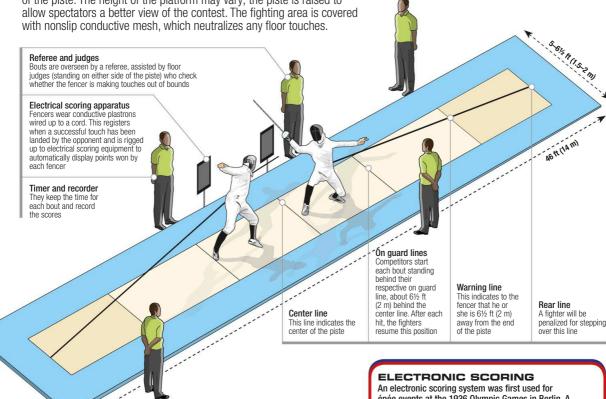
Fencing matches consist of bouts between two opponents armed with lightweight, blunt-tipped swords. Points are scored by hitting target areas on the opponent's body with the tip of the weapon. The target areas are determined by the type of weapon being used. Modern fencing developed from the centuries-old tradition of sword fighting in warfare. Swordplay developed during the 16th century as a sport rather than as a means of survival. Fencing featured in the first modern Olympic Games of 1896 and has appeared ever since.

"DISONISCHENKO"

DURING THE 1976 OLYMPICS (AT THE HEIGHT OF THE COLD WAR), SCANDAL ROCKED THE GAMES, BORIS ONISCHENKO OF THE USSR WAS COMPETING AGAINST BRITAIN'S JIM FOX. FOX SUSPECTED FOUL PLAY, AND IT WAS DISCOVERED THAT ONISCHENKO'S ÉPÉE HAD BEEN RIGGED. ALLOWING HIM TO FALSELY RECORD HITS. DUBBED "DISONISCHENKO" BY THE PRESS, HE WAS DISQUALIFIED. ALONG WITH THE WHOLE SOVIET PENTATHLON TEAM.

ON THE PISTE





EQUIPMENT

There are three different weapons used in fencing: the foil (the sword with which novices usually learn how to fence), the épée, and the saber. Each has its own associated scoring zone on the opponent's body and is played to a unique set of rules. Elite fencers usually prefer to specialize in one of these disciplines rather than attempt to master all three.

épée events at the 1936 Olympic Games in Berlin. A spring-loaded button at the tip of the sword is depressed with each hit, activating an electric scoring light. As the whole body is a target in épée, a reliable scoring system was relatively easy to introduce. It wasn't until the 1956 Olympics in Melbourne that an electric system was first used for foil. It required the use of an electric jacket to cover the target areas, enabling the device to differentiate between "on-target" and "off-target" hits.

FOIL

A lightweight weapon with a flexible blade, the foil has a push-button at its tip that must be depressed with a pressure of at least 1.1 lb (500 g) to register a hit.

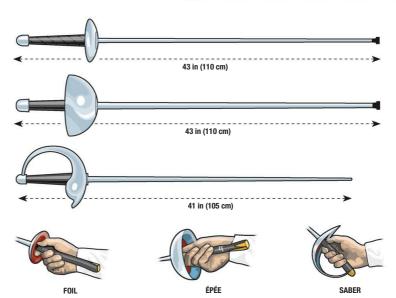
The épée is heavier and stiffer than the foil, requiring a pressure of 1.6 lb (750 g) on the push-button to register a hit. The whole body is a valid target.

SABER

With the saber, points can be scored using the edge of the blade, as well as the tip. There is no push-button: for safety, the sharp point is folded back.

GRIPS

The grip is where the fencer holds the weapon, and there are four main types: French, Italian, Spanish, and pistol. The French grip (shown here) is popular with both novices and advanced fencers.



RULES AND REGULATIONS

A fencing match consists of three three-minute bouts with one minute's rest between each bout. The winner is the first competitor to score 15 points, or whoever has the higher score at the end of regulation time. A competitor scores a point by making a legitimate touch to a target area on the opponent's body. Each of the three disciplines within fencing has its own associated target area. If a fencer steps behind the rear limit of his or her side of the piste, their opponent is awarded a point. At Olympic events, there are no preliminary rounds—only elimination contests.

FENCING TERMS

Fencing was a popular pursuit in France, Italy, and Spain, and many of the technical terms are French:

ATTACK AU FER An attack on the opponent's blade

CORPS A CORPS Literally translated as "body to body," this is when two fencers come into bodily contact (an illegal move)

COUP SEC A meeting of blades that is both crisp and firm (literally, a "drv" blow)

DEROBEMENT An evasive slide off an opponent's blade

DESSOUS The low line **DESSUS** The high line

FINALÉ The last part of an offensive action

JOUR An opening into which an attack can be launched

REPARTÉE Making repeated jabbing motions with the sword arm

TOUCHÉ A touch with the weapon

BASIC TARGET AREAS

The torso is the main target area (and the only target area in foil fencing). For assault purposes, the torso is divided into four quarters: areas on the upper half are known as the high lines; those on the lower half are called the low lines.

INSIDE AND OUTSIDE LINES

The four quarters of the torso can also be described as inside and outside lines. The two quarters of the target area facing the palm side of the sword hand are known as the inside lines. The two quarters facing the back of the sword hand are referred to as the outside lines.

HIGH LINES

The two quarters of the high lines are each divided into two further areas. Quarte and sixte touches (four and six) are made with the sword hand in supination (nails up). Tierce and quinte (three and five) are made with the sword hand in pronation (nails down).

ALL WHITE ON THE NIGHT

The uniform worn during a fencing bout is traditionally white (although the International Fencing Federation now permits the use of other light colors). It is thought that the white jacket and breeches is a throwback to the days before electronic scoring systems were introduced: the blade would often be covered in soot or ink so that a touch would show up clearly on the opponent's jacket.

FOIL

Foil fighting offers the smallest target area, concentrated on the opponent's torso. The electronic scorina system will only register a hit landed in this area.

ÉPÉE

In épée fighting, a touch can be registered anywhere on the body. However, most attacks are made on the closest part of the competitor, such as the hand, arm, or front foot.

SABER

The entire upper body is a target area in saber fighting, including the arms and the head. Saber fencing is lightning fast and usually consists of attacks and feints (false attacks).

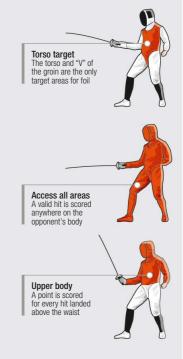
5

4

7

6

2



THE EIGHT TARGET AREAS

The four guarters of the torso are each divided into two sections. These sections are known as: prime, seconde, tierce, quarte, quinte, sixte, septime, and octave (this means simply one to eight).

The first target area—on the low line

Seconde

The second target area—on the low line

Tierce
The third target area—on the high line

The fourth target area—on the high line

Quinte
The fifth target area—on the high line

Sixte

The sixth target area—on the high line

The seventh target area—on the low line

Octave

The eighth target area—on the low line

PLAYING THE GAME

Fencing matches begin with the fencers taking up their positions behind their respective on quard lines. The referee signals the start of a bout by shouting "on quard!" Play is athletic and fast (making an electronic scoring system a necessity), consisting of a series of attacks, parries, and ripostes (counterattacks). In foil and saber fencing, a "right of way" rule determines who receives the point if both players land a hit simultaneously. This generally means the attacking player wins the point. In épée, both players receive a point.



THE SALUTE

Fencing is a sport that takes its tradition seriously, and players adhere to a strict code of courtesy, etiquette, and honor, An important part of this is the ritual of the salute. The opponents salute each other before the bout by standing with their weapon held vertically in front of their face. They also salute the referees and spectators. After the bout, the opponents will salute each other again and shake hands with their unarmed hand.

TECHNIQUES AND TACTICS

Fencing techniques focus on scoring successful touches on the legitimate target areas of the opponent's body. Attacking and defending moves are of equal importance in contests, and a skillful fencer can parry an attack to turn it into an opportunity to launch a counterattack. In contrast to the dramatic gestures and daring attacks often seen in swashbuckling movies, small, precise movements are generally required to avoid (or land) a hit—a surreptitious attack is more difficult to anticipate than a dramatic one.

ATTACK

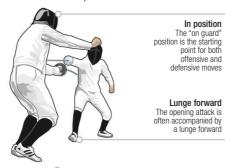
An attack involves extending the sword arm toward the opponent. The arm is extended from the shoulder completely straight, and the attack is made in one fluid movement. A lunge forward will add force to the attack.

PARRY

The parry is a defensive action. This move is designed to deflect or block the opponent's weapon from its intended attacking course. Parries are named after the target position at which they take place, such as a "quarte" parry.

RIPOSTE

The riposte is the counterattacking follow-up to the parry. Once the opponent's weapon is deflected by the parry, this leaves a space open for the defender to make an attack of their own. The riposte can be made directly after the parry or can be delayed.



Blade deflection

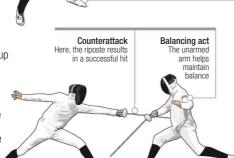
opponent's blade

Overexposure

The attacking fencer is now exposed to

any counterattack

The parry deflects the



INSIDE STORY

Fencing evolved from an ancient form of combat practiced by the ancient Egyptians and Romans, although the current rules and regulations are loosely based on the conventions developed in Europe in the 18th and 19th centuries. Fencing's governing body is the Fédération Internationale d'Escrime (FIE), which was established in Paris in 1913 to standardize the rules that made international fencing tournaments possible. The FIE organizes World Championships that take place every year apart from Olympic years. Fencing has been an Olympic sport since the first modern Olympics in 1896, with the first women's event appearing in 1924.

Founded in 1913 and with headquarters in Lausanne, Switzerland, the Fédération Internationale d'Escrime (International Fencing Federation) is the organization responsible for setting the rules and regulations for international contests. There are currently 153 affiliated national fencing federations.

FOILED AGAIN

TENSIONS RAN SO HIGH AT THE 1924 OLYMPICS THAT AN ACTUAL **DUEL WAS FOUGHT BETWEEN** SPARRING COMPETITORS. AFTER JUST TWO MINUTES, BLOOD WAS DRAWN-AND HONOR RESTORED.

STAT CENTRAL

OLYMPIC MEN'S FOIL CHAMPIONS COUNTRY YEAR NAME **DANIELE GAROZZO** 2016 (ITA) 2012 LEI SHENG (CHN) BENJAMIN KLEIBRINK (GER) 2008 2004 **BRICE GUYART** (FRA) KIM YOUNG-HO (KOR) ALESSANDRO PUCCINI (ITA) 1996

NAME	
NAME	COUNTRY
INNA DERIGLAZOVA	(RUS)
ELISA DI FRANCISCA	(ITA)
VALENTINA VEZZALI	(ITA)
VALENTINA VEZZALI	(ITA)
VALENTINA VEZZALI	(ITA)
LAURA BADEA	(ROM)
	INNA DERIGLAZOVA ELISA DI FRANCISCA VALENTINA VEZZALI VALENTINA VEZZALI VALENTINA VEZZALI

OLYMPIC MEN'S ÉPÉE CHAMPIONS		
YEAR	NAME	COUNTRY
2016	SANGYOUNG PARK	(KOR)
2012	RUBEN LIMARDO	(VEN)
2008	MATTEO TAGLIARIOL	(SUI)
2004	MARCEL FISCHER	(SUI)
2000	PAVEL KOLOBKOV	(RUS)
1996	ALEKSANDR BEKETOV	(RUS)

OLYMPIC WOMEN'S ÉPÉE CHAMPIONS		
YEAR	NAME	COUNTRY
2016	EMESE SZÁSZ	(HUN)
2012	YANA SHEMYAKINA	(UKR)
2008	BRITTA HEIDEMANN	(GER)
2004	TIMEA NAGY	(HUN)
2000	TIMEA NAGY	(HUN)
1996	LAURA FLESSEL	(FRA)

OLYMPIC MEN'S SABER CHAMPIONS		
YEAR	NAME	COUNTRY
2016	ARON SZILAGYI	(HUN)
2012	ARON SZILAGYI	(HUN)
2008	ZHONG MAN	(CHI)
2004	ALDO MONTANO	(ITA)
2000	MIHAI CLAUDIU COVALIU	(ROM)
1996	STANISLAV POZDNIAKOV	(RUS)

OLYMPIC WOMEN'S SABER CHAMPIONS		
YEAR	NAME	COUNTRY
2016	YANA EGORIAN	(RUS)
2012	KIM JIYON	(KOR)
2008	MARIEL ZAGUNIS	(USA)
2004	MARIEL ZAGUNIS	(USA)
2000	COMPETITION NOT HELD	
1996	COMPETITION NOT HELD	

NEED2KNOW

- Freestyle sparring, or randori, is the best way to learn the techniques and tactics of judo. This form of training is considered to be the most effective way to improve muscle strength and cardiovascular fitness, speed up reaction time, and hone the skills needed to resist an opponent's attack.
- Strangulation and choking are some of the most effective techniques in judo. Strangulation cuts off the blood supply to the brain at the carotid arteries at the sides of the neck, while choking blocks the passage of air at the front of the neck. Both may render an opponent unconscious in seconds.
- The Kodokan Judo Institute in Tokyo, Japan, is the spiritual home of judo. It was founded by Jigoro Kano (1860-1938), creator of judo, in 1882.

وولاا

GAME OVERVIEW

Judo developed in the 19th century from the teachings of Jigoro Kano of Japan. Based on the centuries-old techniques of ju-jitsu, this unarmed combat sport forbids any form of punching or kicking. Instead, the aim is to score an ippon—the equivalent of a knockout punch—by throwing an opponent to the ground, pinning an opponent down, or forcing a submission using an armlock or choke.

FIELD OF PLAY

The size of the competition area conforms to the rules of the International Judo Federation (IJF). The floor is covered with protective mats called tatami, which usually measure 6 ft 3 in x 3 ft 1 in and cushion the impact of throws. Traditionally, tatami are made from pressed straw, but pressed foam is more common today. Most competitions take place within a contest area that measures 26 x 26 ft (8 x 8 m), although an area up to 33 x 33 ft (10 x 10 m) is allowed. IJF rules also require a safety area of 10 ft (3 m). The contest area and safety area are together known as the field of play.



In international competitions, the judoka wears a blue or white jacket, called a uwagi made from heavyweight cotton. The size and fit must conform to the sport's regulations

The referee stands within the contest area and shouts "Hajime!" to start the fight. The referee judges the fight and signals his scores to the with the two corner judges to come to a decision

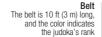


scorers. If there is a dispute, the referee will consult

Identifying colors In competition, the color of the tatami that make up the contest area is different from those that make up the safety area. Any color combination can be used

Safety area

The safety area is a 10 ft (3 m) wide border that encloses the danger area. The safety area is not completely out of bounds. A judoka may throw his or her opponent into the safety area and still score points if a step is taken into the safety area after the throw. But an automatic penalty is given if a judoka intentionally steps out of the competition area



PLAYER PROFILE

Anyone can practice judo. There are different weight classes, so there are no size restrictions, and it is open to both sexes. Strength is vital, but agility and flexibility are equally important.

SIDELINES

The official number of throws in Kodokan judo.

Judoka ranked at 10th dan in 2013, worldwide.

200 The number of national federations affiliated with the sport's official governing body, the International Judo Federation.

The age of Jigora Kano when he died in 1938.

The number of judo weight categories in the Olympics.

The average number of seconds it takes a person to fall unconscious when placed in a chokehold.





BELT SYSTEM

The color of a judoka's belt corresponds to his or her rank within the kyu-dan grading system. Traditionally, there are six student grades (or dan), or kyu. In western judo, they have the following belt colors: white (sixth kyu), yellow (fifth kyu), orange (fourth kyu), green (third kyu), blue (second kyu), and brown (first kyu). Some countries have extra kyu and belt colors, while in Japan, judoka usually wear a white belt up to the rank of first kyu. The belt colors of the 12 advanced grades are much more consistent. Judoka from the first five dan wear a black belt. Judoka from sixth dan to eighth dan wear belts with alternating white and red (or black) panels. Solid red (or black) belts are accorded to judoka up to eleventh dan, while the belt for the highest rank, twelfth dan, is a wider version of the simple white belt of a beginner.

The scoreboard displays the stopclock and the points and penalties accumulated by each judoka during the fight. Judo has three scores, which are shown at the top of the scoreboard below (from left to right): "I" stands for ippon, "W" stands for waza-ari, and "Y" stands for yuko. Judo has two penalties, which are shown by the red light next to the letters in the center of the scoreboard. "H" stands for hansokumake (immediate disqualification), and "S" stands for shido. If a judoka is awarded four shidos, the result is a hansokumake and the judoka is disqualified.



There are two timekeepers. One records the time for the contest. The other specializes in "osaekomi," the referee's command to begin timing a hold

Scorers

The scorer and contest recorder keep a written record of the score and the overall course of each fight

White

SCOREBOARD

The judoka in white scored an ippon to win the match. The scoreboard shows three penalties (shido) against white

Stopclock

The time limit for international competition is five minutes for men and four minutes for women

Blue

The judoka in blue scored two yukos and one waza-ari. There is one shido against blue



SCOREBOARD

Scores are shown on an electronic display. The scoreboard also shows the penalties awarded against each judoka.



Corner judge

Two corner judges sit at opposite corners of the contest area. The main responsibility is to check that the fight remains within the contest area. If the referee disputes a call, all three officials vote to decide on the outcome

THE GENTLE WAY

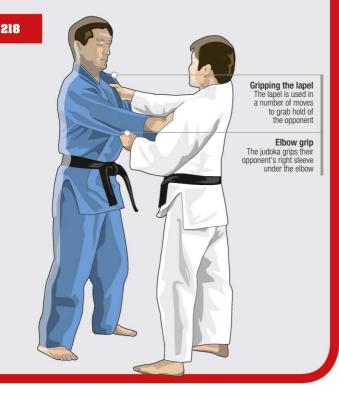
JUDO IS JAPANESE FOR "GENTLE WAY" AND REFERS TO THE AIM OF TURNING AN OPPONENT'S STRENGTH TO YOUR OWN ADVANTAGE. THE GOAL OF A JUDOKA IS TO UPSET THE OPPONENT'S BALANCE AND MOMENTUM TO ACHIEVE FORCEFUL THROWS WITH MINIMUM EFFORT.

Judoka

In competition, the first judoka called to fight wears a blue judogi. His or her opponent wears a white judogi. At the beginning and end of the contest, each contestant stands on the mark that corresponds to the color of his or her judogi and bows as a sign of respect. Both contestants return to their marks if the referee shouts "Mattel" during a fight

BASIC JUDO GRIP

The basic judo grip is the sleeve and lapel grip. This involves gripping the lapel of the opponent's uwagi with the right hand and using the left hand to grip the opponent's right sleeve under the elbow. The basic grip is an excellent starting point for throws.



0-GOSHI

The o-goshi is one of the traditional throws developed by judo's founding father, Jigoro Kano. It is classified as a hip-throwing technique, or koshi-waza. A hip throw uses the hip as a pivot point to throw the opponent to the floor. There are several types of hip throws. O-goshi is one of the first throws a judoka will learn.

TOMOE NAGE

Some throwing techniques, called sacrifice throws, or sutemi-waza, are dangerous to execute because the thrower is positioned on the ground. One of these is the tomoe nage, or circle throw, which uses a foot planted on the stomach or thigh to throw the opponent over the head or shoulders.



High flying The opponent is launched into the air over the thrower, who is on the floor Foot to stomach The thrower plants their foot into the opponent's stomach as leverage for the throw

RULES AND REGULATIONS

Judo is governed by the rules of the International Judo Federation (IJF). Recent rule books show a trend toward a dynamic style of judo—a defensive style is heavily penalized.

IPPON, WAZA-ARI, YOKO, KOKA

There are four ways to score in a judo contest. A judoka can win the fight outright by scoring an ippon or by scoring two waza-aris, which is the equivalent of an ippon. Lesser scores include the yoko and koka. If the time limit passes before an ippon is scored, the number of lesser scores is taken into consideration.

PENALTIES

Judoka are expected to fight fairly and in the spirit of the sport. Foul play is heavily penalized. The four levels of punishment are: first shido (known simply as shido), second shido (chui), third shido (keikoku), and hansokukame (disqualification). Penalties are cumulative and result in the next higher penalty, so a judoka who commits four relatively minor violations may be disqualified.

TECHNIQUES AND TACTICS

There are two main phases of combat in judo. During the standing phase (tachi-waza), the goal is to throw your opponent onto their back using control, force, and speed. During the ground phase (ne-waza), the goal is to pin your opponent onto the ground or force a submission.

THROWS

A judoka uses a variety of throwing techniques (nage-waza) to force an opponent onto the ground. A judoka can score an ippon and win the fight outright by executing a powerful and controlled throw to force the opponent onto his or her back. In competition, however, judoka are evenly matched, so a throw will usually score a koka, yoko, or waza-ari.

IPPON SEOINAGE

The ippon seoinage is the most common throw encountered in elite judo competition. It is classified as a hand-throwing technique, or te-waza. Ippon seoinage involves throwing an opponent over the shoulder and onto the floor. It has been likened to throwing a sack of rice over the shoulder.



Sack of rice Gripping the elbow sleeve, the opponent is thrown over the shoulder and then forced to the floor

Flexible knees
The thrower's knees
are bent and flexible
to add momentum
to the throw

OSOTO GARI

The osoto gari is another of the original judo throws used by Jigoro Kano. It is classified as a foot-throwing technique, or ashi-waza. This type of throw involves using one of the legs to sweep away one of the opponent's legs. An effective osoto gari pinpoints the load-bearing leg so that the opponent falls over.



Getting a grip
The thrower grasps
the sleeve at the
elbow and the jacket

Leg sweep The opponent's leg is swept up, throwing them off balance

SIDELINES

The number of points awarded for throwing an opponent on their back without control and force.

The number of main phases of combat: the standing (tachi-waza) and the ground (ne-waza) phase.

The number of phases in throwing technique: off-balancing, body positioning, execution, and finish.

The number of seconds an opponent must be held or pinned down to the floor in order to win a match.

A pinning hold (osaekomi-waza) is a grappling technique that aims to hold the opponent on the ground. Osaekomi, in which both shoulders touch the ground for more than 25 seconds. results in an ippon. For holds of shorter durations, a judoka may score a waza-ari (20-24 seconds), yoko (15-19 seconds), or koka (10-14 seconds).



KESA GATAME

Many judo throws end with kesa gatame in the ground phase, since the basic judo grip already has one hand on the opponent's lapel and one hand near the opponent's elbow.

SAMURAI SPORT

JUDO IS DERIVED PARTLY FROM JU-JITSU, THE HAND-TO-HAND COMBAT TECHNIQUE USED BY SAMURAI WARRIORS. IT IS THE ONLY OLYMPIC SPORT WHERE SUBMISSION HOLDS ALLOW CHOKING AN OPPONENT OR BREAKING THEIR ARM.

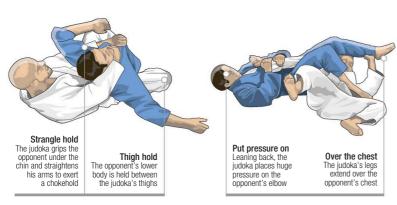


YOKO-SHIHO GATAME

This osaekomi holds the opponent's neck and leg while laying on their chest. One hand wraps around the neck and grips the lapel. The other passes through the legs and grips the belt at the back.

SUBMISSIONS

A submission is achieved through a joint lock (kansetsu-waza) or strangulation (shime-waza). For reasons of safety, arm locks are the only kansetsu-waza allowed in competition. Strangulations are equally dangerous, and the use of shime-waza is usually restricted to age and rank in competitive judo.



OKURI-ERI-JIME

The judoka slides one hand under the opponent's armpit and grips the opposite lapel. At the same time, the judoka wraps the other arm around the neck and slides the hand up the free lapel.

JUJI GATAME

A powerful joint lock, here the legs end up across the opponent's chest, the arm locked between the thighs. The arm is held with the wrist to the chest. Leaning back places huge pressure on the elbow.

STAT CENTRAL

WEIGHT CATEGORIES	
FEMALE	MALE
+172 lb (+78 kg)	+220 lb (+100 kg)
172 lb (78 kg)	220 lb (100 kg)
154 lb (70 kg)	198 lb (90 kg)
139 lb (63 kg)	179 lb (81 kg)
126 lb (57 kg)	161 lb (73 kg)
114 lb (52 kg)	146 lb (66 kg)
106 lb (48 kg)	132 lb (60 kg)

MEN'S HEAVYWEIGHT OLYMPIC CHAMPIONS		
YEAR	WINNER (NATIONALITY)	
2016	TEDDY RINER (FRA)	
2012	TEDDY RINER (FRA)	
2008	SATOSHI ISHII (JAP)	
2004	KEIJI SUZUKI (JAP)	
2000	DAVID DOUILLET (FRA)	
1996	DAVID DOUILLET (FRA)	
1992	DAVID KHAKALESHVILI (EUN)	
1988	HITOSHI SAITO (JAP)	
1984	HITOSHI SAITO (JAP)	
1980	ANGELO PARISI (FRA)	
1976	SERGEI NOVIKOV (USSR)	

WOMEN'S HEAVYWEIGHT OLYMPIC CHAMPIONS		
YEAR	WINNER (NATIONALITY)	
2016	EMILIE ANDEOL (FRA)	
2012	IDALYS OTIZ (CUB)	
2008	TONG WEN (CHI)	
2004	MAKI TSUKABA (JAP)	

INSIDE STORY

Judo was first seen at the Olympics in the 1964 Tokyo Games. It has been a regular Ólympic sport for men since the 1972 Munich Games. Women's judo was included as a demonstration sport in the 1988 Seoul Olympics and became an official Olympic event at the 1992 Barcelona Games. World Championships for men, women, and juniors are held every two years.

GOVERNING BODY

The International Judo Federation (IJF) is the world's governing body for judo. Founded in 1951, the IJF comprises five unions representing Africa, Asia, the Americas, Europe, and Oceania

- Wrestlers are known formally as sumotoris, informally as rikishi.
- From the first bout in Japan in 453 cE until the 1990s, sumo wrestling was a men-only sport, but the International Sumo Federation (IFS) now actively encourages female participation.

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→ The elaborate ceremonies surrounding a sumo contest are derived from Shinto religious practices. The prefight sprinkling of salt on the dohyo, for example, is to ward off evil spirits.

Chon-mage Japanese term for the sumo topknot and hair slicked with oil. The hair is tied to denote rank: the greater the wrestler the more complex the knot

SUMO







SPORT OVERVIEW

Sumo wrestlers attempt to throw their opponent either out of the ring or off balance so that he has to touch the ground with some other part of the body than his feet. Many matches last no longer than a few seconds, but the techniques, tactics. and rituals are endlessly fascinating to millions. Sumo originated in China in the 3rd century BCE, and was practiced almost exclusively in Japan until the 20th century, when its popularity spread worldwide.

Mawashi

This thick belt is made of a band of silk about 32 ft (10 m) long wound repeatedly around the wrestler's midriff and secured between his leas

Raised leg

This ritual precombat gesture is a show of strength

Four corners The four corners may be decorated to symbolize the seasons of the year

Gable roof The structure is oriented Rikishi always enter from east or west

In suspense The tsuriyane is hung from the roof on ropes, wires, or poles



TSURIYANE CANOPY

The overhead structure above the dais on which the combat takes place is known as a "tsuriyane" (canopy). It traditionally resembles the roof of a Shinto shrine, but in some modern arenas, it may be no more than a sheet of plexiglass.

COMBAT ZONE

Sumo bouts are played on a dohyo, a raised square platform within which a circular combat area is marked. The area is regarded as sacred to the spirits of the Shinto religion. A new dohyo is built for every major tournament. The edges of the circle are sprinkled with sand to help the referee see when a wrestler touches the perimeter.

Judges

Four judges are positioned around the dohyo. The gyoji refers to them if he cannot decide a winner himself

18#9in (5.7 m)

Combat area A circular clay

surface is covered with sand; it is set on a raised platform 13-24 in (34-60 cm) above the around

The Japanese term for referee He wears a samurai kimono and a hat similar to that worn by medieval Shinto priests. He also carries the battle fan of Japanese generals

PLAYER PROFILE

Sumo wrestlers must weigh more than 154 lb (69 kg) and be over 5 ft 7 in (1.7 m) tall. Although many of the most famous wrestlers are huge men with enormous torsos and low centers of gravity, small and skillful combatants can often overcome much

Step to raised dias This feature enables the referee and the wrestlers to mount the dohyo elegantly

Combatants square up behind these marks before the initial clinch

Parallel lines Water

For refreshment before the bout and at breaks during it

bigger opponents.

Sagari Decorative silk tassels adorn the lower edge of the mawashi

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LAWS

At the start of a bout, each wrestler claps his hands to show that he is not holding anything. Once battle commences, the first wrestler to go down is the loser. If both wrestlers fall simultaneously, the referee or the judges may award the bout to either fighter if, in their view, the other had no chance of winning. Punching, kicking, choking, going for the eyes or stomach, pulling hair, and hitting below the belt are all prohibited and punishable by disqualification.

SUMO STYLES

There are two main styles of sumo wrestling: oshi-zumo and yotsu-zumo. In the former, also known as "fighting apart," the aim is to push the opponent out of the ring, often by using his own weight to his disadvantage. In yotsu-zumo, the objective is to get ahold of the opponent's belt, then carry him out or throw him down. Specific techniques are shown below.

Handling charge Grab the mawashi and start moving

YORIKI UWAT

This move involves seizing the opponent's belt and attempting to march him out of the ring.

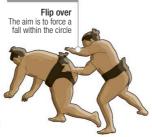


HATAKIKOMI

As one wrestler charges, the other sidesteps and slaps the opponent's back or arm, pushing him over.

UWATENAGE

Gripping the mawashi, the sumotori pulls his opponent down while turning his own upper body.



OKURITAOSHI

The rear push-down: the wrestler attacks from behind and forces the opponent to the ground.

RANKING SYSTEM

Sumo wrestlers have a strict pecking order; their rankings rise in victory and fall in defeat. The exceptions are those in the highest echelon, the yokozuna, who generally retire rather than decline. Juryo wrestlers and those ranked above are entitled to wear kesho mawashi (ceremonial silk aprons).

YOKOZUNA The highest level a sumo wrestler can achieve; there are usually no more than two at any one time, and there have only been 72 in the entire history of the sport.

OZEKI The honorary title given to any winner of 33 bouts over three consecutive fournaments.

SEKIWAKE Usually between three and five per tournament.
KOMUSUBI Again, usually three to five per tournament.
MAEGASHIRA The lowest elite echelon; usually number about 120.
JURYO A group of 28 wrestlers of approximately equal ability.
MAKUSHITA Apprentices who are learning from the grade above them; there are usually about 120 of them.



YORITAOSHI

The frontal crush-out: the opponent is driven backward and collapses under the force of the attack.



OSHIDASHI

Frontal push-out: the attacker shoves the opponent out of the ring without gripping the mawashi.



OKURIDASHI

The rear push-out: wrestlers often become victims of this move after an attack of their own has gone wrong.



TSUKIDASHI

The attacker drives his opponent out of the ring with a rhythmic thrusting motion.

SIDELINES

The weight, in pounds (133 kg), of Ōrora Satoshi, the heaviest wrestler in sumo history. Born Anatoliy Valeryevich Mihahanov in 1983, he became the first Russian to enter professional sumo. He retired in 2018.

The approximate number of full-time professional sumo wrestlers across the six divisions. Most are Japanese, although several other nationalities are also represented.

34,000,000 The annual fight money, in Japanese yen, earned by leading sumotori (about \$284,000). Some sumo stars supplement these basic earnings by sponsoring commercial products and making personal appearances.

INSIDE STORY

In the modern sport of sumo wrestling, the most prestigious events are the Grand Sumo tournaments. Six of them are held each year—three in Tokyo and one each in Osaka, Nagoya, and Fukuoka. Each of the tournaments lasts 15 days and is watched by millions of television viewers. Wrestlers may be promoted or demoted from one rank to another as a result of their performances at these events. From its historical stronghold in Japan, sumo wrestling spread to many other parts of the world during the second half of the 20th century; it is now firmly established in 87 other countries, including the United States and 24 European nations.

INTERNATIONAL SUMO FEDERATION

The world governing body is still based in Tokyo, and most of the administrators are Japanese.









ESTLING

NEED2KNOW

> Wrestling is enjoyed around the world and is particularly popular in the United States, southeastern Europe, and West and Central Asia.

As well as Greco-Roman and freestyle wrestling, many local forms exist, such as glima in Iceland, kushti in Iran, schwingen in Switzerland, yagli in Turkey, and sombo in Russia.

EVENT OVERVIEW

Wrestling is a combat sport in which players try to grapple their opponents to the ground using a variety of holds. It demands concentration and strategy, in addition to strength. The two main variations are freestyle—the more popular form—and Greco-Roman wrestling. Women's wrestling is also popular in some countries, such as the United States.

COMPETITOR PROFILE

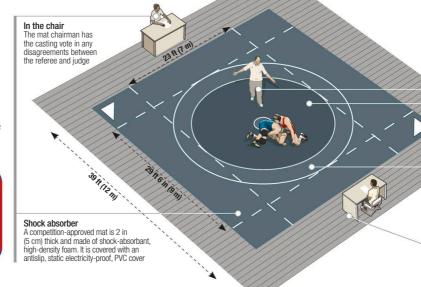
Wrestlers must be physically strong and quick on their feet. Training involves weights and A women's freestyle world championship distance running to build up strength and was introduced in 1987. stamina. Wrestlers also spend long periods rehearsing moves with sparring partners. Color coded Wrestlers wear different-colored singlets in each bout: one contestant wears red, the other blue Ankle support Rubber soled boots come up over the ankles to help prevent twists and sprains Knee quards Skull cap Knee guards give A head guard is not required, but support to the joints many wrestlers wear them to reduce the risk of damage to ear which take a lot of pressure, and lobes during close encounters prevent grazing

COMBAT AREA

The wrestling area must be marked as shown. The surface, made of rubber, should be raised no more than 3 ft 7 in (1.1 m) above the floor. In opposite corners are red and blue triangles that mark the wrestlers' bases at the start of the bout. Matches are observed by a referee, who joins the wrestlers on the mat so that he can study every move at close proximity. On the sidelines sit a judge and a third official known as the mat chairman. They may stop the bout if they notice an infringement that the referee has missed.

MARKING TIME

In freestyle wrestling, a pin (fall) ends a match. It must be held for about a second to score—the time it takes the referee to count "21, 22," which he does in French ("vingt-et-un, vingt-deux"). A wrestler with a six-point lead is awarded that period of the bout.



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RULES OF ENGAGEMENT

Bouts are divided into two three-minute periods, with a third period—known as the clinch—to settle ties. If a wrestler pins both his opponent's shoulders to the ground, he wins outright. More often, the bout goes to the wrestler with the higher score. Points from 1 to 5, according to the move, are awarded by the officials for throws and getting an opponent to the floorparticularly in the "danger position," with his back close to the mat, from where a pin may be easily possible.

GETTING TO GRIPS WITH IT

In Greco-Roman, wrestling only the upper body is involved; the legs may never hold or be held. Freestyle is more of an "anything goes" event—even crotch holds are permitted.

STARTING POSITIONS

The players are called from their corners by the referee, who checks that their clothing has no sharp attachments and that their fingernails are not too long. They then salute each other and shake hands before the start of the bout.

FREESTYLE TAKEDOWN

Although the arms play a significant role in freestyle wrestling, both during and after the initial grapple, leg holds normally dominate. Most of a bout is fought with both players on the mat. The double-lea takedown is a common way to get an opponent to the floor.



The wrestler starts the move by going down on one knee as he advances toward his opponent.



He then drops onto both knees and grabs the opponent's leas behind the knees for leverage.

Tight grip

may turn on him



Maintaining his grip, the attacker then twists and begins to get his legs around those of the other wrestler.



DROP

The attacker keeps ahold of the opponent after he hits the floor and should be in the better position.

pin an opponent from this position,

but the attacking wrestler has the

GRECO-ROMAN **GRAPPLE**

There are two categories of Greco-Roman holds: standing holds and mat holds. One exciting move is the shoulder throw, shown here. Also dramatic are head and hip tosses, which require strength, timing, and the agility to get out of the other wrestler's way as he or she falls.



START

Approaching from the side, the attacker grabs his opponent around the chest.



LIFT-OFF

Having gained a hold, the attacker lifts the other wrestler up, using his thighs and back.



PITCH

Keeping his feet on the floor, the attacker leans back and pulls the opponent over.



Possible pin

LAND LOCK

The attacker maintains his chest hold until the other wrestler is doubled up on the mat.

Protection area

The bout is stopped if a wrestler touches this zone with any part of his body

Wristy ref

The referee wears a red cuff on one arm and a blue cuff on the other; he shows points awarded to each wrestler by raising fingers on the appropriate hand

Wrestling area

The bout begins with the wrestlers facing each other on opposite sides of the inner circle

Passivity zone

A 3 ft 3 in (1 m) circle warns wrestlers that they are near the edge of the wrestling zone. They can fight here but not begin moves

The judge records the scores he awards and also those signaled by the referee

INSIDE STORY

Wrestling has been a medal sport at every modern Olympic Games since 1896. Women first competed at the Olympics in 2004. Professional wrestling emerged in the United States in the early 20th century. The eventual result was the creation in 1963 of what became the World Wrestling Federation, or WWF (now World Wrestling Entertainment, WWE). The WWF oversaw the 1980s' and 1990s' heyday of events such as Wrestlemania, theatrical star-studded bouts that owed as much to entertainment as to sport.

GOVERNING BODY

The Fédération Internationale des Luttes Associées (FILA) was set up shortly before the opening of the Stockholm Olympics in 1912. In 1946, it relocated to France. In 1965, it moved to its current home in Lausanne, Switzerland. The organization currently has 176 affiliated national federations.

STAT CENTRAL

WEIGHT DIVISIONS (MEN)		
DIVISION	WEIGHT (MAX. WEIGHT)	
SUPER HEAVYWEIGHT	211–264 LB (96–120 KG)	
HEAVYWEIGHT	211 LB (96 KG)	
MIDDLEWEIGHT	185 LB (84 KG)	
WELTERWEIGHT	163 LB (74 KG)	
LIGHTWEIGHT	145 LB (66 KG)	
BANTAMWEIGHT	132 LB (60 KG)	
FLYWEIGHT	121 LB (50–55 KG)	

TV TIMES

THE 1970S AND '80S SAW BRITISH WRESTLING AT ITS PEAK, WITH MILLIONS TUNING IN EVERY SATURDAY.

- Karate is the most widely practiced of all the Asian martial arts. There are more than 70 different styles.
- Karate and kickboxing are guite closely related and for many years the same governing bodies oversaw both sports.
- Karate began in Okinawa in the 17th century. Funakoshi Gichin, who created the Shotokan style in the 20th century, is considered the father of modern karate



opponent using the ball of the foot or the instep. First extending the knee and then snapping through the lower

Loose fit

Foot strikes Kicks should strike the

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The uniform must be light and loose fitting to give a full range of movement, including high kicks and low sweeps

SIDELINES

The number of competitors taking part in the 1st World Championships held in Tokyo in 1970. The competitors at the 2018 World Championships in Madrid, Spain, numbered more than 1,000.

The number of cement slabs broken by Bruce Haynes, an 8th-dan black belt and champion of tamashiwari. This karate art literally means "trial by wood" but has become the art of breaking objects with a single blow from a bare hand.

50,000,000

The estimated total number of individual members belonging to clubs, associations. and groups affiliated to the World Karate Federation (WKF).

SPORT OVERVIEW

Karate is a Japanese martial art that literally means "empty hand." Derived from Chinese combat techniques, karate uses the arms, hands, elbows, knees, feet, and head. Its key tenets are self-defense, physical fitness, and spiritual awareness, which karate practitioners (known as karateka) traditionally use for self-development. As pupils, they learn the basic techniques of breathing, kicking, punching, and blocking and the various stances that provide a platform for stability or mobility. Karate's three main elements are kata (a series of moves), kumite (sparring with a partner), and kobodo (weapons forms). In the 1970s and '80s, karate became competitive and eventually evolved into a sport with world championships.









KARATE



contest begins

Colored belt

The color of the karateka's belt indicates the level of proficiency

Balancing act

Achieving good balance is fundamental to all martial arts. If a karateka's stance is poor and not well rooted, he or she will be easy to knock down or throw

SUPERFOOT

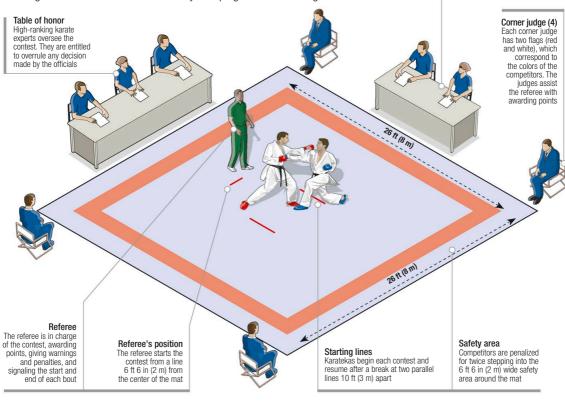
BILL "SUPERFOOT" WALLACE WAS ONE OF THE WORLD'S LEADING PROPONENTS OF KARATE AND KICKBOXING IN THE 1970S, WINNING 23 CONSECUTIVE FIGHTS BETWEEN 1974 AND 1980. WALLACE FOCUSED ON BUILDING MUSCLE IN HIS LEFT LEG AFTER A JUDO INJURY TO HIS RIGHT KNEE. HIS NICKNAME DERIVED FROM THE PRODIGIOUS POWER OF HIS LEFT LEG AND THE SPEED WITH WHICH HE COULD STRIKE. DURING TRIALS, THIS WAS CLOCKED AT 60 MPH (90 KPH).



AREA OF COMBAT

Kumite (sparring) matches are held on a square mat surrounded by a number of officials who ensure the contestants do not break the rules and are awarded the points for displaying the correct techniques. The karate rules of etiquette and respect are followed—for example, contestants bow to each other before the start of a bout by bending forward from the waist but always keeping alert and looking ahead.

Scorer and timekeeper
The scorer keeps track of
the points awarded by the
referee; the timekeeper stops
and starts the clock at the
referee's signal



KARATE GEAR

A karateka wears a white uniform, or gi, made up of a iacket, pants, and belt (see left). Like the judo uniform, the karate gi is cut from a canvasstyle cloth that can stand up to a considerable amount of wear and does not restrict the mobility of the karateka. The gi may be light, medium, or heavy. Karateka usually wear protective gear—men wear an athletic cup to protect their groin and women use a bust protector. Other gear, such as padded mitts, gloves, shin guards, foot protectors, shoes, and mouth guards, are also permitted.



Karate gloves Some kumite competitions allow the use of gloves with closed finger design for semicontact sparring



THE KARATE CODE

Karate has a dojo kun, a set of guidelines that karetekas follow in their everyday lives and in the room, or dojo, in which karate is taught. This karate code can be summarized by five commands: • Seek perfection of character • Be faithful • Endeavor • Respect others • Refrain from violent behavior

COLORED BELTS

Levels of proficiency in karate are normally indicated by the color of the karateka's belt, or obi. Several elements in the student's abilities are evaluated when progressing from one grade to the next, including knowledge and mastery of techniques, as well as kata and kumite. The higher the grade, the more extensive the requirements. The number and color of gradings vary between karate styles, but white is always the most basic grading and brown the highest kyu (pupil). Black belt is the highest karate grade. Upon attaining black, the pupil becomes a dan (master), although there are up 10 levels of dan.



KARATE STYLES

The Federation of All Japan Karate-do Organizations recognizes four main karate styles—Goju-ryu, Shito-ryu, Shotokan, and Wado-ryu—although there are more than 70 different ones, including Shorin-ryu, Uechi-ryu, and Kyokushinkai. Styles that do not belong to one of these schools are not considered to be illegitimate. Most schools are affiliated with or heavily influenced by one or more of these traditional styles.

SHOTOKAN

Shotokan is a school of karate, developed from various martial arts by master Gichin Funakoshi (1868–1957). Techniques in kata are characterized by long, deep stances which provide stable, powerful movements and also help strengthen the legs. Strength and power are demonstrated instead of slower, more flowing motions.

WADO-RYU

After receiving tutelage from Funakoshi and other Okinawan masters, Hironori Otsuka (1892–1982) set off to merge Shindo Yoshin Ryu with Okinawan karate and formed Wado-ryu. The name is translated literally as "harmony."

SHITO-RYU

This was developed in 1931 by Kenwa Mabuni (1889–1952). It is a combination style that attempts to unite the diverse roots of karate.

GOJU-RYU

Using a combination of hard and soft techniques, this style's specialty is close-quarters combat. Major emphasis is given to correct breathing and body conditioning.

RULES OF CONTACT

In kumite, the level of contact varies according to the style and the standard of the karatekas. All techniques must be controlled and executed without excessive force, especially to the head and neck. Attacks to the throat, groin, temples, spine, instep, and back of the head are not allowed, and the referee may award penalties for any foul.

KUMITE

Kumite matches are organized by age, gender, weight, and experience. Each bout is two or three minutes long. Two competitors stand on the starting lines on the mat, bow, and at the referee's signal begin fighting. Kumite bouts feature punching, kicking, knee/elbow strikes, open-handed techniques, locks, throws, and grappling. Karateka issue a loud kiai, or "spirit shout," as they execute a technique. A perfectly delivered strike, blow, or throw receives an ippon, or point. If the strike is slightly flawed, the judge may award a waza-ari, or half point. The first karateka to score three points is the winner of the contest.

NEVER ATTACK FIRST

GICHIN FUNAKOSHI, THE FOUNDER OF SHOTOKAN KARATE, BELIEVED KARATE SHOULD BE A FORM OF DEFENSE ONLY. HE DECLARED "THERE IS NO FIRST ATTACK IN KARATE" BECAUSE IT IS AN ART OF DEFENDING IN WHICH THE ATTACKER ALWAYS LOSES.

SCORING CRITERIA

Scoring in kumite depends on the personal assessment of the referee, who needs to evaluate whether a particular move was delivered from the right distance, as well as being perfect in form, timing, and attitude. The referee also decides if a technique would have been effective in real combat.

REFEREE SIGNALS

During a bout, the referee may use various hand signals as a way of communicating to the karateka and the judges. These include signals for starting, stopping, and resuming the contest, as well as for points awarded, techniques executed simultaneously, fouls committed, and warnings for excessive contact.



AWARDING A POINT

A referee signals that a point (ippon) has been awarded by placing a hand on the opposite shoulder and extending the arm downward at 45° on the side of the scorer.

KATA

In kata, a competitor executes a series of choreographed combat techniques—such as kicks, blocks, punches, and strikes (see right)—against an imaginary opponent. Officials evaluate competence by various criteria: precision, breathing, strength, coordination, rhythm, balance, concentration, and comprehension of movement. As well as individual events, pairs of karateka demonstrate synchronized movements.



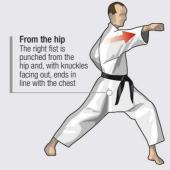
BACK FIST BLOCK

The back fist block (Uraken gamae) in the front stance position ends with the right fist forward at chest height.



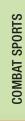
FRONT KICK

In this front kick (Mae geri), the right leg lifts and the foot kicks forward. The right hand stays on the hip, with the elbow in.



REVERSE PUNCH

In the reverse punch (Gyaku zuki), in the front stance position, one fist punches forward as the other goes back to the hip.



PUNCH TO MID



The side kick (Yoko Geri) is one of the most powerful karate kicks, especially when aimed at the ribs or solar plexus. Either the side or the heel of the foot can be used in the kick.

Counternunch

SIDE KICK

A kick to the middle, if properly evaded, can be efficiently countered with a punch to the opponent's midriff

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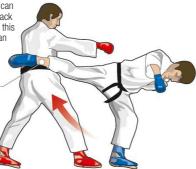
BACK KICK



with the knuckles of the index and middle fingers

Heel first

The strike when performing the back kick should be made with the heel of the foot, with the toes pointing downward

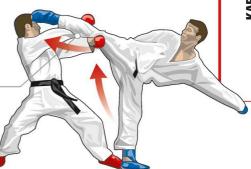


KICK TO HEAD

As the knee comes up. it is twisted sideways and thrust forward at the opponent. At the same time, the body is rotated on the supporting leg.

Leg grab The high kick very quickly, is prone to a





The double punch (Heiko tate zuki) in the front

stance position has both fists forward and the

arms fully extended at chest height.

DOUBLE PUNCH

Fists together The fists are held together with the knuckles facing outward and the thumbs at the ton

on the left hip. and the breath is slowly and strongly exhaled

KNIFE HAND BLOCK

This hand block (Tate shuko uke) is performed in the rooted stance position, and the open right hand is pushed slowly forward at shoulder height.

Open palm

The palm of the

right hand is open

the left fist is kept

Quick fist The left arm straightens as the fist auickly



In the back stance, the crossed arm strike with the right fist (Ura zuki) moves to the side fist strike with the left fist (Mawashi tettsui uchi).



DOUBLE-HANDED BLOCK

This block (Jodan haiwan uke) in the back stance position starts with both fists beside the left hip and ends with both arms raised and forming a rectangle.

INSIDE STORY

The World Karate Federation (WKF) organizes the World Karate Championships every two years. Individual men's events are held in kumite at various weights (-60 kg, -65 kg, -70 kg, -75 kg, -80 kg, and +80 kg) and in kata. Individual women's events are held in kumite at various weights (-53 kg, -60 kg, and +60 kg) and kata. There are also men's and women's team events in both kumite and kata. In addition, the World Union of Karate-do Organizations (WUKO) organizes a World Karate Championships for seniors (between 18 and 35 years of age) and veterans (36 and over), as well as the World Children, Cadets and Juniors Karate Championships.

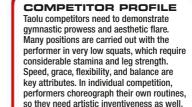
The World Karate Federation was formed in 1990. It is the largest international governing body of sport karate, with 191 member countries, and is the only one recognized by the International Olympic Committee.











- → In China, kung fu is generally known by the term "wushu' and is the country's national sport. Wushu literally means "military arts" or "martial arts."
- → The International Wushu Federation (IWUF) is the governing body for competition taolu, as well as the full-contact sport of sanshou.
- → The types of taolu seen in competition are known as "external" forms, "Internal" forms of taolu are more meditative and reflective. Taiji (tai chi) is a well-known type.

Skilled swordsman Competitors need great mastery of taolu to wield weapons such as the iian in routines

Footwear Lightweight, soft leather shoes are worn during competition

EVENT OVERVIEW

The Chinese art of taolu (forms) was born in 1958 with the establishment of the All-China Wushu Federation. It is a style of kung fu in which competitors perform choreographed routines comprised of basic movements (stances, kicks, punches, balances, jumps, sweeps, and throws) on a padded mat. Performances are judged for artistic merit, much like ice-skating routines or rhythmic gymnastics. Some categories of taolu are performed without weapons (so-called "empty-hand" styles) and some with weapons. Most categories are for solo performers, but some are for pairs or groups.

TAOLU ON FILM

HOLLYWOOD ACTOR JET LI, STAR OF ROMEO MUST DIE. IS THE WORLD'S MOST FAMOUS TAOLU PRACTITIONER, HE WON THE NATIONAL WUSHU CHAMPION OF CHINA TITLE FIVE TIMES.

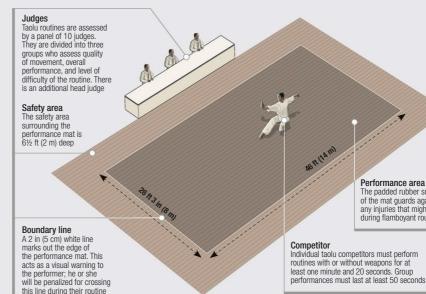
> Performance area The padded rubber surface

of the mat guards against

any injuries that might occur during flamboyant routines

THE FIELD OF PLAY

Taolu competitors perform on a padded mat much like the ones gymnasts use to perform floor exercises. Performances by individual competitors take place on a mat measuring 46 ft x 26 ft 3 in (14 x 8 m). The edge of the mat is marked out by a white border 2 in (5 cm) wide. The mat is surrounded by a 6 ft 6 in (2 m) safety area. Events for pairs or groups of performers are carried out on a larger mat. 52 ft 6 in x 46 ft (16 x 14 m). which is surrounded by a 3 ft (1 m) safety area. The competition area is often set on a raised platform that is 1 ft 6 in-2 ft (50-60 cm) high.



THE WEAPONS

Many of the forms of taolu focus on showing off the dexterity with which the performer handles one of a number of traditional weapons. Choreographed contests between two performers also

take place. HILLI **DAOSHU** Routine performed with a broadsword. JIANSHU Performance with a double-edged sword. 31/4 ft (97 cm) Nandao NANDAOSHU Southern-style broadsword. This type of sword is the TAIJIJIANSHU Taiji sword. Southern broadsword QIANGSHU Spear. **GUNSHU** Staff or cudgel. created in 1992. 31/4 ft (98 cm) This is a single-edged sword described as willow-leaf shaped performed with or without weapons. 31/2 ft (103 cm) The jian is a double-edged straight sword Qiang Gun The qiang is a type The gun is a type of of spear made of wax staff or cudgel made wood. This weapon of wax wood. This is is often practiced in often practiced along Taijijian 31/2 ft (110 cm) conjunction with with the nandao This sword is used in traditional taiji events the iian (sword) (the broadsword) 6 ft (180 cm)

PERFORMING TAOLU

The main taolu events for individuals and groups, performed with and without weapons, are explained below:

CHANGQUAN Long fist; a type of "empty-handed" solo contest derived from northern Shaolin boxing.

NANQUAN Southern fist; a solo contest derived from southern boxing. TAIJIQUAN Shadow boxing; a form of "empty-handed" solo contest.

NANGUNSHU Southern-style staff or cudgel routine. This event was

DUILIAN Choreographed routines for two performers; these may be

JITI Choreographed routines performed by a group, often to music.

OTHER **WEAPONS**

Taolu routines are sometimes performed with more exotic and esoteric weapons than those illustrated, including a three-sectioned staff. a rope dart, and a nine-sectioned whip.

SCORING SYSTEM

Each individual taolu performer starts their routine with 10 points. Five of these points are allocated to quality of movement, three for overall performance, and two for the degree of difficulty of the routine. Each error—whether a divergence from the routine, a stumble, or poor technique—is penalized by the deduction of a point. Group performers are also scored on a 10-point system, split equally between quality of movement and overall performance.

7 ft (210 cm)

TECHNIQUES

Taolu contestants are awarded points for performing moves and maneuvers to a regulated standard; these might include somersaults, kicks, jumps, and balances. Competitions are either in the form of set compulsory routines that all contestants perform or individually choreographed routines. Changguan is considered to be the foundation of taolu and is often the first taolu form that new practitioners learn. Some fundamental changguan stances are described below.

Posture The head and torso are kept in perfect vertical alignment during this stance

SEATED STANCE

Also known as the sitting stance (or chi bu). One thigh is wrapped over the other. The front foot is flat on the floor, while the ball of the back foot is in contact with the floor.



CROUCH STANCE

In Chinese, this is the pu bu, also known as the drop or arrow stance. This is a very low squat where the crouching thigh of the back foot is in contact with the calf.

INSIDE STORY

The governing body of taolu is the International Wushu Federation (IWUF), which was set up in China in 1990. IWUF is currently campaigning to have wushu (both sanshou and taolu) recognized as an official Olympic sport.

CHINESE WUSHU ASSOCIATION

The Chinese Wushu Association was set up in 1958. It is one of 148 national associations under the aegis of the IWUF and is influential because of the art's Chinese origins.



HORSE STANCE

Also known as the horse-riding stance (ma bu in Chinese). The tops of the thighs are parallel to the floor, the knees are turned outward, and the feet point forward.

COMPETITOR **PROFILE**

Sanshou fighters need strength to land blows forcefully on their opponents; speed and agility to move quickly around the fighting area and dodge attacks; and flexibility to execute kicks and leg sweeps.



KUNG FU: SANSHOU

Head protector

to the head are allowed.

fighters wear head guards

for safety

Chest protector

The torso is

protected by a padded

nylon chest

shield

Because blows



SPORT OVERVIEW

Sanshou is a Chinese martial art that resembles kickboxing. Bouts feature two fighters who score points by landing blows on their opponent or knocking them out. Unlike taolu, sanshou is never practiced with weapons.

COMBAT AREA

Sanshou matches take place on a square raised platform called a leitai surrounded by padded mats. The leitai was traditionally 5 ft (1.5 m) above ground level, but lower heights are now more common. It is legitimate to try to force or throw an opponent off the platform. Fighters are penalized if any part of their body crosses the boundary line, which forms a square 3 ft 3 in (1 m) inside the edge of the platform.

the points and penalties awarded. The timekeener times each round and bangs a gong to announce the end of a round Leitai judge The platform judge supervises the fight. He shouts "kaishi!" to start a round and "ting!" to end one Sideline judge There may be three or five of these. Their job is 39 44 11 12 10 to signal if one of the combatants crosses Judges The head judge can the boundary line overrule both the platform judge and the sideline judges. The head judge announces **Boundary line** Fighters are penalized if any part of their body crosses this line during a bout the results of each round

NEED2KNOW

- Sanshou (which translates as "loose hands") was developed by the Chinese army after the Korean War (1950-1953) to improve soldiers' hand-to-hand combat skills.
- Sanshou is not so much a sport as a way of life that demands self-discipline on and off the leitai.

SIDELINES

The number of fighters who were banned from the National Chinese lei tai tournament at Nanking in 1928 for fear of killing other competitors. Lei tai combat was the ancestor of modern sanshou.

The number of Chinese provinces represented by martial arts masters to discuss the new fighting style that would become sanshou.

The number of participants at the 2012 Sanshou World Cup, which was held in the Chinese city of Wuyishan. The competition is separated into 18 different categories, with 11 categories for male fighters and seven

10,000 The prize money, in Chinese Yuan, awarded to the winner of the 2006 World Cup in Xi'an. That's equivalent to \$1,200: Sanshou may be a way of life, but it is not a good way to earn a living.

SANSHOU CAN DO

Competitors fight in one of 10 weight categories. Matches consist of a maximum of three two-minute rounds with one minute's rest in between. (If a fighter wins the first two rounds, he wins outright, and the third round is not contested.) Points can be scored by landing blows with the fists or the feet to the opponent's torso or head, by kicks to the thigh, by knockout, or by making the opponent fall over. Double points are awarded if a fighter makes the opponent fall over while remaining standing himself. Leg sweeps, flying iumps, and grappling are all legitimate moves. Three points are also awarded if the opponent falls off the leitai.

ILLEGAL MOVES

Blows may not be made with the knees or the elbows or by headbutting. Fighters cannot hit opponents in the back of the head, the neck, or the groin. Punches are not allowed below the belt, although blows with the feet can be made to the opponent's upper leg. Groundfighting is not allowed.

METHODOLOGY

Sanshou fighting features many of the tactics and techniques used in other kickboxing-style martial arts—such as punches and kicks—but with the addition of throws and sweeps.

THE KICKING CRAFT

There are several dramatic ways of getting an opponent to the floor. These include the flying scissor-kick, in which one fighter jumps at his opponent, wraps his legs on either side of the opponent's waist, and knocks him to the ground. Leg sweeps are also an effective way of felling an opponent, as shown right. They also allow the fighter to keep his head and torso out of his opponent's reach.

Evasive techniques are also important; combatants must be on their toes at all times other than when they are actually kicking. A sanshou fighter is never more vulnerable than when he just launched an attack into thin air.

FOUR SKILLS

During the Korean War, the Chinese divided the basic skills that proponents should master into four groups: da (striking), which encompasses all blows with the fist, open hand, elbows, fingers, and head; ti (kicking), including sweeping, kneeing, and stomping; shuai (wrestling, throwing, and takedowns); and na (joint locks, chokes, and other submission grips). After the war, some of the more extreme elements were toned down in recognition of the fact that sanshou was now a sport rather than combat, but the broad principles remain central to modern practice.

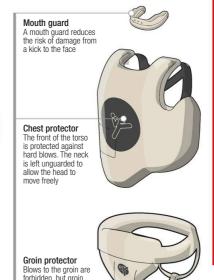
COLOR CODED

During bouts, sanshou fighters wear boxing-style vests and shorts. Boxing gloves soften hard blows from the fist, but fighters are barefoot, affording no protection from kicks. One contestant wears black clothing and the other wears red so the judges can easily distinguish between them. Combatants also wear mouth guards.



COMBAT GEAR

Sanshou is a high-impact, often-violent sport, so fighters are required to wear protection for the chest, head, hands, groin, and mouth.





BACK-SWEEP KICK

The fighter rotates on his front foot so that his back faces his opponent. His back leg sweeps up to his opponent, making contact at chest height with the back of the leg. Unless the opponent anticipates this attack, he will be knocked off balance.



HOOKED-LEG KICK

guards are still essential

In this attacking move, the fighter balances on his left foot, extends his back leg behind him, and sweeps it around in a circular movement, kicking his opponent's front leg from under him and knocking him off balance.

INSIDE STORY

Sanshou's governing body, the International Wushu Federation (IWUF), was established in 1990. It organizes the World Championships of Wushu (covering both sanshou and taolu) every two years. First held in 1991 in Beijing, the championships circled the globe (stopping at, among other places, Baltimore, Hanoi, Rome, and Yerevan) before returning to the Chinese capital in 2007. The first Sanshou World Cup was held in Shanghai in 2002 and is now organized in alternate years to the World Championships of Wushu.

IWUF

The International Wushu Federation was recognized by the International Olympic Committee (IOC) in 2002, but the sport has yet to make its debut as an Olympic event. The headquarters of the IWUF are in Beijing. The IWUF has 152 member nations around the world.

JU-JITSU









SPORT OVERVIEW

Ju-jitsu is an ancient Japanese martial art whose popularity has spread worldwide and developed into different forms. The two versions currently sanctioned by the JJIF, the world governing body, are the fighting system and the duo system. The object of the former is to score points. This can be done by striking them, and—after getting them off balance and onto the mat—forcing a submission. In the duo system, fighters spar using various prearranged moves.

COMPETITOR PROFILE

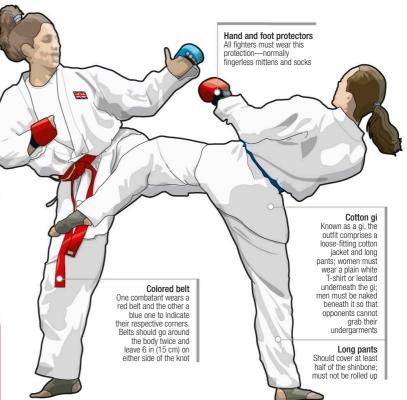
Fighters must have speed of movement, good balance, and strength, especially in the grip. Joints need to be as flexible as possible, both to deliver attacks and—since many of the blows are directed at the shoulders, elbows, and knees—to receive them. And, of course, technical ability is crucial.

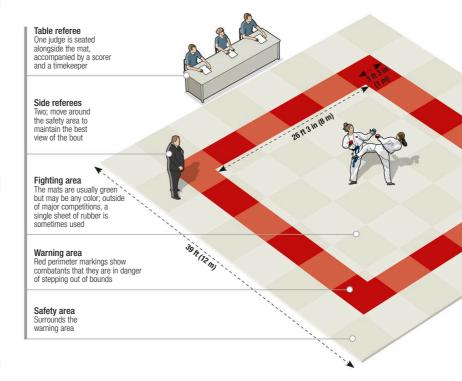
COMBAT AREA

The entire combat zone, including the warning area, is known as the competition area. It is usually 32 ft 6 in (10 m) square, although some national and international tournaments take place on smaller fighting areas measuring 19 ft 6 in (6 m) square. In major competitions, the surface is made of traditional woven straw mats known as tatami.

NEED2KNOW

- Ju-jitsu comes from two Japanese words: "ju" means "gentleness" and "jitsu" is "art."
- As the sport spread across the world, teachers developed their own schools, known as "ryu."
- Telling someone that you practice ju-jitsu is too vague to be very helpful; there are so many different varieties of the art that you need to be more specific.





SIDELINES

The number of basic states of mind that are traditionally regarded as essential for excellence at the art of ju-jitsu. They are zanshin (power), fudoshin (preparation), and mushin

The total number of national bodies affiliated with the Ju-iitsu International Federation.

The period, in years, since the first Japanese ju-jitsu school was founded by Prince Teijun.

RULES OF ENGAGEMENT

The requirements for victory vary according to the rvu, or school of ju-jitsu. In JJIF competitions, there are two main sets of rules, as follows.

FIGHTING SYSTEM

The winner is the combatant who first scores an ippon (point) in each of three categories: in the striking section, a clean punch or kick; in the throwing section, a clean takedown; and in the groundwork section, a submission.

DUO SYSTEM

In this modified form of ju-jitsu, before each stage of the contest, the referee calls out a number that corresponds to one of 20 authorized moves. One competitor attacks and the other defends. For example, the offensive player may be called on to attempt a stranglehold; meanwhile, the defender is given the objective of countering with a throw. (Avoiding the attack is not enough.) Marks are awarded for technique and speed.

POINTED MANEUVERS

Ju-iitsu originated as a philosophy and a way of life; it has only comparatively recently become a sport. Hence, many of the point-scoring techniques have been contrived so that they can be judged by set criteria.

FIGHTING SKILLS

The illustrations below show one possible way of scoring an ippon in each of the categories under the fighting system. Ju-jitsu is classified as a martial art, but injuring the opponent has no part of it. Fighters who have gained an advantage need not—in fact, must not—drive it home; they have already proved their point and scored their ippon.

STRIKE

The fighter on the left aims to land a foot or hand on the body of the opponent, who takes evasive measures and aims to turn defense into counterattack. Pivotal moment The standing leg must be braced with the foot firmly grounded and balanced on the mat



TAKEDOWN

The attacker puts one hand around the opponent's shoulder and the other around his torso, then swivels his own upper body to push him across his thigh and onto the mat.

Role reversal

The man on top may appear to be in control. but he is about to be thrown onto the mat



SURMISSION

One fighter puts the other in an armlock: when the latter can stand the pain no longer, he or she will tap on the mat with the free hand to indicate submission.



uses both hands to twist the opponent's arm to the limit



DUO THROW

When the referee calls the number that corresponds to the shoulder throw, the designated attacker moves in from behind and puts his or her arm around the opponent's neck. That the defender counterattacks is not in doubt; what counts is the way he or she does it. Here, the defender throws the attacker in the manner shown.



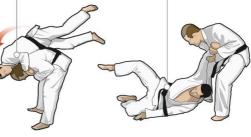












SHERLOCK HOLMES

IN ARTHUR CONAN DOYLE'S 1893 THRILLER "THE ADVENTURE OF THE EMPTY HOUSE," SHERLOCK HOLMES USES JU-JITSU TO SAVE HIMSELF FROM CERTAIN DEATH AT THE HANDS OF HIS ARCHENEMY, PROFESSOR MORIARTY. DOYLE HAD PROBABLY BEEN INFLUENCED BY THE RECENT ESTABLISHMENT OF THE BRITISH JU-JITSU SOCIETY.

INSIDE STORY

At the start of the 21st century, ju-jitsu's biggest growth area was in Brazil, where there were three types of contests: sport ju-jitsu, in which no strikes are allowed; submission wrestling, which is similar except that the fighters wear shorts rather than conventional gi; and, most popular of all, vale tudo contests (straight fights with few rules). These forms of the sport are outside the control of the JJIF.

JU-JITSU INTERNATIONAL FEDERATION

Largely through the efforts of the JJIF (founded in 1972), in 1994, iu-jitsu was added to the list of sports at the World Games. The JJIF controls every aspect of the study and teaching of all styles of the sport and divides them into two broad categories: koryu (classical) and goshin (modern).

The word "Tae kwon do" is variously translated as "the way of hand and foot" or "the way of kicking and striking."

Tae kwon do originated in Korea, where it remains the national martial art. In other parts of the world, it is also popular as a form of exercise.

TAE KWON DO



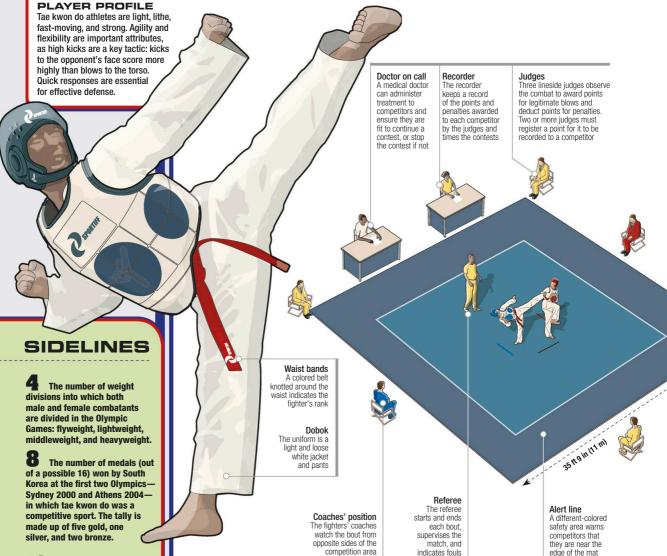






EVENT OVERVIEW

Tae kwon do is an exciting combat sport between two men or women who score points by striking their opponent, often with a rapid combination of kicks—including jumping or flying kicks—and punches. The fighter with the greater number of points at the end of the timed bout is the winner, unless one is knocked down for a count of 10.



The number of student ranks, from tenth (beginner) to first. Ranks are known as dans.

The number of member nations in World Tae kwon do.

COMPETITION AREA

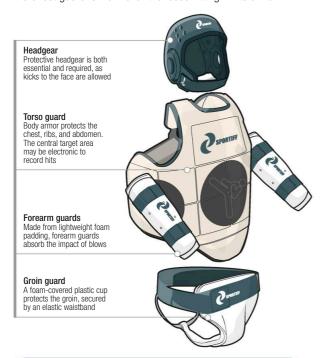
Contests take place on a square rubber mat at least 1 in (2 cm) thick. The competition area may be raised by $19\frac{1}{2}-23\frac{1}{2}$ in (50–60 cm), with a shallow slope (around 30°) to floor level. The officials take up position around the outside of the competition area.

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REQUIRED CLOTHING

Fighters wear full protective clothing when they take up position on the mat. To make each combatant distinct, one wears blue and one wears red markings on the chest guard or helmet, or on hand and foot protectors if they are worn. Only the chest guard is worn over the loose-fitting white uniform.



ESSENTIAL VOCABULARY

Tae kwon do retains its Korean origins in much of the language associated with the sport. Referees begin bouts by shouting "Shi-jak!" ("Start") and end bouts by shouting "Keu-man" ("Stop"). Combatants often scream "Kiai!" (which means "working with ki") when delivering a blow to their opponent; the shout releases energy (ki) and helps them strike a blow with greater strength and force. As with boxing, a knockout is concluded by the referee counting to 10-announced by the referee declaring "Yeol" (the Korean word for "10").

SCORING POINTS

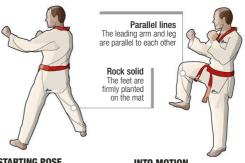
Points are earned by landing blows on the opponent or, in sparring competitions, by stopping blows 1 in (2 cm) from an opponent. A blow to the torso with the hand or foot earns one point, a kick to the neck or head earns two, and knocking the opponent down earns three. Under World Tae kwon do rules, if a fighter reaches 12 points or gets 7 points ahead, he or she wins the match. A match can also be won by knockout. Points are deducted for fouls, such as hitting below the belt, hitting the back, and hitting behind the head. In the case of a tie, a sudden-death bout is played.

HAIR-RAISING ROOTS

TAE KWON DO EVOLVED SOME 2.000 YEARS AGO FROM A NUMBER OF KOREAN MARTIAL ARTS. ONE FIGHTING TECHNIQUE, AT A TIME WHEN IT WAS FASHIONABLE FOR MEN TO WEAR A LONG PONYTAIL, WAS TO TIE A SHARP COMB OR METAL WEIGHT TO THE END OF THE BRAID AND SWING IT TO STRIKE AN OPPONENT IN THE EYES.

KICKING OUT

Tae kwon do places more emphasis on kicks than most martial arts and takes advantage of the legs' ability to deliver blows with more force and from a greater distance than punches. Two of the most effective kicks are the hook kick and the side kick (below).



STARTING POSE

The fighter is in regular defensive pose, with his hands raised to block any attack.

INTO MOTION

The fighter raises his knee to hip level and keeps his hands raised.



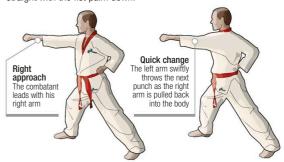
WIND-UP

The fighter pivots to face forward to come into an attacking position.

The leg is fully extended to the side and the hip twisted for extra power.

STRAIGHT PUNCH

In the straight punch-pull combination, the nonstriking hand is kept low with the fist palm upward as the striking hand guickly punches straight with the fist palm down.



INSIDE STORY

Tae kwon do was internationalized by US troops returning home after the Korean War in the early 1950s. Korean lobbying led to the founding in 1973 of the World Tae kwon do Federation (WTF)—now World Tae kwon do—as the sport's governing body. The first world championships were held the same year.

GOVERNING BODY

World Tae kwon do was recognized by the International Olympic Committee in 1980. Tae kwon do became an official Olympic sport in 2000, having appeared at the games as a presentation sport in Seoul in 1988.

KICKBOXING









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NEED2KNOW

- → Kickboxing is a professional sport for both men and women. Top bouts draw huge audiences in southeast Asia and Japan, where kickboxers enjoy superstar status.
- > In the West, kickboxing has become a popular form of exercise due to its high fitness demands and challenging moves.
- → The rules of kickboxing are complicated by the fact that there is no one governing body but a number of rival organizations.

SPORT OVERVIEW

Kickboxing is a fast-moving combat sport that combines boxing techniques with kicks derived from martial arts, mainly karate, Although it resembles traditional Thai boxing and Full Contact (see box opposite), it was developed by martial arts experts in the United States in the 1970s. Professional bouts are up to 12 rounds long, and each round lasts two minutes. Fights are decided by knockout or, more commonly, by points scored for blows landed on the opponent.

FIGHTER PROFILE

Kickboxers need the strength, speed, resilience, and endurance of boxers combined with the agility and flexibility required to execute the extended high kicks. A high level of resistance to pain is necessary, particularly when competing under rules that allow kicks to the fighters' legs.

Hand protection Kickboxers fight in standard boxing gloves **Exposed target**

No padding is worn on the torso, and this area of the body

is a major target

Referee

The referee stands in the ring with the fighters, starting and ending each bout and overseeing the contest

Starting positions

The fighters line up on two white lines, marked 3 ft (1 m) from the center of the ring on opposite sides

Corner team

Each fighter has a trainer who discusses tactics and two seconds who tend to injuries between rounds



Timekeener

He times each bout ringing a bell to star and end each round

THE RING

Originally fought on mats, modern kickboxing contests take place in standard boxing rings sprung canvas squares enclosed on all four sides by four ropes. The bottom rope must be a minimum of 13 in (33 cm) above the canvas floor; the top rope should be no more than 4 ft 4 in (1.32 m).

BOXING BEAUTY

Strength

During training

fighters work

extensively on

building leg muscles

TRAINED AS A MONK, NONG TOOM BECAME ONE OF THAILAND'S LEADING KICKBOXERS-AND THE MOST NOTORIOUS. HE WAS A MAKEUP-WEARING TRANSSEXUAL WHO FOUGHT TO EARN CASH FOR A SEX CHANGE OPERATION, WHICH HE HAD IN 1999. HIS STORY WAS TOLD IN THE 2005 MOVIE BEAUTIFUL BOXER.

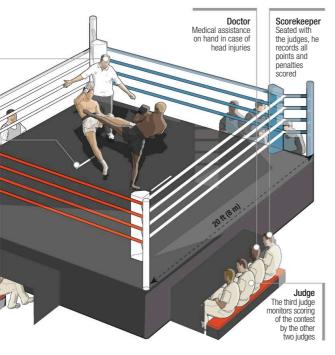


In Full Contact kickboxing, padded foam protectors are permitted for the feet and shins

KICKBOXING, FULL CONTACT, AND MUAY THAI

The pure form of kickboxing is often confused with Thai boxing (Muay Thai) and the European sport of Full Contact. All are closely related, and it is important to understand the key differences. Fighters in all three sports wear mouth guards, gloves, and groin protection.

- In kickboxing, combatants are permitted to punch according to the rules of professional boxing—in other words, no blows below the belt—and kick any part of the body.
- In Full Contact, fighters wear long pants and T-shirts, protective foam boots, and optional shin pads and head guards. Normal boxing rules apply, but fighters are prohibited from kicking below the waist.
- Muay Thai is the oldest and most violent form of "kickboxing." The rules regarding punching and kicking are more relaxed, and fighters are permitted to strike using their hands, shins, elbows, and knees.



PROTECTIVE GEAR

Most protective equipment is mandatory for Full Contact combat. Shin guards and footpads are not allowed in Oriental, Muay Thai, and sanshou bouts, but are optional, or even recommended, in other forms of the sport—and certainly for amateur bouts.



Helmet
Protects the
vulnerable temples
and head from
blows or punches



Shin guards In Full Contact, shin guards offer protection from illegal kicks



Foot pads Cushion the impact of kicks for both fighters

SCORING SYSTEM

Contests are won either through knockouts or accumulation of points. In some contests, winners are decided on the number of rounds won, not overall points. The scoring areas are the front, back, and side of the head; the front and side of the body; and all areas of the leg. Points are awarded as follows: One point is awarded for all successful punches. Footsweeps and kicks to the body also score one point. Two points are awarded for a kick to the head. A jumpkick that lands on the body is awarded two points, and one that connects with the head is awarded three points.

FIGHTING STYLES

Kickboxers can target the opponent's torso and head with punches such as jabs, hooks, crosses, and uppercuts. There is also a variety of kicks, including front and side kicks and the swinging roundhouse kick. A roundhouse kick is one when the fighter swings his or her leg in a circular motion to gain momentum for a blow to the opponent's lower leg, torso, or head. There is very little difference between the punching styles of kickboxing and traditional boxing—in fact, many fighters move between one or the other discipline. A well-executed punch is often less destructive than a kick, however, owing to the padded gloves used.

KNEE STRIKE

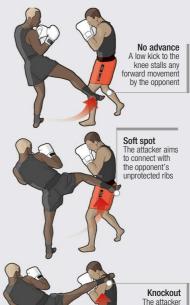
Low kicks to the leg are often most effective, as they slow the opponent down and prevent him or her from preparing a retaliatory kick. Low kicks (excluding sweeps) are not permitted in Full Contact.



A midlevel kick is aimed at the midsection of the opponent's body. When performed with speed and power, such kicks can bruise or even damage the opponent's ribs.

AIM HIGH

High kicks to the head are potentially the most risky, as they leave the attacker most open to counterattack. But they are spectacular—and can potentially win a bout with a single blow.



swings his leg high, aiming for the

opponent's head

INSIDE STORY

The first governing body associated with kickboxing when the sport emerged in the 1970s was the Professional Karate Association (PKA). Today, the governance of the sport is fragmented, with several different organizations each hosting regular events and world championships. The World Kickboxing Association (WKA), which was established in the late 1970s and has over 107 member nations, is the best known of this group of rival federations.











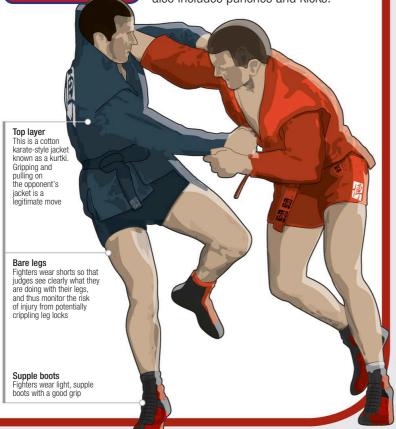
SOMBO

FIGHTER PROFILE

Strength and resilience are essential. Fighters need endurance to withstand attacks, together with the fighting spirit and tactical awareness to overcome their opponents. Speed and agility are also important qualities that help combatants to outmaneuver the opposition.

SPORT OVERVIEW

Sombo is a Russian combat discipline featuring many wrestling techniques. such as throws, pins, and locks. There are two types of sombo (which is also known as sambo): sport sombo and combat sombo. Sport sombo includes many moves, such as leg locks, that are illegal in judo. Combat sombo also includes punches and kicks.



NEED2KNOW

- Sombo was developed in the Soviet Union in the 1920s when Joseph Stalin wanted his army to improve its hand-to-hand combat skills. Military leaders combined disciplines including karate and judo with traditional wrestling styles from Armenia, Georgia, Moldova, Mongolia, and Russia.
- The International Amateur Sambo Federation (FIAS) is the sport's governing body. Sambo is an acronym that stands for "self-defense without a weapon."

SCORING SOMBO

Sombo matches usually last five minutes and are supervised by a center referee (who gestures when points have been awarded), a mat judge, and a mat chairman. Points are awarded for hold downs: a fighter who holds his opponent's back to the mat for 10 seconds gains two points and for 20 seconds gains four points. Whoever is first to achieve a 12-point margin wins the match.

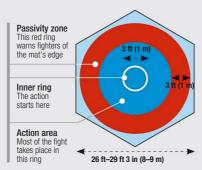
OUTRIGHT VICTORY

A fighter can win outright without the necessary points margin if he can throw his opponent onto his back while remaining standing. He also wins outright by forcing his opponent into a successful submission hold. This kind involves getting the opponent in an arm or leg lock while on the floor. Chokeholds and holds to feet and hands are illegal. When the grip is so strong and the opponent can no longer stand the pain, he calls out or hits the mat, prompting the referee to end the match.

Leg lock Out of the loop This fighter is executing a The victim cannot use leg lock and stretching his his right leg to resist because of the pressure opponent's Achilles heel on his left thigh

FIELD OF COMBAT

Sombo contests take place on a circular area in the middle of a hexagonal or square mat. The bout begins in the inner circle, marked with a white boundary line. This is where sombo fighters begin their bout. Around the mat is the protection area, which is colored pale blue. This is padded to help prevent injury if a fighter is thrown out of the main wrestling area.



THE BEST POLICY?

VASILI OSHCHEPKOV'S DECLARATION THAT HE HAD BEEN INSPIRED TO DEVELOP SOMBO BY JIGARO KANO. THE JAPANESE FOUNDER OF JUDO, ANGERED STALIN, WHO WANTED THE SOVIET UNION TO BE THE SOURCE OF EVERYTHING GOOD IN THE WORLD. OSHCHEPKOV PAID FOR HIS HONESTY WITH HIS LIFE.



Kenjutsu, from which kendo is derived, dates back to

the 11th century. It was the martial art favored by the samurai warriors. Todav's kendo gear resembles samurai armor.

- Kendo translates as "the way of the sword," while keniutsu means "the art of swordsmanship."
- A number of bodies promote kendo as a modern sport, including the International Kendo Federation (FIK), which organizes the World Kendo Championships that take place every three years.

FIGHTER PROFILE

Kendo fighters train their minds, as well as their bodies: mental discipline is as important as physical fitness, and calmness and concentration are vital. The cuts and thrusts require precision and skill to execute, and fighters need quick reactions to defend themselves from attack.

CAN DO'S

Kendo matches last for five minutes, and whoever is the first to score two points wins. An extra three minutes may be played if there is no outright winner after the first five minutes—then whoever scores the first point wins. A point is scored by making a cut to one of seven permitted areas (see below) with the top third of the shinai or by a thrust to the throat with the tip. Usually, one chief referee and two sub-referees score the match; a point is logged when at least two of them signal that a clean hit has been made.

contenders, clothed head to foot in distinctive black

gear, who aim to strike each other with their shinai.



ON THE SQUARE

Kendo contests, known as shiai, are fought on a wooden floor in a court known as a shiaio that has a cross marked in the center. Fighters must remain on the shiajo during a contest. Traditional etiquette is observed, and fighters bow to one another at the beginning and end of the match.

BREACHING THE DEFENSE

A key offensive technique is to draw the opponent out of position with a feint, then land a blow on one of the other target areas thus exposed. When landing a blow, the fighter calls out the part of the body he has struck—for example. "do!" for the side. Fighters shout "kiai!" before launching an attack to try to intimidate their opponent.

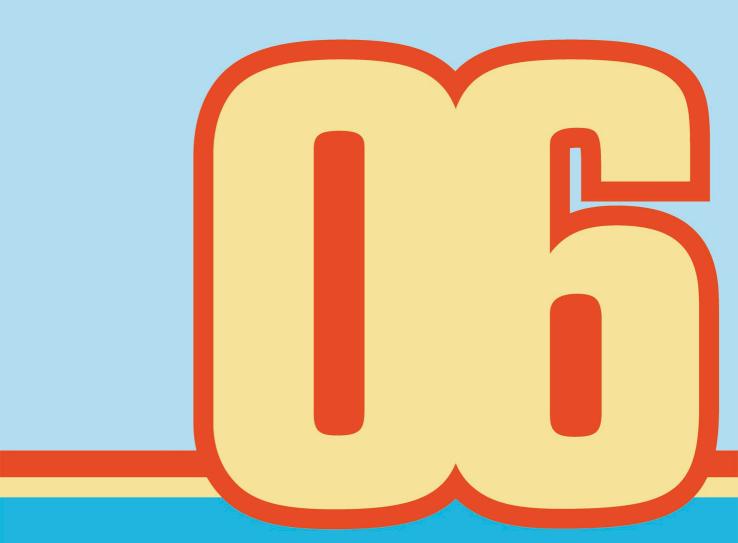


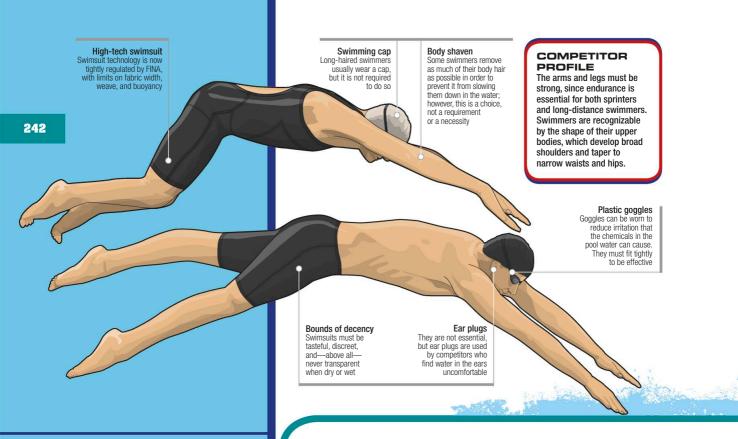
and scores a do



fighter to cut or strike an opponent with the shinai: three on the head, one on the throat, two on either wrist, and two on any part of the side of the body.

WATER SPORTS





- There are four main competitive swimming styles: backstroke. breaststroke, butterfly, and freestyle.
- There are currently 34 officially recognized Olympic swimming race events, 17 for each sex.
- Olympic Games competitions, prior to 1908, included a variety of unusual events such as underwater swimming, 200 m obstacle swimming, and the plunge, for vertical distance.

SIDELINES

20.91 The number of seconds it took Brazilian freestyle swimmer César Cielo to achieve a world record for completing one length of a 164 ft (50 m) pool on December 18, 2009.

The number of gold medals won by **American swimmer Michael Phelps at** the 2008 Olympic Games in Beijing.

Age at which Australian Ian Thorpe, nicknamed "Thorpedo," became the youngest ever individual world champion, in 1998.

24.98 The time, in seconds, it took China's Yang Wenyi to swim 164 ft (50 m), the first female to break 25 seconds for this distance.

SWIMMING









EVENT OVERVIEW

No matter what the distance—and the length of events varies from 164 ft (50 m) to 4,921 ft (1,500 m)—the object of any swimming race is to beat the other swimmers in the race and complete the course. Each race requires a particular stroke or combination of four swimming styles: breaststroke, backstroke, butterfly, and freestyle. There are both individual and team races; the team races include four swimmers from each team that compete against each other, and they usually take place at the end of a meet.

THE POOL

The pools used in top-class competitions are 164 ft (50 m) long and 82 ft (25 m) wide. They are divided into eight lanes, each 9 ft (2.75 m) in width; there is an extra 1 ft 3 in (40 cm) of water outside lanes one and eight. The water should be a uniform 6 ft (1.8 m) deep throughout and maintained at a constant temperature of 75-84°F (25-28°C). When lanes are used, the color of the lane ropes should be as follows: two green ropes for lanes 1 and 8; four blue ropes for lanes 2, 3, 6, and 7; and three yellow ropes for lanes 4 and 5. The floats extending for a distance of 16½ ft (5 m) from each end of the pool are red, and at the 49 ft (15 m) mark from each end of the wall of the pool, the floats should be distinct in color from the surrounding floats.

In other events, such as diving, pools with sloping bottoms may be used, as long as they are no less than 4 ft (1.2 m) deep at the start and at least 3 ft 6 in (1 m) deep at the other end; they may be divided into as many as 10 lanes.

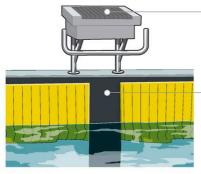
each about 7 ft (2 m) across.

IN THE SWIM

There are several different swimming styles, and the rules of competition are tailored to take account of each discipline. However, the configuration of the pool, starting and finishing regulations, and the way in which races are timed and judged are common to all types of races. Rules for international events are laid down by Fédération Internationale de Natation (FINA), the world governing body for the sport.

STARTING BLOCK

For all competitive events apart from backstroke, each swimmer mounts a starting block, which is a small platform situated on the end of the pool. above the racing lane. When the start of a race is signaled, swimmers dive from the starting block into their lane and begin swimming.



Block construction The starting block is built of stainless steel, and the top of the platform is covered

Wall touch pad

with slide-free rubber

This is the area that must be touched when a swimmer turns or at the end of a race. Pressure closes an external electric circuit when contacted, so that races can be timed

WHAT THEY WEAR

Traditional-style swimsuits have largely been replaced by high-tech swimwear. Suits fit tightly and reduce drag, although regulations were tightened by FINA in 2010 amid fears that the suits gave athletes an unfair advantage.

SWIMSUIT DESIGN

The full-body skinsuits used to great effect at the 2000 and 2004 Olympics were limited to leg and torso coverage only for Beijing 2008, then banned altogether from 2010.

High-tech material

Modern body suits are made of a combination of materials, including Nylon, Spandex, and Lycra

Strict regulations

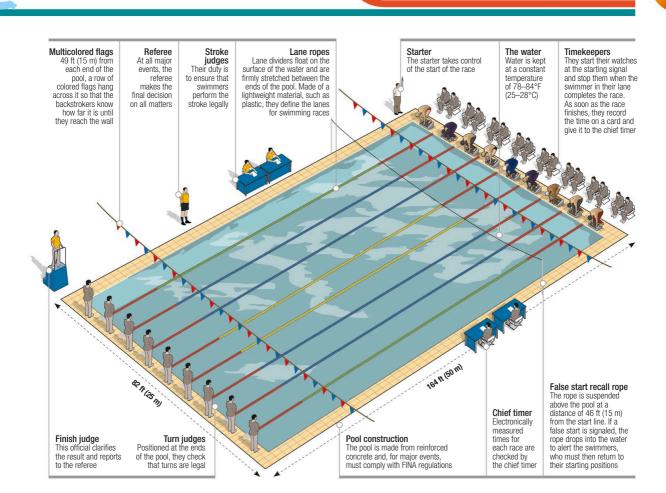
FINA rules state that women's suits must not cover the neck, shoulders, or knees, while men's suits must leave knees and navel bare

Antifog, scratch-resistant lenses in a flexible PVC frame are an essential aid for improving the visibility of competition swimmers.

No leaks

Some goggles have silicone seals for improved waterproofing





STAT CENTRAL

LONG COURSE WORLD RECORDS (MEN)	
EVENT SWIMMER	TIME
50 M FREESTYLE CÉSAR CIELO	20:91
100 M FREESTYLE CÉSAR CIELO	46:91
200 M FREESTYLE PAUL BIEDERMANN	1:42:00
400 M FREESTYLE PAUL BIEDERMANN	3:40:07
800 M FREESTYLE ZHANG LIN	7:32:12
1,500 M FREESTYLE SUN YANG	14:31:02
100 M BACKSTROKE RYAN MURPHY	51:85
200 M BACKSTROKE AARON PEIRSOL	1:51:92
100 M BREASTSTROKE ADAM PEATY	56:88
200 M BREASTSTROKE ANTON CHUPKOV	2:06.12
100 M BUTTERFLY CAELEB DRESSEL	49:50
200 M BUTTERFLY KRISTÓF MILÁK	1:50:73

LONG COURSE WORLD RECORDS (WOMEN)	
EVENT SWIMMER	TIME
50 M FREESTYLE SARAH SJOESTROEM	23:67
100 M FREESTYLE SARAH SJOESTROEM	51:71
200 M FREESTYLE FEDERICA PELLEGRINI	1:52:98
400 M FREESTYLE KATIE LEDECKY	3:56:46
800 M FREESTYLE KATIE LEDECKY	8:04:79
1,500 M FREESTYLE KATIE LEDECKY	15:20:48
100 M BACKSTROKE REGAN SMITH	57:77
200 M BACKSTROKE REGAN SMITH	2:03:35
100 M BREASTSTROKE LILLY KING	1:04:13
200 M BREASTSTROKE RIKKE MØLLER PEDERSEN	2:19:11
100 M BUTTERFLY SARAH SJOESTROEM	55:48
200 M BUTTERFLY LIU ZIGE	2:01:81

RACE STARTS

The start of competition races are governed by an official starter, who reports to the event referee. Once the referee gives permission for an event to start, the starter assumes authority to begin the race. At the starter's first signal, swimmers assume their starting positions. For a backstroke event, this is in the water; for other races, the competitors will mount their starting block and face down their respective lanes.

RACE TIMING

In major swim meets, such as the World Championships and the Olympics, races are electronically timed to the nearest one-hundredth of a second. Electronic touch pads are affixed to the walls of the pool at the end of each lane. Their upper edge must be at least 12 in (30 cm) above the water level. Touch pads are linked to an electronic timing system and respond to the slightest pressure from the swimmer at the end of the race. Individual timekeepers are also used, and each one takes the time of the swimmers in the lane assigned them. After the race, they record the times on a card, which is passed to the chief timekeeper.

FALSE STARTS

These occur when a swimmer attempts to begin a race before the official signal to do so. Fédération Internationale de Natation Amateur (FINA) rules state that anyone causing a false start will be disqualified. When a false start happens, the starter gives a second signal (identical to the start signal), and the false start rope also falls into the pool to alert the swimmers.



STARTING FROM THE BLOCKS

Almost all competitive events begin from the starting blocks. When the starting signal sounds, swimmers dive from their block into the water to begin swimming. A block is usually 20×20 in $(0.5 \times 0.5 \text{ m})$ and stands 20-30 in (0.5-0.75 m) above the water. Blocks have a maximum downslope of 10° from back to front.

QUICK TURNS

A vital part of any race is the turn, which takes place when a swimmer reaches the end of the pool and needs to begin another length in the quickest possible time. A smooth turning technique can shave vital seconds from a competitor's overall event time. Each swim stroke requires a slightly different turning method, but the tumble turn forms the base for freestyle and backstroke turns. Butterfly and breaststroke turns do not require a tumble.

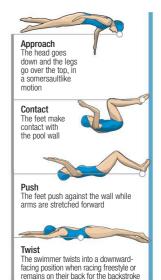
THE TUMBLE TURN

Illustrated on the right, the tumble turn is used in freestyle and backstroke events. While the butterfly and breaststroke require that the swimmer touches the pool wall with both hands when turning, in freestyle and backstroke, the turn can be executed using just the feet. Swimmers racing backstroke events are allowed to turn onto their front (while gliding only) just before executing the turn. As with the start of the race, swimmers are to be underwater for only 49 ft (15 m) before breaking the surface and using the event stroke.



STARTING IN THE POOL

Backstroke and medley relay events begin with each swimmer in the pool gripping the starting block. Swimmers brace their legs against the pool wall and, when the start signal is given, use this leverage to power in a backward direction to begin racing.



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TECHNIQUES

Swimming styles have been developed based around a number of basic principles. To achieve maximum speed, for example, the torso and legs should be kept parallel to the surface of the water to reduce the amount of drag acting on the swimmer. The arms and hands should extend in front of the head as much as possible. A longer stroke generates more forward thrust, as the arm spends more time moving through the water.

SEVEN UP

AT THE 2007 LONG COURSE CHAMPIONSHIPS IN MELBOURNE, AMERICAN MICHAEL PHELPS PROVED HIS DOMINANCE IN THE SPORT BY WINNING SEVEN GOLD MEDALS, FIVE OF THEM IN NEW WORLD RECORD TIMES.

BREASTSTROKE

To execute the breaststroke, good coordination is needed. The arm movements must be made simultaneously, as should the leg movements. The arm cycle comes first and is followed by a kick, then a brief glide. The event starts with the swimmer diving from the blocks.

Forward start

After the dive, begin the stoke by shrugging the shoulders up, with elbows turned out and the palms of the hands facing outward at an angle of 30 to 45° to the forearms

The palms are pushed back to down and back in a full circle. Breathe in as you finish the circle, lifting your face out of the water

Beginning the stoke

Finishing the stroke

Put your face into the water stretch your arms forward, then kick. Bend your knees and lift your feet up to your bottom. Turn your feet, pushing with the bottom of your foot, in a circular motion



BACKSTROKE

Also known as the back crawl, the swimmer counts the number of strokes to figure out when the end of the pool will be reached. When using this stroke. the swimmer should remain close to the surface of the water. The race begins in the pool, not on top of the block. The technique is shown on the left page.



Put one arm in the water in a straight line above your shoulder; keep the arm straight all of the time it is out of the water. The little finger should enter the water first



Once the hand is in the water, it should push down and toward the feet. The elbow

Finishing stroke

Keep pushing the hand toward the feet until your elbow is straight. Then lift it out of the water, back to its original position, and repeat



FREESTYLE

The fastest swimming stroke, the freestyle, or front crawl, requires the swimmer to move facedown through the water, breathing after every two or three strokes by turning the head up through the surface. Movements should be as smooth as possible, and the legs should be kicking continuously.



Put your hand into the water in front of your head and stretch it forward as far as it will go



Beginning the stroke

Beginning the stroke

Increase your speed by bending your elbow and pushing your hand toward your feet, keeping it going until it reaches the top of your leg



Finishing the stroke



BUTTERFLY

This stroke requires a high degree of stamina and strength, particularly in the upper body. The arms must leave the water, then power back down through the water, at the same time. It can be difficult getting the right order: kick the legs as the hands go in; kick the legs as the hands come out; when the arms are near the thighs, lift up the torso and breathe.

Forward start

Diving from the starting block, the swimmer begins to dolphin kick the legs when submerged



Beginning the stroke

Put the hands in the water in front of the shoulders and pull them toward your feet. The arms work at the same time and keep moving throughout the stroke

Finishing the stroke

When the hands reach the thighs, lift them out of the water, breathe, then throw them back to the start. Kick when your arms go in and come out

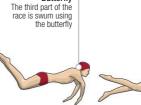


MEDLEY

The medley relay involves individuals or teams of four, each member swimming at least 164 ft (50 m) before handing over to a teammate. Four different strokes are used for each "leg" of the race in a prescribed order: backstroke, breaststroke, butterfly, and freestyle.

Backstroke Breaststroke The medley relay The second leg begins in the pool, of the race is the with the backstroke breaststroke

Butterfly



Freestyle The final leg is swum

using any other recognized stroke

INSIDE STORY

Representations of swimmers date from the Stone Age, but competitive swimming began in Europe in approximately 1800, and modern styles have evolved since that time. Swimming events were included in the first modern Summer Olympic games in Athens, Greece, in 1896. Women were not eligible to compete until the Stockholm Games of 1912.

GOVERNING SWIMMING

The international governing body for swimming is the Fédération Internationale de Natation (FINA). established in 1908. FINA oversees and runs all world championship and Olympic events, as well as diving, water polo, open water marathon, and synchronized swimming events.



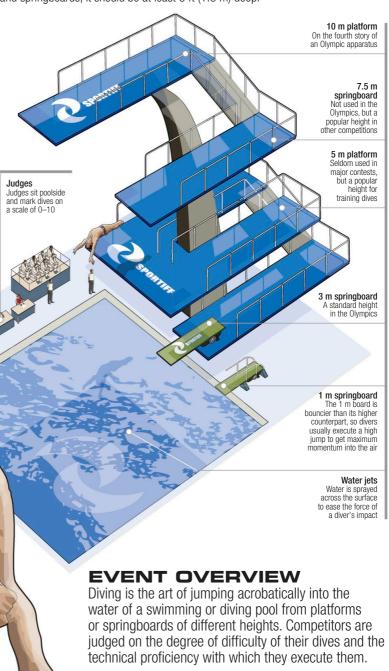
- The four main diving events are the men's and women's 3 m springboard and 10 m platform. The World Championships also feature a 1 m springboard event.
- The Fédération Internationale de Natation (FINA) governs the rules for diving in the Olympic Games, the World Championships, the World Junior Championships, and the World Diving Cup.

ATHLETE PROFILE

Divers are supple yet strong enough to hold or alter their position in midair. Legs, arms, and joints must be in peak condition. Divers often emerge at the top level between about 14 and 16 years of age.

THE POOL

Diving events take place from platforms and springboards in a diving pool or swimming pool. The length and breadth of the pool are variable; some competitions are held in the deep end of regular pools. The platforms and springboards have nonslip surfaces and are reached by suitable stairs, not ladders. The minimum depth of water beneath a 10 m platform is 11 ft 6 in (3.5 m). For other platforms and springboards, it should be at least 6 ft (1.8 m) deep.



Water dressing Divers wear a one-piece swimsuit that must not be transparent, even when wet

Shaping up

Judges award marks for the lines formed by the diver's body during the descent—the more shapely the silhouette, the higher the score

Arm shape

The hands and arms are brought together above the head in a single, sweeping, symmetrical motion; any failure incurs a point penalty











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SIDELINES

The number of consecutive Olympic diving gold medals—a record—won by Klaus Dibiasi, an Austrian-born Italian who won the 10 m platform diving events at Tokyo in 1968, Munich in 1972, and Montreal in 1976.

The age of China's Fu Mingxia when she became the youngest-ever champion in the women's 10 m platform event at the 1992 Olympics. Four years later, she took gold in both 10 m and 3 m dives. The number of World
Championship competitions won by
American diver Greg Louganis. He
also won Olympic golds in 1984 and
1988 in the 3 m springboard and
10 m platform events.

70 The number of Olympic medals won by US male divers between 1904 and 2012. The total includes 13 golds in the 10 m platform and 15 golds in the 3 m springboard. The United States has been the world's leading diving nation, but it was eclipsed by China at the 2012 Games, winning one gold medal in comparison to China's six.

KEEPING SCORE

Divers are allowed a certain number of attempts per round, usually six for men and five for women. Every dive must feature various elements, such as somersaults and twists. The exact requirements are notified by the organizers before the competition. Contestants are marked not only on the way they perform these compulsory moves, but also on the way in which they hit the water; top marks are awarded to splashless entries, known as "rips."

SCORING

There are seven judges in Olympic and world events and five in most other competitions. Each judge awards every dive a mark out of 10: 3 for takeoff, 3 for flight, and 3 for entry. (They award the 10th point at their discretion.) After logging the scores, they eliminate the highest and lowest and multiply the remainder by a previously agreed on degree of difficulty (DD) factor to determine the final score for the dive.

BOARD MANEUVERS

There are 91 officially recognized platform dives and 70 springboard dives. They are divided into six groups: forward, backward, reverse, inward, twist, and handspring (or armstand). Handsprings are permitted only from the 10 m platform; all other dives must be launched by the feet.

SYNCHRONICITY

In synchronized competitions, two teammates jump simultaneously from platforms or springboards of the same height and try to perform either exactly the same dive or two different dives that complement or mirror one another. One peculiarity of this event is that divers who have jumped badly may score highly—as long as they both made the same mistakes. Synchronized diving became an Olympic event in 2000.

TUCK

In the perfect tuck, the body is compact and bent at the hips, with the knees bent and held together. The diver tucks the calves against the backs of the thighs, holding them in position with the hands clasped on the shins. The feet are close together and the toes are pointed throughout the movement. In a tuck dive that contains a twist, the diver needs to show the tuck position clearly.

PIKE

In a pike, both legs are straight, with the body bent at the hips, the feet together, and the toes pointed. The position of the arms is at the diver's discretion—the arms may be clasped around the calves or the back of the knees, as shown, or held out at the sides. If a pike dive contains a twist, it is important for the diver to show the pike position clearly in order to prevent the judges from deducting points.

STRAIGHT

Also known as the layout, the straight dive calls for an absolutely rigid and fully stretched body, with straight legs, feet together, and pointed toes; the arms may be stretched above the head or held tight against the side of the body. If a straight dive contains a twist, the twist must not be initiated from the platform or springboard.

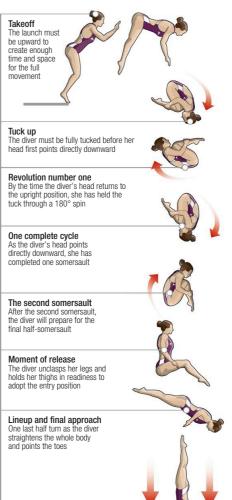
Fetal position Straight backs incur penalties, so divers aim for a kind of fetal position Joint to joint When clasping the calves, the elbows touch the knees Human torpedo The whole body is as stiff as a board

PLUNGE FOR DISTANCE

IN THIS ONE-TIME-ONLY OLYMPIC EVENT HELD IN 1904 IN ST. LOUIS, COMPETITORS MADE STANDING DIVES FROM THE POOLSIDE TO SEE HOW FAR THEY COULD GO UNDERWATER. THEY WERE NOT ALLOWED TO MOVE THEIR BODIES IN THE WATER AND HAD TO RELY ON THEIR PREENTRY MOMENTUM. GOLD WENT TO WILLIAM DICKEY OF THE UNITED STATES, WHO REACHED A DISTANCE OF OVER 62½ FT (19.05 M).

FORWARD TWO-AND-A-HALF SOMERSAULTS WITH TUCK

One of the most popular and spectacular dives, this demanding move packs the maximum of athleticism into a total flight time of less than two seconds.



Perpendicular entry

Divers aim for a 90° angle and lose points for deviations

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- Water polo originated in England around the 1860s, when swimming was combined with field-based sports. The earliest version of water polo was based on rugby and was notoriously violent and lawless.
- Water polo first appeared at the Olympics in 1900.
 The men's event has taken place at every Olympics since 1908. The women's event was introduced in 2000.
- Water polo is popular in the US and Europe, particularly Hungary, Italy, and Spain.

SIDELINES

20 The number of goals shared by Croatia and Serbia in the final of the men's World Cup in Oradea, Romania, in 2010. The Serbia team won the game 13–7.

The number of gold medals shared by the women's teams of the United States, Italy, and Hungary in World Championships.

WATER POLO









GAME OVERVIEW

Water polo is a water-based sport played by two teams of seven players (six outfield players and one goalkeeper). The object of the sport is to propel the ball into the opposing team's goal; each goal scores one point, and the winning team is the one with the highest number of goals. Matches are made up of four quarters lasting seven minutes each; two three-minute phases of overtime may be played if necessary. Water polo is a particularly challenging and fiercely competitive sport; the action is fast, and fouls are very common, particularly underwater—referees have to be extra alert to spot them all. The sport has been likened to a mixture of swimming, volleyball, rugby, and wrestling.

THE POLO POOL

The dimensions for the water polo pool at the Olympic Games are as shown here. The water should be at least 5 ft 9 in (1.8 m) deep. Matches in other competitions may take place in areas of different dimensions. Conventional swimming pools may be used, but they have shallow ends, which are undesirable in a game where field players are not allowed to touch the bottom. Whatever the type of pool, the playing area is marked out by buoys. The field of play is divided by goal lines, 2-meter lines, 4-meter lines, and 7-meter lines on either side of a midline.

Swimming cap The competitors

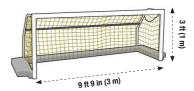
The competitors wear swimming caps in team colors; the home team wears dark-colored caps and the away team wears light-colored caps. The goalkeepers wear a red cap marked with a number 1

Ear protectors

The caps feature ear protectors designed to keep water out but allow the players to hear their teammates and the referees

GOAL AREA

The goals are either fitted to the side of the pool or attached by cables. A limp net encloses the entire goal area. The goalkeeper for each team guards the goal area by trying to deflect or catch the ball when the opponents attempt to shoot the ball through the goal mouth.



PLAYER PROFILE

Players need strong swimming skills, including the ability to sprint. Accurate ball handling is essential; this is particularly difficult, as throws are made while treading water and the player has to propel his or her body out of the water. Players need to be strong to tackle opponents and withstand attacks. Team skills and strategic thinking are also key.

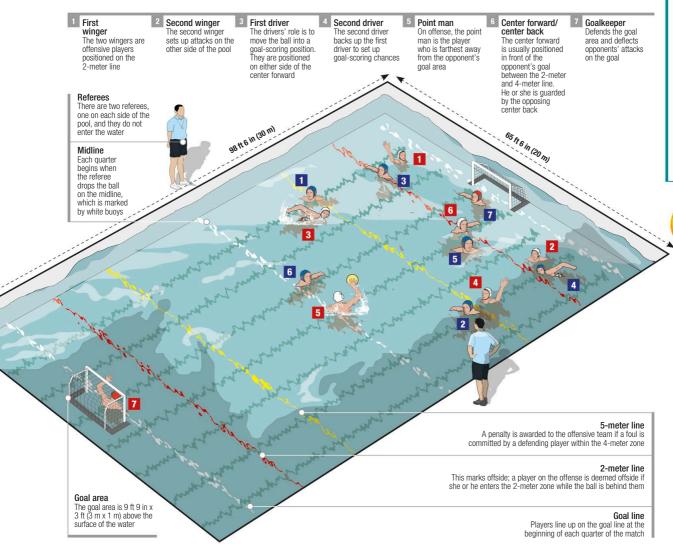


WHO PLAYS WHERE?

The goalkeepers are not allowed to move over the midline into the other half of the pool. The field players (all the players except the goalie) can move anywhere, and they play both offense and defense. The center forward, who leads the attack, will generally take up a position directly in front of the opponent's goal. The other five field players are known as perimeter players. They tend not to keep to one position but rotate around the perimeter of the offense to find goal-scoring opportunities or keep an eye on their opponents.

STARTING PLAY

Water polo matches are divided into four quarters. Each quarter begins with the two teams lined up on opposite sides of the pool on their respective goal line. The referee blows a whistle to indicate the start of the quarter, then drops the ball on the midline. The players sprint toward the ball, and whoever reaches it first wins possession. That team now takes the offense. Whenever a team takes possession of a ball, they have 35 seconds to shoot at the goal or surrender possession—a shot clock starts counting down the time.



POLO WITHOUT HORSES

WATER POLO NOW BEARS
LITTLE RESEMBLANCE TO
FIELD POLO, PLAYED ON
HORSEBACK. IT TOOK
THE NAME WATER POLO
BECAUSE, ORIGINALLY,
PLAYERS RODE ASTRIDE
FLOATING BARRELS TO
SIMULATE HORSES AND
HIT THE BALL WITH STICKS.

WET GEAR

All competitors must wear swimsuits and colored, numbered caps, which are the key feature to identify players. Athletes are not allowed to play with grease or oil on their body.

BALL

The ball has to comply with strict regulations. It is spherical and has a waterproof rubber outer cover, an air chamber, and a self-closing valve. Competition balls weigh 14–15 oz (400–450 g) and are usually yellow with black lines.



LIGHT AND TIGHT

The swimsuit should be tight-fitting but allow ease of movement through the water. Items that may cause injury are not permitted.





POOL RULES

Matches consist of four quarters of seven minutes, with a two-minute break between each quarter. Each team is allowed a timeout of two minutes during each match. In case of a draw, two further three-minute sessions are played, followed, if necessary, by three minutes decided by a golden goal.

Field players may touch the ball with only one hand and cannot use their fists to hit the ball. They must not touch the bottom or side of the pool.

Goalkeepers may handle the ball with both hands, may hit the ball with their fists, and may touch the bottom of the pool. However, they are not allowed past the halfway line. Players cannot push the ball underwater when being tackled or push or hold an opponent unless that player is holding the ball. If an attacker's shot goes out of play at the end of the pool, the game is restarted by the defense. If the defense touched the ball last, the attacking side is awarded a free throw from the 2-meter line.

SCORING

A goal is counted if the entire ball crosses the line between the goal posts and the crossbar. Although goals can be scored with any part of the body other than the fist, in practice, they nearly all come from attacking throws.

FROM DEFENSE TO ATTACK

In addition to preventing the opposing team from scoring, the goalkeeper has a key part to play in launching team members on the offensive. Accurate passing is a vital skill.

Touch and go

The defender keeps an eye on the goalkeeper and the ball as she swims out of her team's goal area to make herself available for a pass

WATER SKILLS

Outstanding swimming skills and stamina are essential for water polo players, who may swim 1¾–3 miles (3–5 km) during a typical match. There is a lot of physical contact, and resilience is needed to withstand robust opposition challenges. Players must be constantly aware of their surroundings—the rapidly changing range of opportunities and threats in every part of the pool. That is why water polo features some swimming styles that look different from those employed in swimming races. Players always swim with their heads out of the water to observe the action, and a type of backstroke where the player is almost upright in the water is frequently used. Swimming is combined with ball-handling skills to shoot goals or advance the ball to teammates, as discussed below.

SHOOTING

There are several ways to shoot. The lob is a high, arching overhead shot often taken from an angle on either side of the goal. The skip shot involves bouncing the ball off the water with enough force to propel it into the goal. The power shot is made by a player propelling her body out of the water and throwing the ball at the goal. The diagram below shows an attacker faking a shot in one direction and then, having made the keeper dive, throwing the ball into the unquarded other side of the goal.

DRIBBLING

Players can advance the ball up the pool by swimming while pushing the ball in front of them. They must neither hold the ball while pushing nor push it beneath the surface of the water. Any player attempting to dribble the ball will almost certainly be challenged, and he or she will need to fend off tackles from the opposing side. Here, the attacker has made her way through the last line of defense to create a shooting opportunity in an advanced position. A pass to that position would have been offside.

TREADING WATER

Outfield players cannot touch the bottom or the side of the pool; shots and passes must be made while treading water. To power their shots, players propel their bodies out of the water; some can lift themselves out to thigh level. The popular "eggbeater" method of treading water involves rotating the legs rather than using a scissor kick to maintain a constant position.

Two hands good

The goalkeeper is the

only player permitted

to catch the ball with

Red head

Goalkeepers wear a

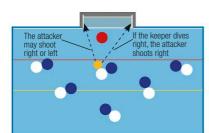
easily identifiable

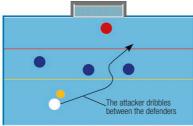
red cap to make them

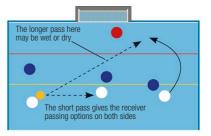
both hands

PASSING

All but the simplest passes require great skill, as the ball must be thrown and caught accurately with one hand only. A dry pass is a high-speed pass made to an outfield player without the ball touching the water. A wet pass is made by bouncing the ball off the surface of the water to an attacking teammate. In the diagram below, the player in possession has several passing options, including the simple one to the player on his right and a more ambitious through ball for a teammate swimming quickly into space.







BLOOD IN THE WATER

HUNGARY BEAT THE SOVIET UNION 4-0 IN A FAMOUS GRUDGE MATCH SHORTLY AFTER THE RED ARMY HAD SUPPRESSED THE 1956 HUNGARIAN UPRISING. IN THE POOL, VERBAL ABUSE SOON TURNED TO PHYSICAL VIOLENCE. THE WORST OF THE NUMEROUS PUNCHES THAT WERE TRADED THROUGHOUT THE MATCH FORCED HUNGARY'S ERVIN ZÁDOR TO LEAVE THE POOL WITH BLOOD GUSHING FROM BELOW HIS EYE.

POLO SPEAK

The following are some of the most commonly used specialized terms that relate to water polo tactics and techniques:

DRIVER An attacking player, usually a fast swimmer, whose main duty is to advance the ball into a goal-scoring position.

HOLE GUARD A defensive player who takes position in front of his or her goal and marks the center forward.

HOLE MAN Alternative term for a center forward: also called a hole set.

PRESS DEFENSE A form of man-marking; the defense plays very tight to the attackers in an effort to prevent or impede their passing or driving movements.

PUMP FAKING When a player gets in position to shoot but stops halfway, causing the defending keeper to commit too early to block the shot, thus leaving the goal at the attacker's mercy.

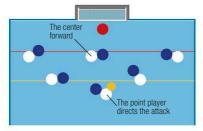
STALLING Failure to shoot within 30 seconds of gaining possession, which is penalized by a free throw to the opposition. **SWIM-OFF** The sprint for the ball in the center of the field of play that starts each guarter of the match.

STAT CENTRAL

OLYMPIC CHAMPIONS	
YEAR	TEAM
2016	SERBIA (MEN)
2016	UNITED STATES (WOMEN)
2012	CROATIA (MEN)
2012	UNITED STATES (WOMEN)
2008	HUNGARY (MEN)
2008	NETHERLANDS (WOMEN)
2004	HUNGARY (MEN)
2004	ITALY (WOMEN)
2000	HUNGARY (MEN)
2000	AUSTRALIA (WOMEN)
1996	SPAIN
1992	ITALY
1988	YUGOSLAVIA
1984	YUGOSLAVIA
1980	SOVIET UNION
1976	HUNGARY
1972	SOVIET UNION
1968	YUGOSLAVIA
1964	HUNGARY

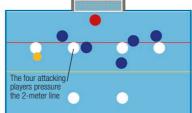
TEAM FORMATIONS

Defense positions in water polo can be either man-to-man or zone-based. The most common formation is a 3-3 formation, with two lines of three players. The 4-2 formation is a useful attacking formation when the opposing team has a player excluded (they are sent off for 20 seconds for a major foul), while the 1-4 is a formation used when the defending team is a man down.



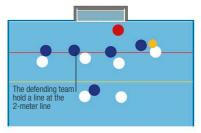
STANDARD "UMBRELLA" ATTACK

The standard "umbrella" attack is an offensive formation adopted by high-level teams. The point man sits at the apex of the umbrella, while the center forward sits inside it, in front of the goal.



4-2 ATTACK (6 ON 5)

If one team has a player excluded, the opposing team will press the advantage by playing in the 4-2 formation. Four players are placed on the 2-meter line and two on the 5-meter line.



1-4 DEFENSE

When playing with one player down, the defending team will often adopt the 1-4 defense, with four players positioned on the 2-meter line and one on the 4-meter line

SIDELINES

The number of Olympic gold medals won by Hungary, the most successful water polo team in the history of the modern Olympic Games. The second-most successful nation-with gold medals in 1900, 1908, 1912, and 1920-is Great Britain. Italy has won a total of five gold medals at the Water Polo World Championship, making it the most successful nation since the event began in 1973.

The total number of nations that participated in the men's and women's water polo events in the 2016 Olympics.

The highest number of goals scored by an individual player in an international. This was achieved by Debbie Handley, playing for Australia against Canada at the 1982 World Championships. Australia won 16-10.

INSIDE STORY

Aside from the Olympics, the main international competitions are the World Water Polo League, which have been contested in July and August each year since 2002, and the World Championships, which have taken place every two years since 2001. Both contests are organized by the Fédération International de Natation (FINA), the world ruling body for aquatic sports.

- Originally known as water ballet, the sport began in Canada in the 1920s. It spread to the United States in the early 1930s, where a display at the 1934 Chicago World's Fair drew rave reviews.
- Synchronized swimming has been an Olympic sport since 1984; the two medal events are altered from time to time, but most recently have been for duets and teams of eight.

BODY SHAPE

Maintaining a pleasing body shape is the most important requirement in both the artistic and free sections of any synchronized swimming event. There are heavy penalties for any visible unsteadiness in the water. Teams must ensure that all of their movements are made in unison or are complementary and are performed in perfect time to their chosen music.

BARRACUDA (A BIG PIKE)

This move begins with a bottom-first downward thrust with the legs together and pointing straight up; this position must be maintained while the trunk is straightened below the surface.



PLATFORM POSITION

One person is supported at or above the surface by the rest of the team. They must all rise and descend once, with the person being lifted rising head first.



SYNCHRONIZED SWIMMING





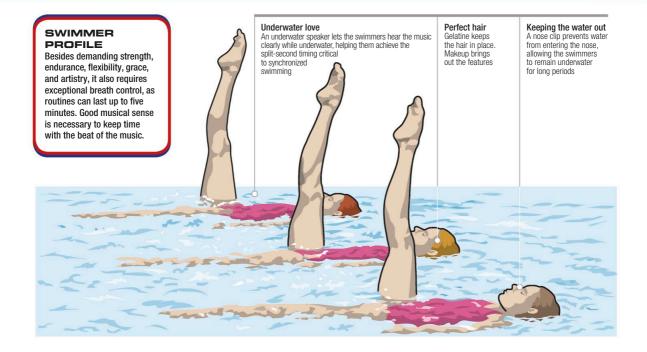


SPORT OVERVIEW

This pool sport is a unique combination of dance, swimming, and gymnastics. Competitors perform graceful movements to a musical accompaniment while out of their depth in water. Judges award them marks out of 10 for technical merit and artistic effect. The term "synchronized" implies multiple participants, and most contests involve teams of two or more; however, there are individual competitions.

TECHNICAL MERIT

Both team and solo events consist of a technical routine and a free routine, each performed to music within a time limit. In the technical routine, swimmers perform specific moves in a set order, including boosts, rockets, thrusts, and twirls. In the free routine, there are no restrictions on music or choreography. Judges of each routine look for a high degree of difficulty and risk, flawless execution, innovative choreography, pool coverage, patterns, perfect synchronization with one another and with the music, and a seemingly effortless performance.



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UNDERWATER SPORTS







EVENT OVERVIEW

The three most popular underwater team activities are hockey, rugby, and soccer. They have fewer players than their on-land counterparts, and because nearly all the action takes place beneath the surface, these strenuous subaqua sports are naturally not big spectator attractions. However, they have an enthusiastic and growing band of participants in Australia, Europe, and North America, and many scuba divers use the games as a form of recreational training.

I LOVE WATER HOCKEY

A fast-moving game played competitively by some and for fun by others, often as a means of keeping fit for another underwater pursuit, water hockey is a noncontact sport in which size and strength are not important, so it is often played at local level by mixed teams.

UNDERWATER HOCKEY

Matches are contested between two teams of six players who are chosen from a squad of 12. Matches are 33 minutes long, each half lasting for 15 minutes, with a three-minute break when the teams change ends. The object of the game is to outscore the opposing team. A goal is scored by hitting a puck into a 9 ft 10 in x 10 in (3 m x 25 cm) wide goal using a plain white or black wooden or plywood stick. Players take turns at being under the water. If there is no winner at full time, a period of overtime (two five-minute periods) will be played. If there is still no winner, the team who scores the next goal is declared the winner.

UNDERWATER RUGBY

Usually played with a round rather than an oval-shaped 10 in (25 cm) ball, this six-a-side game for men and women is known as rugby because opponents may be grabbed and tackled as long as they are in possession of the ball. A tackled player must release the ball, which is filled with dissolved salt, when tackled. The goals are metal buckets 16 in (40 cm) in diameter, situated on each end of the floor of the pool. A foul is called if the ball leaves the water.

Agile and fast As maneuverability and speed are important, softer, free-diving fins are often used Ear protection A blow to the ear can easily burst an eardrum, so ear protectors are required in tournament games Touch or no touch? The wooden hockey Rapid breathing stick must not be A large-bore snorkel allows faster intake more than 14 in (35 cm) long, including the handle of air, reducing time spent at the surface Safety gear Players must wear a diving mask, a cap, and at least one reinforced glove **PLAYING TOGETHER**

Deep puck

The puck must be 25/8 in

(80 mm) in diameter, 1 in

(30 mm) thick, and weigh 3 lb (1.3 kg)

UNDERWATER SOCCER

A five-a-side game somewhat misleadingly named since players may use their hands. The object is to propel a sand-filled ball into the opposition goal. To score, the ball must be placed in the goal area of the gutter at the side of the pool in such a way that the ball rests for a moment while still in the scorer's grasp. A match is 10 minutes each way, with a three-minute half-time interval. If the match is tied, an extra 10 minutes is played to determine the winner.

INSIDE STORY

NOT VERY MANY PEOPLE PLAY

MALE-FEMALE TEAMS.

UNDERWATER RUGBY; BECAUSE OF

THIS, IT IS OFTEN PLAYED IN MIXED

NEED2KNOW

not allowed.

Swimming costume, mask,

snorkel, and fins are worn-

The first underwater rugby

wetsuits and weight belts are

world championship took place in 1980 in Mülheim an der Ruhr

in Germany, the birthplace of

underwater rugby.

Underwater hockey emerged in the 1950s, and was followed 20 years later by soccer and rugby. The 2006 Underwater Hockey World Championships were contested by 17 nations. The first world underwater rugby championship was held in Germany in 1980.

GOVERNING BODY

World tournaments are run by the Confédération Mondiale des Activités Subaquatiques (CMAS), which was established in 1959.

NEED2KNOW

254

- There were eight Olympic class boats selected for the 2016 Games.
- At the 2012 Olympics, six male classes (Sailboard, Laser, 470, Star, Finn, 49er) and four female classes (Sailboard, Laser, 470, and Yngling) were selected.
- At the 2008 Olympics, three classes (Finn, 49er, and Tornado) were open to either sex. Open classes were discontinued for 2012.

COMPETITOR PROFILE

For racing sailors, physical fitness and strength are important, but mental skills and attitude are the key to success. Upper-body strength is needed for hoisting and trimming (adjusting) sails, plus leg strength to move around the boat quickly, and a strong trunk to hike or lean out. Quick thinking and a fast reaction time are essential, as racing is all about tactics and using the ever-shifting elements to maximum advantage. Racing can start young. Children race tiny dinghies, many Olympic athletes are in their mid-twenties, and around-the-world racers are often much older than sportsmen competing at international levels in other sports.

BUILT FOR SPEED

Boats raced in the Olympics are small, with between one and three crew members. A typical Olympic boat will have a large sail area for such a small, light boat and a planing hull, which allows it to skim over the water and minimizes drag.

Physical agility
The crew hikes out as far as possible, using a trapeze, to balance the weight of the wind in the sails. Quick reflexes are needed to react to wind shifts and avoid tipping

Luffing the mainsail The luff (front edge) of the mainsail should not flutter, or speed will be reduced

The slot

A slot between mainsail and iib, with sides as parallel as possible, gives a clean wind flow over both sails

Avoiding a flutter

The leech (back edge) of the jib should not flutter, or speed will be reduced

Steering

The helm steers as steady a course as possible and controls the mainsail, working with the wind

Foresail

The crew adjusts the foresail to work efficiently with the mainsail

Smooth sailing

Keeping the hull level in the water maximizes hydrodynamics and is the fastest way to sail

SIDELINES

1851 The year in which the yacht America challenged English boats to race around the Isle of Wight, England, for a trophy that has since become known as the America's Cup.

The age of the oldest competitor to date in the Velux 5 Oceans Single-Handed Race (Sir Robin Knox-Johnson).

The VHF Radio channel dedicated for use in an emergency at sea to request help from coast guard or other vessels.

The number of feet (1,852 m) in a nautical mile—a standardization of the measurement of I' (minute) of latitude.

The number of sailors competing in the annual Kiel Week regatta, in northern Germany, in 2,000 boats.

ILING









EVENT OVERVIEW

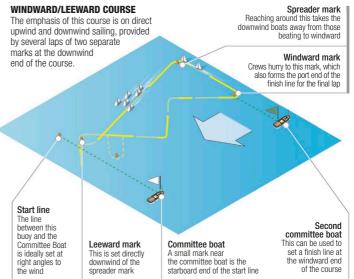
Sailing has been described unjustly as akin to standing under a shower ripping up money while someone is throwing buckets of cold water at you. It is an exhilarating and demanding sport, both physically and mentally. There are many different types of racing governed by strict international rules, as well as local regulations. Racing may be on lakes or coastal bays and estuaries, around courses defined by temporary marks; in coastal waters, using fixed navigational marks to define the course; or far offshore across entire oceans. Sailors may race single-handed, in a small crew, or in a crew of more than 20 athletes.

WHERE THEY RACE

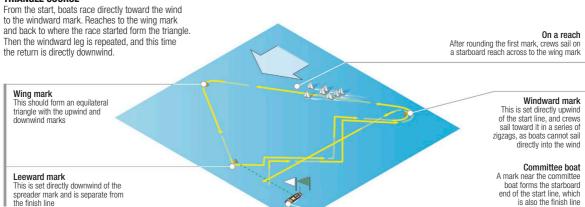
Offshore races usually follow a route delineated by fixed navigational buoys. Shorter coastal and inland races have temporary race marks laid in such a way as to provide the best test of sailing ability for the conditions of the day.

OLYMPIC COURSES

Racing is based on short events of 30 to 75 minutes. A classic Olympic course has a distance of 1 mile (1.6 km) between race marks, which are set to provide a variety of different sailing angles. Beating (sailing toward the wind, or windward) provides the best test of ability, and the windward leg is the most important part of the course. On an Olympic course, such as the triangle course below, the windward leg will be sailed twice, and there will be at least one leg downwind (sailing away from the wind). Reaching (sailing between 45° and 135° to the wind) is the easiest and fastest point of sailing, and usually there will be one reaching leg in each direction relative to the wind. The start line is ideally set square (at right angles) to the wind to provide a fair, unbiased start for all the boats.



TRIANGLE COURSE

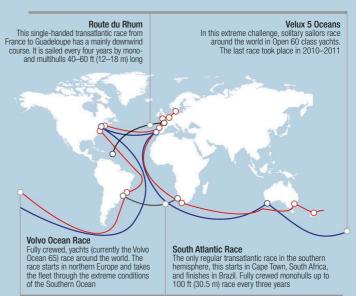


OCEAN RACING

Ocean racing is the pinnacle of yachting challenges—the ultimate test of both boats and sailors. These races are long (often lasting many months) and grueling, taking competitors far from the shelter of home waters.

All ocean races are held under the Racing Rules of the International Sailing Federation (ISAF). Some are raced single-handed, testing the endurance of a single yachtsman or woman. They face extreme loneliness and tough challenges, but most do endure and are recognized for their skill and resilience in adversity. Other races are sailed with a large crew, where the skill of the skipper is in leading a team that can work and live together at close quarters through storms and calms. Interestingly, it is often the calms that produce severe psychological difficulty; the phenomenon of drifting aimlessly through the ocean, far off the planned course because there is no wind to drive the boat, creates frustrations that many sailors find difficult to deal with.

Ocean racers must be resourceful. They must know how to achieve the best sailing speeds from their boats and be able to navigate safely through unmarked oceans. They must also deal with breakages of equipment that occur in stressful conditions, improvising repairs to complex equipment with only the most basic of materials or tools on hand.







WHAT THEY RACE

Boats of all sizes may have one hull (monohulls) or two or three parallel hulls (multihulls). A boat with two hulls is a catamaran, while a boat with three hulls is a trimaran. Racing boats have a large sail area for the size of boat and underwater foils (the fins and rudder) to minimize leeward drift (the sideways force of the wind). Designers constantly strive to find ways to construct boats with even lighter materials and are always looking for ways to improve the balance between speed and safety.

OLYMPIC CLASSES

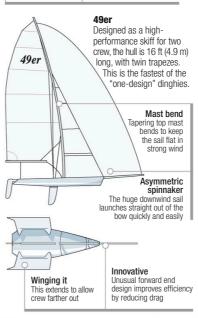
Boats sailed for Olympic events are measured to precise formulas so that craft in any one class are as nearly identical as possible. The test is then of the athlete's skill, not that of the boat builder. Classes are chosen by the International Sailing Federation (ISAF), and occasionally changes are made to the list to reflect developments in boat design and the greater athleticism of sailors.

The Laser, Laser Radial, and 470 dinghies are very popular and commonly sailed in club racing throughout the world, both inland and in coastal waters. The Tornado catamaran, high-performance 49er skiff, and the Yngling and Star keelboats are less commonly seen outside elite racing circles. The Tornado was not selected for the 2012 Olympics.

GETTING THE EDGE

Racers work hard to find ways to "tune" or "tweak" their boats to achieve a technical edge over competitors. The measurement rules are strict, so everyone is using the same equipment, but even very small adjustments to rigging or sails might produce a tiny advantage that could lead to a big medal.

LASER This 14 ft (14.2 m) monohull dinghy is popular worldwide. It is simply designed, mainly for single-handed sailing, with basic rigging. Sleeved sail The single sail has a "sleeve" that slides over the mast **Control lines** All controls must be rope, with no high-tensile strength materials such as Kevlar Within the rules Unstayed mast The tall mast is supported through a slot in the deck Design is governed by class standards



The single hull is 15 ft 5 in (4.7 m) long, designed for a crew of two. A trapeze helps crew keep the planing hull 470 level in the water. Stayed mast The mast is supported by stainless-stee wire rigging "Bermuda" rig Conventional mainsai and iib give a large sail area with a spinnaker for downwind sailing Adjustable foils Self-buoyant As on all dinghies, the The lightweight hull includes integral buoyancy tanks centerboard and rudder can be raised as required



OCEAN RACERS

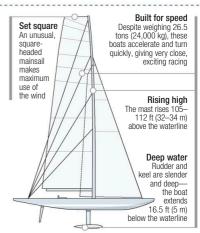
Some ocean racing events are open to any type of boat, often grouped into classes of different-sized yachts handicapped according to criteria such as weight and sail area. Other events are for "one-design" classes.

Yacht designers are constantly searching for ways to combine lightweight materials such as carbon fiber with the strength needed to deal with huge forces and potentially heavy seas. Those boats destined for around-the-world racing are extremely robust vet also sleek and hydrodynamic. They have strong mechanisms for handling huge sails and up-to-date electronic navigation and communications equipment safety is a serious consideration in this dangerous sport. There also has to be some living accommodations; the crew must be able to sleep and eat in order to maintain their ability to perform under arduous conditions. But space and weight are at a premium, so there are no frills, and the crew will be expected to "hot bunk" (alternate in bunks) to save space.



OCEAN RACER (VOLVO 70)

This 70 ft (21.3 m) monohull yacht was designed for the 2005–2006 Volvo Ocean Race. A core crew of nine sails the boat (11 for an all-female crew), with 11 different sails (excluding storm sails) to choose from.



AMERICA'S CUP CLASS

This is a design-restricted class that is newly developed for each series of challenges. The boats are 49.5 ft (15 m) long catamarans fitted with an 28 ft (8.5 m) high beam. A crew of six racers is stipulated.

PARTS OF A BOAT

All sailing boats consist of a hull; a rig with spars, such as mast and boom; sails; and underwater foils for steerage and to resist leeway (sideways drift). Fittings and control systems vary in size and complexity but are recognizable from boat to boat. Many sailing boats are at least partially decked.

KEELBOAT

A keelboat falls midway between a dinghy and a yacht—larger than most dinghies but with a ballasted keel or centerplate instead of the dinghy's adjustable centerboard. Keelboats are considerably more stable than dinghies and less likely to capsize. Below-decks accommodation is usually either absent or rather cramped, but an open cockpit may have room for several crew members.

Mainsail

Most racing boats have a triangular mainsail extending right up to the top of the mast

Mainsheet

A rope-and-pulley system attached to the main boom is used to control the mainsail

Sheets to the wind

The ropes used to control the sails are known as sheets

On course

In smaller keelboats and dinghies, the rudder is controlled via the tiller in the cockpit; larger yachts use a wheel

Steerage

Turning the rudder from one side to another changes the direction of the boat



The bellying downwind sail is set on a spinnaker pole. Modern asymmetric spinnakers are set off a bowsprit

Foresail

A standard foresail is a jih that reaches from the bow (front) of the boat back to the mast. A larger foresail, which overlaps the mainsail and sweeps the deck, is known as a genoa

Strong spars

Mast and booms may be made of aluminum, fiber-reinforced plastic or lightweight modern composites reinforced with carbon fiber

Boom

While the mast supports the sails vertically, the boom supports the mainsail laterally

Halvards

Ropes used to raise and lower the sails are called halvards and are usually fastened close to the mast

Keel

The keel resists drift caused by pressure of wind on the sails, turning this sideways pressure into forward motion.

A ballasted (weighted) keel makes capsize unlikely

WHAT THEY WEAR

Keeping warm, comfortable, and dry is part of safety on the water. Specialized fabrics and specially designed clothing are an important part of successful racing.

DINGHY

Buoyancy aids must be worn by all racing dinghy crews, and wetsuits are worn by most racers. There is a choice between a full suit-covering from neck, to wrist, to ankle-and a shortie, which leaves lower legs and arms bare

Buoyancy aid Helps flotation without impeding swimmingessential in a craft liable to capsize





Sailing gloves With or without finger

ends, gloves with reinforced palms protect hands from rope burn and aid arip on the ropes

Dinghy shoes

Wetsuit shoes keep feet warm and grip the side decks firmly and safely

Life jacket An inflatable life jacket is worn folded flat, to be inflated only if the wearer falls into the water. It is designed to turn the wearer face up in the water

Overalls

Chest-high waterproof pants, which can also be worn over warm fleece layers, are heavily reinforced at seat and knees

Jacket

A wind- and waterproof jacket with tightly fitting cuffs is essential. A high collar helps keep the wind and water out

OFFSHORE/OCEAN

There are times when a vacht crew can strip to shorts and T-shirts in the sunshine, but foul-weather clothing is usually essential. Clothing systems are based on layering for warmth, with the top layer as waterproof as possible.

Full gloves

Waterproof gloves protect from the elements and from rope burn while also giving better grip

Yachting boots

Knee-high boots with soft rubber, nonslip soles are worn underneath the pants











RACING RULES

All yacht and dinghy racing is governed by rules established by the International Sailing Federation (ISAF), with local rules applying if circumstances demand. The rules are complex and, to race successfully, competitors must know them all in detail and be able to apply them tactically.

TACTICAL RACING

Sail racing is about tactics. To the uninitiated, some of the maneuvers undertaken during racing may look like shady practices, but when both helms know the rules thoroughly, each should use the rules to the fullest extent possible in order to gain an advantage. This is most noticeable to spectators in match racing—such as the America's Cup races—where two evenly matched yachts race boat-for-boat over a short course.

The Race Committee is not responsible for making sure that rules are not infringed. Sometimes it is possible to have referee boats out on the water, watching all competitors, especially at the turning marks. Otherwise, one boat can "protest" another for infringing rules, by raising a red flag. If the protest is disputed, the Protest Committee will take evidence from both boats after the race to adjudicate.

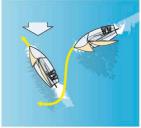
WINNING ISN'T EVERYTHING

RACING RULES STATE, "A BOAT OR COMPETITOR SHALL GIVE ALL POSSIBLE HELP TO ANY PERSON OR VESSEL IN DANGER." IN 2006, SAILORS IN THE VELUX 5 OCEANS RACE (SINGLE-HANDED) RAN INTO SEVERE STORMS. ALEX THOMSON'S YACHT *HUGO BOSS* LOST HER KEEL, AND HE WAS FORCED TO TAKE TO HIS LIFEBOAT. MIKE GOLDING IN *ECOVER* WAS SEVERAL HOURS AHEAD, IN SECOND PLACE, BUT TURNED BACK TO RESCUE HIS FRIEND. "THAT IS THE GAME," HE WROTE. "THAT IS WHAT WE DO." SOON AFTER, *ECOVER*'S MAST BROKE AND SHE, TOO, WAS FORCED OUT OF THE RACE.



STARBOARD RIGHT OF WAY

If two boats are approaching each other on opposite tacks, the boat on port tack (with the wind coming from the left side of the boat) must always stay clear of the boat on starboard tack (with the wind coming from the right side of the boat).



WINDWARD BOAT STAYS CLEAR

When two boats are on the same tack (both have the wind on the same side of the boat), the windward boat (the one closest to the side the wind is coming from) must stay clear of the other boat.



OVERTAKING BOAT STAYS CLEAR

A boat overtaking another on the same tack must stay clear until the masts are level. The boat being overtaken can "luff" (sail closer to the direction the wind is coming from) to force the overtaking boat off course, but only until their masts are level.



OVERLAP AT A MARK

When two boats are on the same tack at a mark, the outside boat must give the boat overlapping her on the inside room to round or pass the mark without touching it, including room to tack or jibe if necessary.

TACTICS AND TACKS

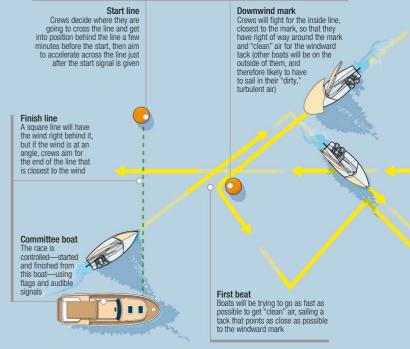
The course shown on the right is the standard Olympic course involving all points of sailing. Racing requires not just technical skill but also clever use of tactics to exploit any advantage possible and to disadvantage the opposition.

BEATING TO WIN

Sailing directly into the wind requires a zigzag course, known as "beating." Each time the boat changes course so that the wind passes across the bow (front) of the boat, it is said to "tack." If the wind comes from the side of the boat, the sails are not hauled in so tightly and the boat is said to be "reaching." With the wind directly behind, the boat is "running." A turn so that the wind passes across the stern (back) of the boat is called a "jibe."

STRATEGIC STARTS

Approaching the start line, starboard tack is the safest tack since it confers right of way. A skilled helm (helmsperson) may judge there is room to approach the line and cross it on port tack before meeting a starboard tack boat. If that judgment is wrong, the port tack boat can be forced early over the line by a boat approaching fast on starboard tack. The penalty for that infringement is a detour around the end of the start line and back over it from the correct side—behind most of the fleet.



ON THE START

Sail races are usually set to start directly into the wind. A Race Committee Boat marks the start line, anchoring in the starting area, and a mark buoy is laid close to it. An outer distance mark is then anchored in position to make a line that is directly at right angles to the wind. (In shifting winds, this line may have to be laid and relaid several times.) The first mark is then laid directly upwind, at right angles to the start line. If several classes are racing, scheduled so that starts are spread over time, the wind may shift so that the line is no longer square to the wind. This can give an advantage to boats starting at one end of the line or the other—yet another tactical element to add to the skippers' calculations.

COUNTDOWN

Each class racing is identified by a separate code flag. An audible signal is given each time a flag is hoisted or lowered. The class flag is raised five minutes before the start and the preparatory signal (P) at four minutes. The preparatory signal is then lowered one minute before the start and the class flag at the point of go. Referees check that no boat is over the line at the start: if a boat is over, the Committee will signal that the boat is over and it must return via the outer distance mark and start again. An "over" boat that does not restart will be disqualified.

PORT-END BIAS

If the wind shifts so that the outer distance mark lies at less than 90° to the wind, boats at the port (left-hand) end of the line will have a shorter distance to sail to the first mark. This creates crowding at that end of the line as boats jockey for position.



SQUARE LINE—NO BIAS

With a start line that is properly square to the wind, boats should be evenly spread along its length, giving all an equal distance to sail to the first mark.



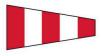
STARBOARD-END BIAS

If the wind shifts so that the outer distance lies at more than 90° to the wind, boats at the starboard (right-hand) end of the line will have the shorter distance to sail to the first mark. With the extra obstruction caused by the committee boat, this can become a tricky start.

Wing mark Boats will try to jibe round the mark as smoothly as possible, protecting their "clean" air from other crews seeking to "steal" their wind and overtake them On a reach One of the most important things on a reach is to keep "clean" air. especially if flying a spinnaker Running for the line On the final leg, crews will be looking for the areas of strongest wind to fill the sails and give the boat maximum possible speed Second beat By the second windward leg, boats will be more spread out, and crews have more Windward mark Boats will try to come in on a starboard room to choose their line and concentrate tack, giving them right of way over any boats that approach on a port tack on sailing as fast as possible

FLAGS

Races are controlled by visual signals, supported by audible signals. Internationally recognized racing signals use maritime code flags. Audible signals are also given—such as gun, whistle, or hooter, but it is the visual signal that counts for timing.



ANSWERING **PENNANT**

Race is postponed; numeral signals tell how long the postponement will last



ANSWERING PENNANT OVER "A" FLAG

No more racing today.



"N" FLAG

Race is abandoned.



"P" FI AG

Preparatory signal (four minutes before start); competitors are now under Racing Rules.



Indicates there are boats over the start line at the start gun.



FIRST SUBSTITUTE

General recall due to several yachts infringing the start line-too many to identify individuals.



"S" FLAG

The course has been shortened.



"C" FLAG

The position of the next mark has been changed.



"L" FLAG

Come within hailing distance.



An object displaying this signal is replacing a missing mark.



"R" FLAG

Sail the course in the reverse direction to the sailing instructions.



BLUE FLAG

This Race Committee boat is on station on the finish line.







SAILING TECHNIQUES

Sailing is all about using the wind to the greatest advantage to gain speed and reach a specified destination. This involves the set of the sails and the hydrodynamics of the hull in the water. It all starts with boat design. But how the sails are adjusted and how the boat is balanced by the crew are the techniques that sailors must learn.

POINTS OF SAIL

Each time a boat alters its angle to the wind, the set of the sails must be altered. In a dinghy, the crew's weight must be adjusted to trim the balance of the boat fore and aft and from side to side. Each different point of sailing has a technical name.

SIDELINES

The number of nations that shared 30 medals in Olympic sailing events in Rio 2016.

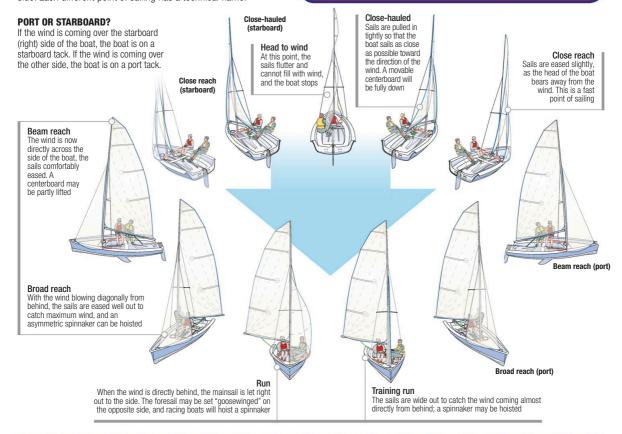
1.5 The estimated cumulative television audience, in billions, for the 2011–2012 Volvo Ocean Race.

181,000

The number of adult single-handed Laser dinghies sailed in 120 countries.

22,500

The number of nautical miles (25,892 miles/41,670 km) sailed in the longest nonstop yacht race, the Vendée Global Challenge.



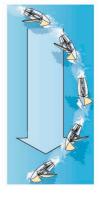
TURNING THE BOAT

To change the direction of the boat, both sails and rudder need to be adjusted. Sails provide most of the power: pulling in the mainsail ("luffing") turns the boat toward the wind, and letting it out turns it away from the wind. At the same time, the tiller or wheel is turned to move the rudder and the jib is adjusted to work efficiently with the new mainsail position. If the boat is racing, tacking and jibing are critical maneuvers that need to be carried out with complete crew coordination. Lack of precision can cost vital seconds, and crews will spend hours practicing tacking and jibing to ensure the turns are as quick as possible.



TACKING

If the wind direction across the bow is changed, the sails "tack" to the other side of the boat. To change tack, the crew pulls in both sails and adjusts the rudder. As the boat moves through the head-to-wind position and onto the new tack, the sails flip onto the other side of the boat. The idea is to do this as quickly and smoothly as possible without losing any forward momentum



JIBING

Changing direction with wind crossing behind the boat is less easy to control than a tack; on a broad reach or run, the sails will be far out to one side. To "jibe" the sails, they are first brought in as far as possible without altering course, then as the tiller or wheel is turned hard. the boom and mainsail jibe across the boat onto the new side. Sails are adjusted quickly to keep the boat sailing smoothly.

STAT CENTRAL

AROUND THE WORLD (ONE-HANDED/VELUX 5 OCEANS)

BOAT/SAILOR (COUNTRY
LE PINGOUIN	
BRAD VAN LIEW	USA
CHEMINEES POUJOULAT	
BERNARD STAMM	SUI
BOBST GROUP ARMOR L	JX
BERNARD STAMM	SUI
FILA	
GIOVANNI SOLDINI	ITA
	LE PINGOUIN BRAD VAN LIEW CHEMINEES POUJOULAT BERNARD STAMM BOBST GROUP ARMOR LU BERNARD STAMM FILA

AROUND THE WORLD (CREWED/VOLVO OCEAN RACE*)

YEAR	BOAT/SKIPPER CO	UNTRY
2017–2018	DONGFENG RACE TEAM	
	CHARLES CAUDRELIER (FRA	A) CHN
2011–2012	GROUPAMA 4	
	FRANCK CAMMAS (FRA)	FRA
2008–2009	ERICSSON 4	
	TORBEN GRAEL (BRZ)	SWE
2005–2006	ABN AMRO ONE	
	MIKE SANDERSON (NZL)	NED
2001–2002	ILLBRUCK CHALLENGE	
	JOHN KOSTECKI (USA)	GER
*FORMERLY WHIT	TBREAD AROUND THE WORLD RACE	

OLYMPIC GAMES RIO 2016				
COUNTRY	GOLD	SILVER	BRONZE	TOTAL
GBR	2	1	0	3
NED	2	0	0	2
AUS	1	3	0	4
NZL	1	2	1	4
FRA	1	0	2	3

INSIDE STORY

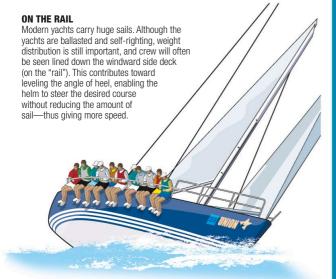
The International Sailing Federation (ISAF) is descended from an organization dating back to 1907, when the International Yacht Racing Union (IYRU) was formed in Paris, France. Yachting authorities were included from France, Austria-Hungary, Holland and Belgium, Finland, Denmark, Germany, Great Britain, Italy, Norway, Sweden, Switzerland, and Spain. They devised a code for measuring racing yachts and rules for racing in Europe. In 1929, the North American Yacht Racing Union aligned its rules with Europe, and in 1960, a worldwide code was adopted. The IYRU became the ISAF in 1996. Some of the rules devised in 1907 are still in use today.

HEELING AND HIKING OUT

The force of the wind on sails naturally makes a boat heel over to one side, but it sails faster if level in the water. In a dinghy or small keelboat, the crew balances the tendency to heel by moving their weight toward and then beyond—the outer edge of the hull. In conventional dinghies, this means sitting on the gunwale (the side of the boat), tucking the toes under the toe straps for grip, and leaning backward over the water. This effect can be enhanced by use of a trapeze—the crew hooks onto a wire attached to the upper mast and stands on the gunwale to lean out over the water. Some modern, extreme boats such as the 49ers have wings that dramatically extend the distance the crew can hike out.

HIKING OUT







NEEDKNOW

- Rowing is governed by the International Rowing Federation (FISA). Founded in 1892, FISA is the oldest federation in the Olympic Games
- Rowing with one oar in both hands is called sweep or sweep-oar rowing, while rowing with one oar in each hand is called sculling.
- Rowers speak in terms of numbers of strokes per minute, with the rating being the number of strokes the crew completes during one minute.

SIDELINES

6,000 The average number of calories consumed each day by an Olympic oarsman to give him enough energy to complete his training program.

The current Olympic record time, in minutes and seconds. set by the US heavyweight men's eight in the 2004 Athens Games.

The number of nations that participated in the 2011 World **Rowing Championships.**

The number of national federations affiliated with rowing's governing body, the International Rowing Federation (FISA).

The average distance rowed each year (in miles, equivalent to more than about 10,000 km) by an Olympic oarsman during training.









ROWING

EVENT OVERVIEW

Rowing can be described as hurtling backward as fast as possible in an unstable craft while ignoring burning lungs and screaming muscles. One of the few athletic disciplines that actually involves all of the body's major muscle groups, rowing demands high fitness and power levels for racing. Many different disciplines have evolved within the sport heavyweight or lightweight events, for example, and sprints or longdistance races—for both individuals and for teams of up to eight crew.

"SHOOT ME"

ONE OF THE MOST SUCCESSFUL **OLYMPIC ATHLETES EVER IS BRITISH** ROWER SIR STEVEN REDGRAVE-THE ONLY ATHLETE EVER TO HAVE WON FIVE CONSECUTIVE OLYMPIC **GOLD MEDALS IN AN ENDURANCE EVENT. IMMEDIATELY AFTER HIS** FOURTH WIN. IN ATLANTA IN 1996. REDGRAVE FAMOUSLY GASPED, "IF YOU EVER SEE ME NEAR A BOAT AGAIN. YOU HAVE MY PERMISSION TO SHOOT ME." HIS RETIREMENT DIDN'T LAST LONG, HOWEVER, AND HE WENT ON TO WIN A FIFTH GOLD MEDAL IN SYDNEY IN 2000.

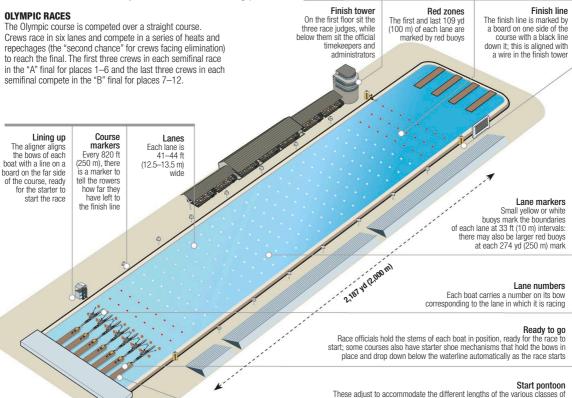


RACE FORMATS

There are many different types of rowing races, reflecting the sport's long history. In addition to standard 2,000 m races, there are time-trial events called head races, long-distance events such as the Tour du Léman, and regattas over non-Olympic distances. In the UK, there are also bumps races that involve a pursuit to "bump" the boat in front, while stake-racing is an American event that involves a race to a marker some distance away and back to the starting point.

Although not included in the Olympic program, there are many coastal and ocean-rowing events. FISA organizes the World Rowing Coastal Challenge as a championship event for international crews, and there are many other cross-ocean races and coastal regattas worldwide.

COASTAL AND OCEAN ROWING



2,000 M RACES

The Olympics, World Cup, and World Championships are all rowed over a standard distance of 1 mile 427 yd (2,000 m). There are 14 different events in the Olympics and the World Cup: eight for men and, since they were first introduced in 1976, six for women. Every year except an Olympic year sees the staging of a World Championship, which has 22 events, including 13 for men and nine for women. World Cup events occur annually as a series of three international regattas at different venues chosen each year. Adaptive rowing events for rowers with physical disabilities were first incorporated into the World Championships program for 2002 and the Beijing Paralympic Games for 2008.

LIGHTWEIGHT ROWING

Rowing is unusual in that it is one of few noncombat sports to have a special weight category for lightweights. This allows countries with "less statuesque" people to participate in the sport. For men in the lightweight class, the crew average must be $154\frac{1}{3}$ lb (70 kg), with no individual crew member weighing more than $159\frac{3}{4}$ lb (72.5 kg); for women, the crew average is limited to 125 lb (57 kg), with an individual maximum of 130 lb (59 kg) for each crew member. Lightweight events were first included in the World Championships in 1974 for men and 1985 for women and were added into the Olympic program in 1996.

HEAD RACES

An alternative to side-by-side racing, a head race is essentially a time trial and can involve hundreds of crews setting off in procession seconds after each other and chasing each other down the course. The oldest, founded in 1926, is the Head of the River Race on the Thames in London, UK; the largest is the Head of the Charles in Boston, Massachusetts, which is the largest two-day rowing event in the world.

boat racing to ensure they all align with the starting line correctly

OTHER RACES

Over time, various other events have established themselves in the rowing calendar. First held in 1829, the Oxford and Cambridge Boat Race is contested annually by the two English universities over a course of 4 miles 374 yd (6,779 m) on the Thames in London, UK. Yale and Harvard universities have been having a similar annual battle since 1852 in New London, Connecticut. There are many other variations on university races and on regattas over distances other than 2,000 m, such as Henley Royal Regatta. Established in 1839, this unique and prestigious international event races crews side by side two abreast down a course that is 1 mile 550 yd (2,112 m) long. In 1988, the first Henley Women's Regatta was held, and in 1993, Henley Royal Regatta introduced its first event for women for single sculls. This has since been followed by events for eights and quads.

The difference between rowing and sculling lies in the number and size of the oars used—the shells used are the same, just rigged differently to accommodate the respective number of oars.

ROWING

Competing in combinations from a pair to eight, rowers have one blade each. Many rowers have one preferred side, just as most people have a preferred writing hand.

Scullers have two oars, one in each hand. Although octuples (eight scullers in a boat) do exist, most sculling events are for combinations from a single to a quad (containing four scullers).



EVENTS

The classification system used to describe rowing events uses a mixture of characters:

- L OR LT: The event is for lightweights.
- J: The event is for under-19s. B: The event is for under-23s.
- M: The event is for men.
- W: The event is for women.
- 1: The number of athletes in the boat; the number will be either 1, 2, 4, or 8.
- X: The event is for scullers.
- + OR signifies whether a cox is or is not present.

So, for example, LM4x denotes a lightweight men's quad, while W8+ is a heavyweight women's eight. There are further classifications at national level to denote experience or handicap levels, or age classifications for veteran rowers, but these vary from country to country and most are not used for international competition.

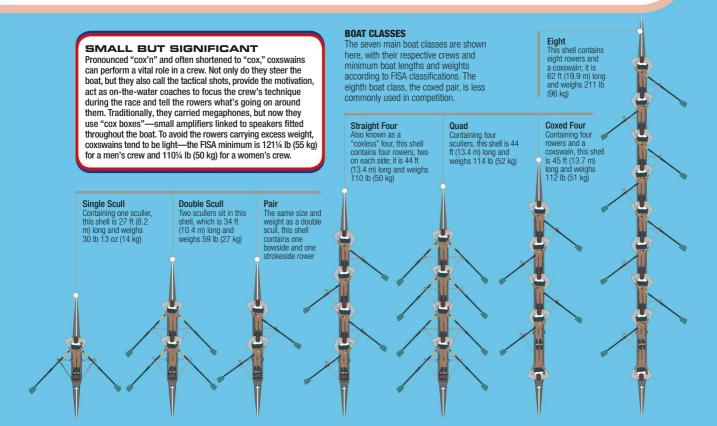
BOATS AND BLADES

Rowing equipment is expensive and is usually owned and maintained by rowing clubs or squads, although many scullers own their own single scull. For racing, rowers usually wear a one-piece suit in club or national colors. This garment is designed to be tight fitting to avoid snagging on the boat or blades during the race. Additional layers of breathable clothing may be worn depending on the weather conditions.

Traditional wooden rowing boats have been largely replaced by boats made from modern materials such as carbon fiber and fiberglass. The shell has a long, narrow shape to cut through the water with minimum drag. The length conforms to the rules of FISA and varies according to the class (minimum requirements shown below). The shells range from 231/2 to 241/5 in (59.7 to 62.2 cm) wide. A small fin or skeg is fitted to the hull for stability, and a small rudder will be attached to all classes of boats except single and double sculls.

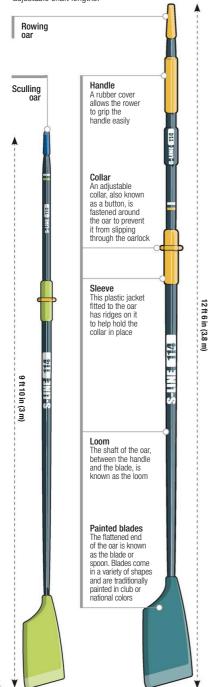
STEERING

Most racing shells have rudders not much larger than a credit card, and these are connected to rudder wires that feed back into the boat. If the boat is coxed, the coxswain will control the rudder (see box below): if not, the rower or sculler nearest to the bow (the front of the boat) will usually control the steering via a movable footplate to which the rudder wires have been attached. He or she may have to look around to check the direction of the boat at regular intervals, depending on how straight the course is.



264

Modern oars are usually made of hollow carbon fiber. Lengths given are averages, as many designs have adjustable shaft lengths.



BOAT BASICS

Rowing shells are light, guite fragile. and built in different weights and strengths to suit a crew's size and weight. They are very unstable without their oars in place.

Bowball

Every boat must have a rubber bowball secured to its bow. The bows of the boat would otherwise be very sharp, so bowballs can prevent any nasty spearings if a collision occurs

Canvas

The narrowing sections of the hoat between the crew area and the bow or stern are named after the material historically used to cover them Crews that win by just over 3 ft (1 m) are said to "win by a canvas"

Sliding seat

The seat is mounted on wheels that roll back and forth on rails (slides) fixed to the shell. The sliding seat allows the rower to use the legs to drive the oar through the water

Fixed feet

Shoes are bolted to an adjustable footplate within the boat. Fixing the feet provides the rower with a strong platform from which to push the legs and drive the oar through the water Shoes have quick-release Velcro straps in case the boat capsizes

Built for speed

A modern shell is made from lightweight materials such as carbon fiber and shaped to cut through the water. It has to be as light as possible yet strong enough to support the crew

ROWING RULES

Within each country, there is a national governing body with its own rules for rowing and sculling events. Although these rules vary slightly, they all exist to ensure that races run safely and fairly. Each national governing body is a member of the International Rowing Federation (Fédération Internationale des Sociétés d'Aviron: FISA), which is the world governing body for the sport.

RACES AND REGATTAS

Regattas take place under the supervision of a committee of race officials headed by a chairman. Before a crew takes to the water, officials check that the crew and the boat conform to the rules of the sport. At the start of the race, each crew lines up in lane and are held in place either by an electronic mechanism called a starter shoe or by an official while the aligner checks that all of the boats are lined up correctly. A loud beep or gun may be used to start a race, the starter may call "Go," or a "traffic light" system may be used. At this point, the boats are released and the race gets underway. In the event of a false start, a bell is rung and the starter waves a red flag to recall crews. Crews are allowed one false start only before being disqualified.

An umpire follows each race down the course to ensure that there are no steering infringements, for which crews can be disqualified. A hooter sounds as each boat crosses the finish line, and the umpire raises a white flag at the end of a race to confirm that it has been completed properly. The winner is the boat whose bow is deemed to touch the finish line first. Three photo-finish judges adjudicate if the race is too close to call. A jury of at least three officials, appointed by the race umpire before a race, resolves any formal protests arising out of competition.

CATCHING A CRAB

ft (8.2 m)

THE ROWER'S ULTIMATE NIGHTMARE IS CATCHING A CRAB—NOTHING TO DO WITH THE CLAWS OF CRUSTACEANS. BUT STILL VERY PAINFUL. CRABS ARE CAUSED BY THE BLADE ENTERING THE WATER AT THE WRONG ANGLE, WHICH SLICES THE BLADE DOWN AND CAUSES THE OAR HANDLE TO SHOOT UPWARD OR BACKWARD FAST-SOMETIMES FAST ENOUGH TO CATAPULT A ROWER OUT OF THE BOAT OR CAPSIZE IT. AND THAT'S IF THE ROWER'S LUCKY—IF HE OR SHE IS UNLUCKY, THE HANDLE SLAMS INTO THEIR RIBS INSTEAD.



THE ROWING STROKE

Although rowing may look like an upper-body sport, the power in a rowing stroke comes from the legs. Rowers sit facing backward (toward the stern) holding an oar or oars and propel the boat forward by pushing with the legs. The technique is fundamentally the same for both rowing and sculling and involves four key phases (see below)—the secret is to flow smoothly from one phase to the other. Good rowing looks graceful and effortless, but this belies the tremendous power and physical demands required. Applying the necessary power smoothly enough to avoid acting as a brake on the boat while also maintaining balance and keeping in time with the crew is a task that requires great technical skill and many hours of practice.

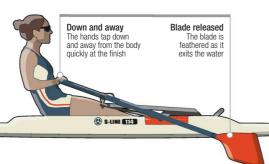
TAKING THE CATCH

The rower leans forward with knees compressed so that the shins are vertical. With arms outstretched for maximum "reach," the rower places the oar blades vertically ("squared") in the water and starts to push with the legs against the footplate.



3 THE EXTRACTION

Also known as the finish or the release, for this phase the rower pushes down on the handle of the oars to lift the blades out of the water. Once the oars are clear of the water, the rower rotates the handle to "feather" or position the blades parallel to the water, which cuts down on air resistance.



INDOOR ROWING

Most indoor rowing takes place on an ergometer (often shortened to "ergo" or "erg"), which is a land-based machine designed to simulate the experience of rowing. The ergo is a useful training tool and allows coaches to test a rower's performance and power output. It can be a factor in making crew selections, although performance on the ergo does not always equate directly with performance on the water, where technique and balance also play a critical factor. Indoor rowing has also become a competitive sport in its own right. There are numerous local and national competitions worldwide, with hundreds of thousands of participants, and an annual world championship event called the CRASH-B Sprints, which is held in Boston, Massachusetts.

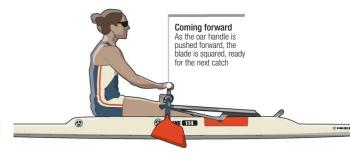
2 THE DRIVE PHASE

As the legs engage and start to power the blades through the water, the seat slides backward. The rower uses the momentum gained through the leg drive to draw the blade handles toward the body and leans back slightly to optimize the stroke length.



RECOVERY TIME

The rower begins by stretching the hands forward beyond the knees, with the blades initially still parallel to the surface of the water. The body then rocks forward to be ready in the catch position, while the hands are rotating the oar handles to square the blade and the legs are compressing to bring the body forward for the next catch.



SIDELINES

250,000

The number of spectators lining the banks of the Thames River each year to watch The Boat Race between Oxford University and Cambridge University.

7,500 The number of competitors competing in the annual Head of the Charles race in Boston.

20¹/₂ The lung capacity in pints of British rower Peter Reed (equivalent to 11.68 liters and more than double that of the average person).

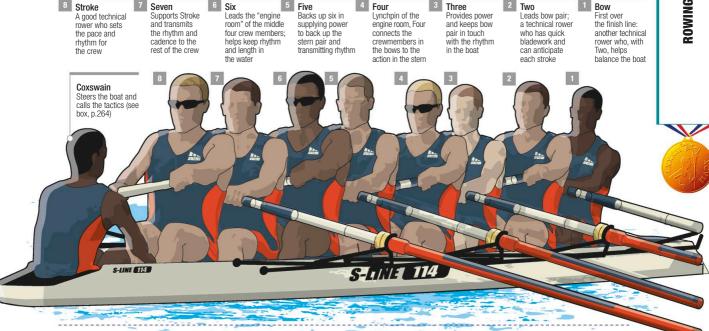
of victory in seconds over the Canadian boat when British rower Matthew Pinsent took his fourth consecutive Olympic gold in the men's coxless four in the 2004 Athens Olympics. Pinsent's teammates were James Cracknell, Ed Coode, and Steve Williams.

RACING TO WIN

Rowers talk in terms of "rating"—the number of strokes a crew completes in a minute. At the start of a race, the stroke rate will be high—upward of 50 for a men's eight—as the boat sprints away. During this phase, the rowers are working hard and building up lactic acid in their muscles. Once the boat is up to speed, the crew settles into its race pace and the rate steadies out—around 38–40 for a men's eight. At tactical points in the race, or to counter threats from the opposition, there may be a call for a "power 10" on the legs or an "up two" of the rating. Approaching the finish, crews wind up for another sprint and the stroke rate rises again—46 or more is not uncommon—and the rowers' muscles and lungs will be burning even more than they did at the start. A high rate does not always guarantee speed. however; a good technical crew may go faster than a less able crew rowing at a higher rate.

TFAMWORK

Aside from the single scull, rowing requires a high level of teamwork. One rower cannot pull a crew to victory alone; it takes the whole crew to win. Bladework and timing must be synchronized; body positions and movements must be coordinated. Crews are numbered from the bow through to the stern, with Bow first, then Two. Three, and so on through to Seven and finally Stroke.



STAT CENTRAL

WORLD BEST TIMES (MEN)			
CLASS	CREW	TIME	YEAR
M1X	NEW ZEALAND (R. Manson)	6:30.74	2017
M2-	NEW ZEALAND (H. Bond, E. Murray)	6:08.50	2012
M2X	CROATIA (Valent Sinkovic, Martin Sinkovic)	5:59.72	2014
M4-	GREAT BRITAIN (A. Triggs-Hodge, T. James, P. Reed, A. Gregory)	5:37.86	2012
M4+	GERMANY (J. Dederding, A. Weyrauch, B. Rabe, M. Ungemach, A. Eichholz)	5:58.96	1991
M4X	UKRAINE (Artem Morozov, Ivan Dovgodko, Olexandr Nadtoka, Dmytro Mikhay)	5:32.26	2014
M8+	GERMANY (M. Jakschik, M. Sauer, R. Schmidt, J. Weissenfeld, T. Johannesen, J. Schneider, M. Planer, H. Ocik, F. Wimberger)	5:18.68	2017

WORLD BEST TIMES (WOMEN)			
CLASS	CREW	TIME	YEAR
W1X	BULGARIA (R. Neykova)	7:07.71	2002
W2-	NEW ZEALAND (G. Prendergast, K. Gowler)	6:49.08	2017
W2X	AUSTRALIA (S. Kehoe, O. Aldersey)	6:37.31	2014
W4-	NEW ZEALAND (G. Prendergast, K. Pratt, K.Gowler, K. Bevan)	6:14.36	2014
W4X	GERMANY (A. Thiele, C. Baer, J. Lier, L. Schmidla)	6:06.84	2014
W8+	USA (E. Regan, A. Polk, K. Snyder, K. Simmonds, G. Luczak, H. Robbins, L. Schmetterling, V. Opitz, C. Lind)	5:54.16	2013

INSIDE STORY

"Modern" competitive rowing probably began between the watermen of the Thames River in London, but had spread to Europe and North America by the late 18th century. In the UK, The Boat Race between Oxford and Cambridge universities was first held in 1829, followed by the first annual regatta at Henley in 1839. In the US, Yale and Harvard established their own intercollegiate race in 1852, and by 1892, the sport's popularity ensured its inclusion in the 1896 Athens Games, although bad weather prevented the Olympic debut until the 1900 Paris Games. Women's events were first introduced in the 1976 Montreal Games, and lightweight rowing has been an Olympic sport since the 1996 Games in Atlanta.

INTERNATIONAL ROWING FEDERATION

The International Rowing Federation (Fédération Internationale des Sociétés d'Aviron; FISA) is the world governing body for rowing. FISA organizes international regattas such as the Olympics, the World Championships, and the Rowing World Cup. Founded in 1892, it is the oldest international sports federation in the Olympic movement.









SPORT OVERVIEW

From the adrenaline-fueled excitement of the whitewater slalom to the sheer speed and lung-busting effort of the flatwater sprint, kayaking is a sport of supreme athletic ability and technical skill. In the Olympics, there are individual, paired, and four-person flatwater sprints over various distances, as well as the dramatic whitewater slalom. In this individual race against the clock, each competitor paddles around a series of gates, in assigned order and direction, without touching any part of the gate. In addition to the Olympic events, marathon and wildwater races are contested at international level. There is even a ball sport, confusingly called canoe polo, played in kayaks.

COMPETITOR PROFILE

Flatwater kayak events demand a high degree of aerobic fitness and muscular stamina. Competitors must maintain excellent technique under pressure. Technical ability is more important in slalom races, but strength, power, and aerobic endurance are still essential.

Propulsion

High-level competitors use a double-bladed paddle made from a lightweight carbon-epoxy laminate

Gripping the paddle

Many competitors use paddle grips to provide a better grip for more efficient paddling

Head protection

The helmet is made from reinforced plastic, fiberglass, or super-light carbon. Compulsory in the slalom, the helmet protects the head from impacts against rocks or gates

NEED2KNOW

- Kayaking differs from canoeing in that competitors paddle from a seated position and use a double-bladed paddle.
- Especially popular in North America and Europe, kayaking is governed by the International Canoe Federation (ICF).
- The Olympic Games are the highest level of competition. The ICF World Championships are also highly prized.
- Flatwater and slalom races require different techniques, and some of the gear used is unique to each event.

ON THE COURSE

Olympic flatwater events take place over 656 feet (200 m); 1,640 ft (500 m); or 3,280 ft (1,000 m) of calm water. The straight course is marked into nine lanes (see right), each of which is 29 ft 3 in (9 m) wide. Slalom events take place on the rapids of natural rivers or purposebuilt waterways. The course varies in length but always includes between 18 and 25 gates (pairs of poles) suspended above the surface of the water. Each gate has a number that marks the route of the course. Competitors must negotiate at least six of the gates upstream.

SAFETY FIRST

Kayaking gear is designed with safety in mind. Perhaps the most important safety equipment is the personal flotation device, which keeps a kayaker afloat in the water. Equally important, however, are wetsuits and drysuits, which guard against hypothermia in cold water.

paddling gear. Lightweight and comfortable, the foam-filled PFD keeps the competitor afloat after capsize

Staying afloat A personal flotation device (PFD) is an essential piece of

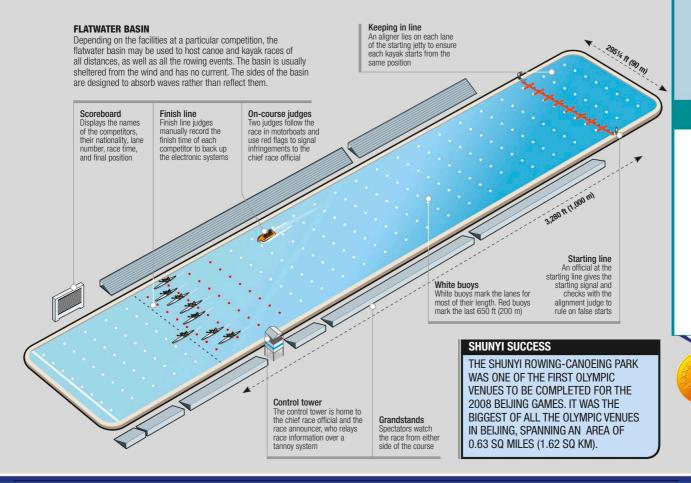
Power paddle

Kayakers need fantastic upper body strength to power through the water—the more forceful their paddling, the faster they will tra

Staying dry Outer shells made from synthetic fabrics are waterproof and windproof yet allow sweat to escape from the inside

Spray skirt

waist and stretches around the cockpit of the kayak to form a water-tight seal



FLAT KAYAK CLASSES

In flatwater Olympic races, there are three different kayak classes: K1, K2, and K4. The letter "K" stands for "kayak," and the number represents the number of competitors in the boat. In the K1, men race over 656 ft (200 m) and 3,280 ft (1,000 m). In the 2020 Olympics, men will race over 3,280 ft (1,000 m) in the K2 class and over 1,640 ft (500 m) in the K4 class. Women race over 656 ft (200 m) in the K1 class and over 1,640 ft (500 m) in all three classes. The specifications of the single, double, and four-person kayaks are listed below.

 LENGTH
 17 ft (5.2 m)
 21 ft 31 in (6.5 m)
 36 ft (11 m)

 BEAM
 1 ft 10 in (51 cm)
 1 ft 11 in (55 cm)
 2 ft 1 in (60 cm)

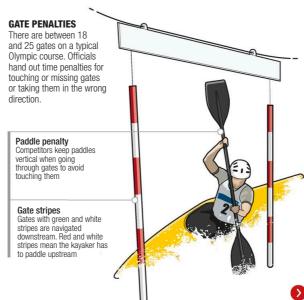
 WEIGHT
 26 lb 6 oz (12 kg)
 39 lb 10 oz (18 kg)
 66 lb (30 kg)

JOHN MACGREGOR AND ROB ROY

MANY PADDLERS DATE THE BEGINNING OF RECREATIONAL SEA KAYAKING TO JOHN MACGREGOR'S FAMOUS ADVENTURES IN THE SECOND HALF OF THE 19TH CENTURY. MACGREGOR COMMISSIONED A KAYAK OF CEDAR AND OAK, WHICH HE CHRISTENED "ROB ROY" AFTER THE FAMOUS SCOTTISH OUTLAW TO WHOM HE WAS RELATED, AND TRAVELED AROUND EUROPE AND THE MIDDLE EAST. HIS BOOK A THOUSAND MILES IN THE ROB ROY CANOE BECAME AN INTERNATIONAL BESTSELLER.

WHITEWATER SLALOM

The whitewater slalom is a technical and demanding race in which competitors guide their kayaks through a series of numbered gates over challenging rapids. In the Olympics, there are single slalom kayak events for men (K1) and women (K1). Each competitor has two attempts on the course. The final result is based either on the faster of the two runs or the total time for both runs, plus any time penalties.



COMPETITION CLOTHING

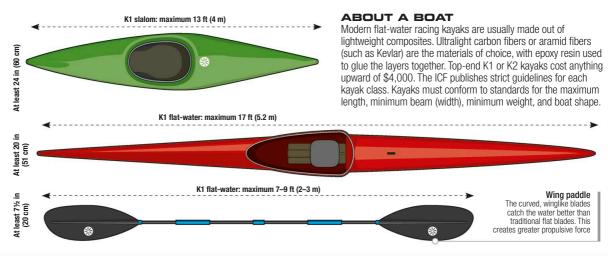
Competitors' clothing is made from the latest synthetic materials. The aim is to keep warm, dry, and comfortable, but the clothing also incorporates some vital safety features, such as the combined dry top and spray skirt, which stops water from entering the cockpit of the kayak and prevents it from sinking.

WARM AND DRY The vest and trunks are made from lightweight antimicrobial fabrics. These undergarments act as base layers, keeping competitors warm. dry, and free from infection.





Tight trunks Tight-fitting, guickdrying trunks have durable seat panels and hidden seams to prevent chafing around the crotch



PADDLING SKILLS

The body is the driving force behind all the key paddling strokes. Beginners often try to power the stroke with the arms, resulting in rapid fatigue and poor technique. Experienced kayakers use the body as the engine, the arms as the transmission, and the blades as the wheels. Another common mistake for novices is to grip the shaft tightly with both hands. An experienced kayaker grips the shaft securely with the control hand only. The shaft should be able to rotate freely in the other hand.

PADDLING

Every stroke in kayaking involves pulling against the water with the control hand and letting the other hand relax and push the stroke through. The stroke is done with both arms held comfortably in front of the body. A left pull starts by cocking the wrist of the left hand down to turn the pulling blade into position. After the pull, the left hand relaxes and rotates the shaft into position for the right pull.

FORWARD SWEEP

The forward sweep is a control stroke used to spin the kayak in a stationary position or to make a turn when moving forward. It is both a propulsive stroke and a turning stroke, so it is the best way of turning without losing momentum. The stroke is powered by a solid catch at the same time as rotating the upper body.

STARTING THE SWEEP

The forward sweep begins in the same position as the basic forward stroke. The kayaker plants the blade in the water and then rotates his or her upper body toward the stern. The kayaker then pushes the legs in the direction of the new course.

SWEEP TO STERN

The kayaker sweeps the paddle through an arc extending about 3 ft (1 m) from the boat, at the same time rotating his or her upper body as the blade moves to the stern. Most of the power is produced as the paddle sweeps between the hip and the stern.

BODY BALANCE

At the end of the sweep, the kayaker's body faces toward the side of the turn, with the shaft of the paddle over the water and parallel to the kayak. Before starting the next stroke, the kayaker edges his or her body back into the center of the kayak.







CATCH The basic paddling stroke starts with the catch, when the driving paddle enters the water Plant the naddle The kayaker plants the paddle firmly in the water

BRACE

The brace steadies the kayak in preparation for the main propulsive phase of the stroke.



OTHER KAYAK SPORTS

Flat-water and white-water slalom are the only kayak events contested at the Olympic Games, but there are many other competitive races and sports held at international level. Wild-water is a race against the clock along a white-water section of a river. Marathon races are long-distance races on natural bodies of water. Canoe polo is a ball sport played by two teams of five players in kayaks.

WILD-WATER

Unlike the slalom events, there are no gates to consider in wild-water; the simple aim is to complete the course in the fastest time possible. There are two types of events. Sprint events are frenetic dashes over 545-820 yd (500-750 m). Classic races take place over a longer distance, usually 4-6 miles (6-10 km). The kayaks used for wild-water racing are longer and narrower than those used for flat-water racing.

MARATHON

ICF rules set the minimum distance for marathon races as 12½ miles (20 km) for men and 9½ miles (15 km) for women. At the World Cup and World Championships, races usually cover up to 25 miles (40 km) and include obstacles such as rocks and shallows. Many marathon races are extreme endurance events that are often held over hundreds of miles and take many hours to complete.

CANOE POLO

Described as a cross between water polo and kayaking, the object of canoe polo is to score more goals than your opponent in two 10-minute halves. The game is usually played in an indoor swimming pool. Enjoyed competitively in many countries throughout the world, the pinnacle is the World Championships, which is held every two years.

SIDELINES

The cost, in millions of dollars, to construct the Deodoro Olympic Whitewater Stadium for slalom canoe-kayak events at the 2016 Olympic Games in Rio de Janeiro, Brazil.

The record, in hours and minutes. to complete the 460-mile Yukon River Quest in a solo kayak. The record is held by American Carter Johnson.

The number of Olympic medals won by Hungary in canoe-kayak events-more than any other nation in the sport.

SURFSKI RACING

SURFSKIS ARE LONG. NARROW KAYAKS USED FOR LIFESAVING IN SURFING HOT SPOTS AROUND THE WORLD, ESPECIALLY AUSTRALIA, NEW ZEALAND. SOUTH AFRICA, AND CALIFORNIA AND HAWAII IN THE UNITED STATES, MANY LIFEGUARDS COMPETE IN SURFSKI RACES ORGANIZED BY THE INTERNATIONAL LIFESAVING FEDERATION (ILF). THERE ARE MANY DIFFERENT EVENTS, FROM SHORT SPRINTS TO LONG-DISTANCE "IRONMAN" SURFSKI EVENTS.



ESKIMO ROLL

The Eskimo, or sweep, roll is a technique that involves a flicking hip motion and use of the paddle to right a capsized kayak. The hip flick is the key step in a kayak roll. It involves jerking the lower body to one side so that the kayak begins to return to an upright position. The Eskimo roll is one of the easiest techniques to master. Other roll styles suit different kayaks. An example is the hand roll, which is performed without a paddle.

SIT-UP START

To do an Eskimo roll to the left, the kayaker does a "sit-up" to the right side and pushes his hands up and out of the water so the forearms press against the side of the kayak.



STROKE Propulsion is achieved as the blade sweeps The paddle is almost vertical as the kayak is through the water. propelled forward

INSIDE STORY

Competitive kayaking first came about in the 19th century, when people began to race over set distances. Flat-water racing became an official Olympic sport at the 1936 Berlin Games. White-water slalom is a more recent addition to the Olympic calendar, becoming a regular event since the 1992 Barcelona Games.

FLICKING THE HIP

Held aloft

Keeping the head near the water's surface, the kayaker then sweeps his body and paddle away from the side of the kayak. The hip flick begins at the same time as the sweep.



FLIPPING OVER

Lausanne, Switzerland.

The hip flick continues until the kayak flips all the way over to an upright position. The kayaker straightens his back to

INTERNATIONAL CANOE FEDERATION

The International Canoe Federation (ICF)

is the ruling body for all canoe and kayak

the Olympic flat-water and slalom races.

events held at international level, including

It is also responsible for dragon boat racing

and ocean kayaking. The ICF was founded

in Stockholm in 1946 to replace the

International Repraëtantschaft für

Kanuspart (IRK). It is now based in



TRANSITION

The transition of strokes from side to side should be as smooth as possible



Side swap As soon as the blade emerges, the catch starts on the other side

EVENT OVERVIEW

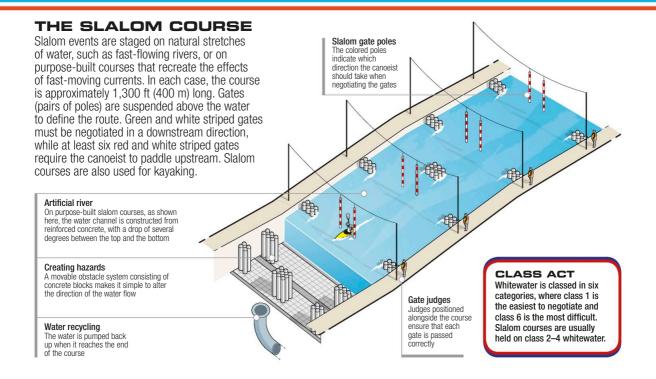
Canoeing is a strenuous water sport for men and women, competing either individually or as a pair. Competitors race to complete the course in the quickest time and use a single-bladed paddle to propel the craft through the water. There are two competitive disciplines: slalom and flatwater canoeing. Staged on fast-flowing water, slalom events involve competitors negotiating a series of gates, while flatwater racing takes place on calm water with competitors racing side-by-side. Unlike kayakers, canoeists usually paddle from a kneeling position.

NEED2KNOW

- → A popular worldwide sport, canoeing is governed by the International Canoe Federation (ICF), based in Switzerland.
- Developed by the indigenous peoples of the Americas, boats are sometimes referred to as Indian or Canadian canoes.
- Competitors from 88 nations competed in 37 events at the 39th ICF Canoe Sprint World Championships in Hungary in 2011.

CANOEING

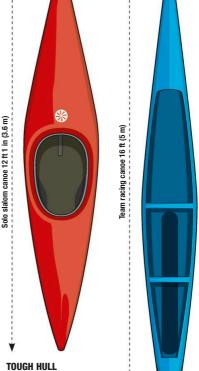




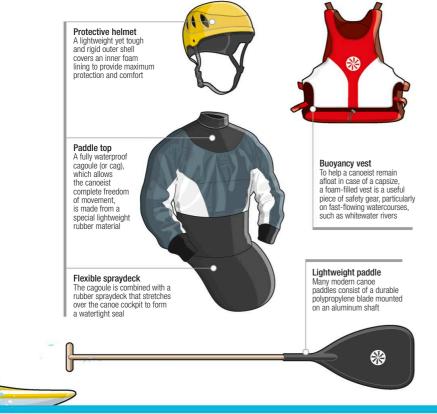








Canoe hulls, which need to be lightweight yet impactresistant, are constructed from materials such as fiberglass, Kevlar, polyethylene plastic, or ultralight carbon fiber.



Racing or sprint canoes are long and narrow to facilitate high speeds. Slalom canoes are shorter and are fitted with a spraydeck—a waterproof apron worn around the canoeist that stretches over the rim of the canoe

SPEED AND SAFETY

cockpit to prevent water from entering the boat.

SLALOM RACING

The object of canoe slalom racing is to negotiate a rapid-flowing natural or artificial river course measuring around 1,300 ft (400 m) in length. The course is defined by 18-25 gates, and the competitor must finish the course without making any faults in the shortest time possible. Each competitor's run is accurately timed, with a time penalty of two seconds added for touching a gate. An international competition consists of two runs, and the times are added together to give the overall time.

RACING ON FLATWATER

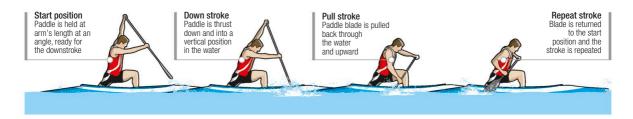
ICF-recognized flatwater canoe race competitions take place over clearly defined, unobstructed courses. Competitors race alongside each other. often in lanes, along courses ranging from 650 ft (200 m) to 1,625 ft (5.000 m) in length. A minimum of three boats are required for each race, and the winner is the first canoe to cross the finish line completely. As in slalom canoeing, separate events are held for men and women.

EXTREME PADDLING

AS WELL AS SLALOM AND FLATWATER RACING, CANOEING HAS MANY OTHER DISCIPLINES. IN PLAYBOATING (OR RODEO), FOR EXAMPLE, COMPETITORS EARN POINTS BY PERFORMING STUNTS AND TRICKS, WHILE EXTREME RACING INVOLVES NEGOTIATING DANGEROUS WHITEWATER.

POWERING UP

To gain the optimum power from each stroke, the flatwater canoeist braces his or her body by kneeling on one knee with the other leg thrust forward. From this position, the paddle is driven swiftly into the water, with the canoeist leaning into the paddle and using their full body strength to pull against the paddle handle.



DRAGON BOAT RACING







NEED2KNOW

Most dragon boats can carry crews of 20 paddlers, although these boats are often raced with just 18 paddlers.

The largest boats, called swan boats, carry about 50 people. They are largely ceremonial and seldom raced. Smaller phoenix boats are raced with 10 paddlers.

Competitive events are held over a range of distances, between 217 yd (200 m) sprints and marathons of 31¼ miles (50 km).

In control

The steerer, or helmsman, stands in the stern; with the best view of the water ahead, he has overall command of the boat

Stern look

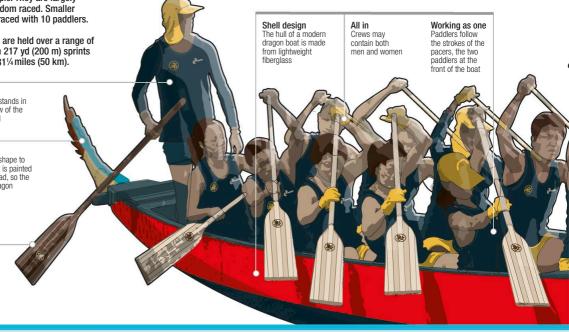
The stern has a traditional shape to symbolize a dragon's tail; it is painted in the same style as the head, so the whole boat resembles a dragon

Steering oar

The helmsman has a long oar that trails behind the boat; he pulls the handle toward him to go right and pushes it away to go left

SPORT OVERVIEW

Originally based on Chinese customs, dragon boat races have been taking place for more than 2,000 years, and today elite crews race each other all over the world. With up to seven brightly decorated dragon boats taking part, the races make an impressive spectacle.



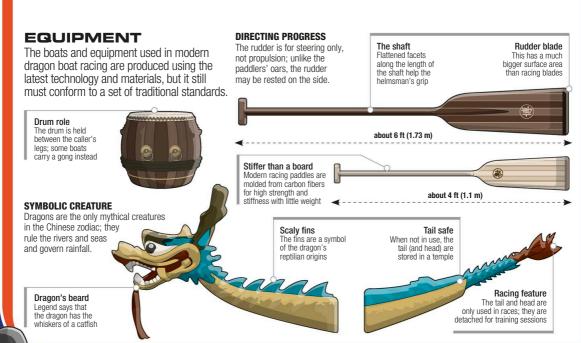
ON THE HEAD

Races, especially sprints, may be very close. In the days before photo finishes, crews had an elegant solution to determine the winner, one which is still widely used today. As the boat approaches the finish, an extra crew member—the flag catcher-climbs onto the dragon's head and reaches forward. The finish line is marked by flags in each lane, and whichever crew's puller grabs a flag first is the winner. Boats with large heads to accommodate pullers originate from Taiwan.



TRADITIONAL ORIGIN

ACCORDING TO ANCIENT CHINESE LEGEND, DRAGON BOAT RACING COMMEMORATES THE DEATH OF QU YUAN, A FAMOUS POET AND KING'S MINISTER OF THE 3RD CENTURY BCE. QU YUAN COMMITTED SUICIDE IN PROTEST AGAINST CORRUPT RULERS BY JUMPING INTO A RIVER. VILLAGERS ROWED OUT TO SAVE HIM BUT WERE TOO LATE. THEY STAYED IN THE WATER, HOWEVER, AND BEAT DRUMS AND SPLASHED THE WATER TO KEEP FISH AND EVIL SPIRITS AWAY FROM HIS BODY. THE RACES COMMEMORATE THEIR UNSUCCESSFUL RESCUE ATTEMPT.





SYMBOLIC SPORT

In China, dragon boat races are held on May 5, the so-called Double Fifth—the fifth day of the fifth month. The races mark the beginning of the rice planting season, and by celebrating the spirit of the dragon—the ruler of water—the racers hope that rain will come to flood the fields. Before a boat can be raced, its dragon head is "awoken" by a priest or another dignitary, who paints red dots on the bulging eyes.

Today, the safety of crews is taken seriously, but in ancient times, racers who fell in and drowned were thought to have been sacrificed to the dragon spirit—a sign of a good harvest to come.

STROKE-PULLING

A crew must paddle in time to move at top speed. Even small discrepancies in timing slow the boat. It is hard for people in the stern to see the paddles of the pacers in the bow; that is why the caller's beat is so important. Paddle blades hitting the water a fraction of a second after the ones in front is called "caterpillaring" because the paddles resemble a many-legged animal.

The largest paddlers sit amidships to keep the boat balanced and be the powerhouse that drives the boat along. A paddle may be any length between 41 in (104 cm) and 51 in (129 cm). Taller crew members have longer paddles.

TAKE THE A-FRAME

At the moment of entry into the water, the paddle and the paddler's upper body should form the shape of the letter A. There should be no splashing, because splashing is inefficient and wastes energy.

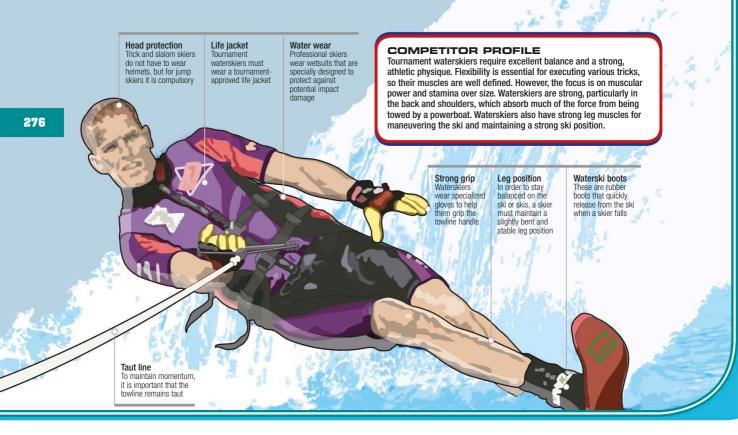


INSIDE STORY

The sport became popular outside of China in the late 1980s, at first in Canada and the west coast of the United States. The sport has since spread to Australia and Europe. The annual international Hong Kong races have been held since the mid-1970s, and a World Nations Championship has been held every two years since 1995. In the even-numbered years, there is a world championship for the top club crews.

INTERNATIONAL DRAGON BOAT FEDERATION (IDBF)

The IDBF currently has 72 member nations, including Britain, Denmark, Germany, Italy, South Africa, and Switzerland.



WATERSKIING









EVENT OVERVIEW

Waterskiing is a high-speed, adrenaline-fueled water sport. Skiers demonstrate impressive agility and balance in executing jumps, turns, and acrobatic maneuvers while being towed at great speeds behind a powerboat. Tournament waterskiing consists of three events: slalom, ski jump, and trick skiing. There are winners in each event, as well as men's overall and women's overall tournament champions. There are also professional tournaments for other waterskiing sports, such as wakeboarding, barefoot skiing, ski racing, and show skiing.

NEED2KNOW

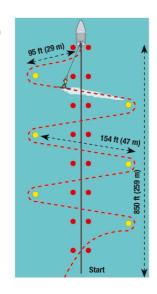
- Tournament waterskiing is popular all over the world. It is particularly popular in Australia, Canada, Ireland, France, New Zealand, and the United States.
- Waterskiing is not currently an Olympic sport. The closest it has come to acceptance was at the 1972 Olympic Games, where it was a demonstration event. To date, there are no plans for the sport to be added to the Olympic program.

WATER COURSES

Tournament events can be conducted on almost any stretch of still water and are mostly held on lakes or rivers. If courses overlap, buoys from the unused course must be removed.

SLALOM

The slalom course is 850 ft (259 m) in length and consists of six small rubber buoys that a skier must round. The start and finish gates are also marked by buoys that are different in color from the course buoys. The distance from the entry gate to the first buoy is 95 ft (29 m), as is the distance from the sixth buoy to the finish gate. The distance between each successive course buoy is 154 ft (47 m). The line the powerboat must take runs straight from entry to finish gate and is marked by six pairs of buoys spaced 8 ft (2.5 m) apart. A turning buoy is placed 459-591 ft (140-180 m) beyond the start and finish gates, which boat and skier round before returning to continue the run.



EQUIPMENT

Water skis were first made of wood, but modern skis are far more advanced. Most skis consist of a fiberglass or carbon fiber base, a fin secured to the bottom of the ski to make turning easier, and a foot binding that holds the skier's boot.

JUMP SKIS

Long and wide toward the back of the ski, jump skis have raised front edges that allow for entry onto the ramp.

TRICK SKI

Wide and flat, the trick ski has a smooth bottom and no fins, making it easier to turn and slide on the water's surface.

SLALOM SKI

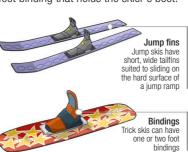
Designed for making sharp turns at high speed, slalom skis have a tapered tail and concave underside

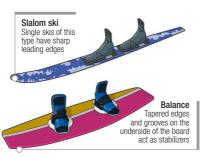
WAKEBOARD

This is a wide board with a concave base, which helps the skier achieve greater height jumping off the wake.

TOWLINES

Two lines are used in a tournament, measuring 75 ft (23 m) and 61 ft (18.5 m) respectively. The longer line is used for jump skiing and the shorter line for slalom.









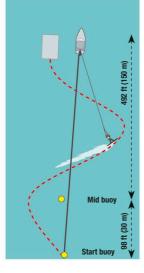
allows exceptional freedom of movement

Boots

Waterskiing boots are made from waterproof rubber and have strong ankle support

JUMPING

The jump course is 591 ft (180 m) in length, measured from the start buoy to the front edge of the jump ramp. The ramp is made of wood or fiberglass and has either a waxed surface or is equipped with a watering system that ensures the surface is continually wet. The ramp surface is also required to be completely flat. It can range from 21 to 22 ft (6.4 m to 6.8 m) in length and 12 to 14 ft (3.7 m to 4.3 m) in width. In tournament jump skiing, a skier has a choice of two heights for the ramp: for men, either 5 ft (1.65 m) or 6 ft (1.80 m), and for women, either 5 ft (1.50 m) or 5 ft 4 in (1.65 m). Beyond the ramp, the water is marked with measurement buoys for measuring the jump distance.



WATER INTO GUINNESS

RALPH HILDEBRAND AND DAVE PHILLIPS WATERSKIED 1,337 MILES (2,152 KM) NONSTOP AROUND INDIAN ARM, AN INLET OF THE PACIFIC OCEAN IN CANADA. IT TOOK THE CANADIANS 56 HOURS 35 MINUTES 3 SECONDS TO ACCOMPLISH, WHICH GAVE THEM THE WORLD RECORD FOR THE LONGEST WATERSKIING MARATHON.

RAMP COLOR

Boot buckles

increase the responsiveness

of the skis

Lock-down buckles

The sides of the jump ramp are different in color from the ramp surface so that a fast-moving skier can easily Starting the jump differentiate between the different surfaces. The front of the ramp is below the level of the water 28°-50 12-14 ft (3.7-4.3 m) (45° recommended) 21-22 ft (6.4-6.8 m)

TOURNAMENT COMPETITION

Standard competitions involve three events: slalom, jump skiing, and trick skiing. Each event consists of a preliminary elimination round and a final round. In slalom, the winner is the skier who rounds the most buoys using the shortest towline in the final round. In jump skiing, the skier who jumps the farthest distance in the final round is declared the winner. In trick skiing, the skier who scores the most number of points in either of two 20-second passes in the final round is the winner. The overall tournament champion is awarded to the skier who accumulates the best overall score across the three disciplines. A skier's overall score is determined by adding up the points attributed to their best performance in each discipline, which are calculated using a predetermined formula.

SLALOM

The skier is towed through the slalom course and must pass around the outside of all six buoys and proceed through the finish gate, make a turn, and return through the course in a similar fashion until a buoy or gate is missed. A skier is allowed three attempts in the preliminary round and three again if competing in the final round. The length of the towline is reduced for each run, making it harder for a skier to get from buoy to buoy. To round a buoy, the skier must ride outside or partially outside the buoy. Riding over or partially inside the buoy does not score. A run is concluded once the skier misses a buoy or misses an entry or finish gate.

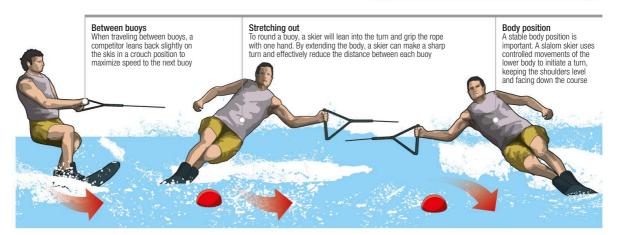
SIDELINES

253.9 The number, in feet (77.4 m), of the world record men's ski jump, held by Freddy Krueger of the United States since July 2017.

12,570 The highest number of points scored by a skier in the trick event. It was achieved by Alexi Zharnasek of Belarus in April 2011.

BOAT SPEEDS

The slalom and jump events both have predetermined boat speeds. For men's slalom, it is 36 mph (58 kph), and for women's slalom, it is 34 mph (55 kph). In the jump event, the maximum speed allowed for men is 35 mph (57 kph) and for women is 34 mph (54 kph). In trick skiing, there are no predetermined boat speeds.

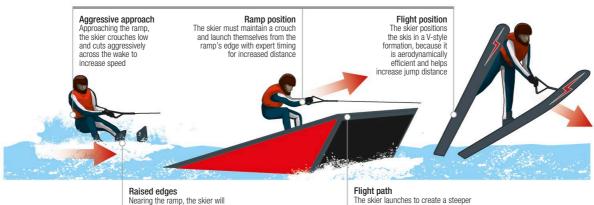


SKI JUMP

Towed behind a powerboat at a fixed speed, the skier cuts a deliberate path across the course to achieve maximum speed onto the ramp. The path takes the form of an "S" shape, known as a "double-wake cut," with the skier cutting across the wake of the boat to create a slingshot effect. This method can increase approach speed up to 66 mph (100 kph). The skier is then slung from the ramp high into the air for many feet, holding the body rigid to reduce wind resistance. For the jump to be scored as complete, the skier must land and ski away without falling.

CRACK THE WHIP

ALFREDO MENDOZA DEVELOPED THE MODERN SKI JUMP APPROACH IN 1951. THE DOUBLE-WAKE CUT, OR "CRACK THE WHIP" AS IT WAS KNOWN THEN, HELPED MENDOZA WIN MANY WORLD TITLES DURING THE 1950s.



raise the front edges of the skis

angle than the incline of the ramp

TRICK SKIING

The trick ski course is 574 ft (175 m) in length. The skier is towed behind a powerboat at a constant speed of their choice, usually about 18 mph (29 kph). The skier is allowed two 20-second passes to complete as many tricks as possible, which must be submitted to the judges prior to starting the competition. A skier can use one or two skis, with each option suited to different types of tricks. A trick is any action completed by the skier that is specified in the tournament trick rules. Points are awarded for any successful trick according to its degree of difficulty and the accuracy of its execution. The degree of difficulty is calculated according to preset scores attributed to different elements of a trick.

TRICK TECHNIQUES

A trick skier's run will involve various combinations of flips, turns, spins, and holds. The highest scoring tricks usually combine the greatest number of spins and flips. A spin is known as a "wake-turn" (when executed in midair crossing the wake) or "water-turn" (when executed on the water surface). A skier will rotate anywhere from 180° to 900° during a spin. A "step-over" involves the skier jumping over the towline and is often combined with a spin or spins. Variations of both forward- and backflips are used, which must involve the tail of the ski passing directly above the skier's head.

TOEHOLD

One of the more awkward tricks is the "toehold." A special harness is used to secure the skier's foot to the towline handle. The competitor then proceeds to execute combinations of step-overs, jumps, and spins, with the foot secured to the handle. This trick requires exceptional balance and, although not as breathtaking as a flip, it is still very difficult.



WAKE FLIP

One of the most exciting tricks is the "wake flip." A skier uses the wake created by the powerboat as a ramp from which to launch into the air. While airborne, the skier flips forward or backward and lands upright on the water. During the flip, the skier will also incorporate twists or spins and is capable of rotating through 720°.



OTHER WATERSKI SPORTS

One of the main attractions of waterskiing is its variety. It is also one of the few sports in which exhibitions are every bit as exciting as competitions. A number of new waterskiing sports have their own international tournaments and are rapidly gaining the popularity of traditional waterskiing events.

BAREFOOT SKIING

The three main competitions in barefoot skiing tournaments are similar to those in tournament waterskiing. In the trick event, competitors have two passes (each of 15 seconds) in which to execute as many tricks as possible. In barefoot slalom, the objective is to cross the powerboat's wake as many times as possible in the 15-second time limit. In the jump event, the goal is to jump the farthest distance, with top professionals capable of clearing 88 ft (27 m).

SKI RACING

This is the fastest form of waterskiing. It is held over long set-courses, the longest distance covered by an event being 87 miles (140 km). Skiers race each other at high speeds and are capable of reaching 118 mph (190 kph). Professionals use a long, single ski because it is easier to control. The skier holds and is harnessed to a towline to reduce the strain on the arms.

WAKEBOARDING



SHOW SKIING

Teams have one hour to perform "acts" of their own design. These acts can involve activities such as a "ballet line," a team ski jump, and a "final pyramid" that displays all team members creating a human pyramid while skiing. Backing music and the skill of the powerboat drivers is also considered in the scoring. which is assessed by five judges.

INSIDE STORY

The invention of waterskiing is widely accredited to Ralph Samuelson. In 1922, Samuelson first tried skiing on the Mississippi River on two curved staffs detached from a wooden barrel. He fastened the staffs to his feet using two leather straps and his brother Ben pulled him along using a window sash as a towrope. Samuelson later fashioned waterskis out of two lengths of wood.

GOVERNING BODY

The International Water Ski Federation is the sport's governing body, which sets the official rules for events. Founded in 1946, it was originally known as the World Water Ski Union. It later organized the first World Championship in 1949.

WINDSURFING









280

EVENT OVERVIEW

Windsurfing is both a high-speed and acrobatic water sport. Competitors sail or race a board powered by a single sail across an inland lake or the open sea. When professional windsurfers aren't reaching speeds of up to 50 mph (80 kph), they are performing gravity-defying tricks such as jumps, spins, and loops. There are a number of professional disciplines—some focus on speed and technical skill, while others focus on tricks and style.

WINDSURFER Extra strength

Sails are reinforced with "battens

to make the sail more taut and

therefore stable in strong winds

The basic premise of the windsurfer has not altered much since it was first patented by Jim Drake and Hoyle Schweitzer of the United States in 1970.

Luff tube

The luff is the leading edge of the sail which houses the mast in a sleeve called the Juff tube

Sail size

Small sails catch less wind and are easier to maneuver. Large sails catch more wind and are good for high-speed sailing

This is the rear edge of the sail. A loose leech makes the sail easier to handle in high winds, and a tight leech keeps power in the sail in light winds

Sail material

This is made from a lightweight polvester composite material and is reinforced with a light but strong Keylar mesh

Sail types

There are two types of sails: the camber-induced sail and the rotational sail Camber-induced sails create greater speed and stability. Rotational sails are easier to handle and maneuver

Wishbone boom The boom is the

steering mechanism for a windsurfer. It is attached to the mast and supports the sailor

Seat harness

The sailor is attached to the boom with a harness, which provides stability and lower back support

Board weight

At the top level, race and wave boards can weigh as little as 11-15 lb (5-7 kg)

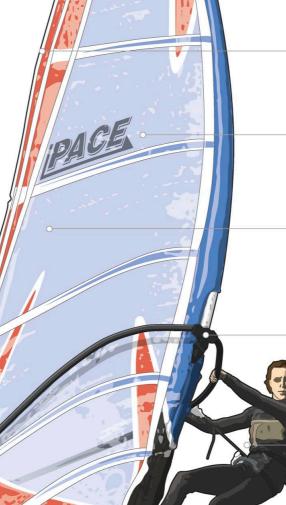
NEED2KNOW

- → The popularity of windsurfing peaked in the 1980s, when it was first introduced as an Olympic sport in 1984.
- Indoor windsurfing is a popular event. In 1991, the first indoor race was held in Paris. Sailors race in a 246 ft (75 m) pool with 25 fans set up to create wind.
- The first professional windsurfing World Cup tour involving multiple events in various countries was established in 1983.

COMPETITOR **PROFILE**

Windsurfing is a very physical sport. Studies have shown that Olympic windsurfers are as fit as Olympic rowers and cross-country skiers. Competitors must be extremely strong through the chest and shoulders to control the sail in strong winds and must have powerful leg muscles for maneuvering the board on rough open water. Stamina is also crucial for extended periods of racing in difficult conditions.

The term given to how a windsurf board skims across the water surface is "planing." In winds of 17-29 mph (28-46 kph), the windsurfer is lifted onto the water surface and can reach significantly faster speeds because it is no longer breaking through the water.



COMPETITION

The main competition divisions of windsurfing each focus on differing elements, such as speed, technical skill, tricks, and style.

WAVE AND FREESTYLE

Wave and freestyle competitions are the high-flying. acrobatic divisions of windsurfing. In wave performance, sailors perform jumps and tricks in a predetermined area of surf and are judged on how well they execute tricks and ride waves. Freestyle competitions involve timed runs on a set area of open water, where sailors perform jumps and tricks for which they are judged and awarded points.

SLALOM

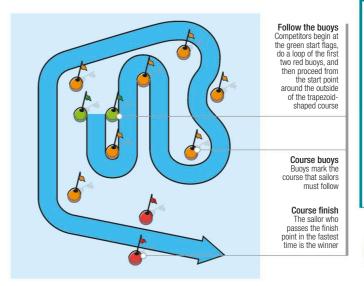
Slalom courses follow a figure-eight pattern and are raced primarily downwind. Races can be started afloat or ashore. and competitors race together. The course is on open water and marked by buoys, which sailors must follow and "jibe" or "tack" around in completing the course. An event will normally constitute a number of heats (maximum of 15), using either elimination rounds or an aggregate points system to find a winner.

SPEED SAILING

There are two forms of speed sailing. The first involves sailors racing separately on a 1,641 ft (500 m) course. A sailor's best two speeds from a two-hour heat are averaged, and the sailor with the best average speed wins. The second format is based on record attempts. Sailors wait for favorable winds to attempt to break the current speed sailing record of 56 mph (90 kph).

OLYMPIC AND FORMULA

In both Olympic and Formula competition, sailors race as one fleet (a fleet can be as many as 120 windsurfers) around a set course marked by buoys. A competition has two to three races per day, which are usually 60 minutes in duration. Races are held on a "windward/leeward" course (meaning it contains mainly upwind and downwind sections) or a trapezoid-shaped course (see below). In Olympic competition, sailors must use identical windsurfers. In Formula competition, sailors' boards and sails can differ slightly in size but must still be certified Formula-class windsurfers.



EQUIPMENT

Windsurfers come in various shapes and sizes. The type of windsurfing being practiced will determine what style of windsurfer is needed. Some sailors choose to wear wetsuits on the water, especially in colder weather, and competitors are responsible for wearing life jackets suitable for racing. Head protection is advised but not required.

BOARDS

Board sizes are measured by volume in liters. A beginner's board will typically measure 150-250 I (33-55 gal). Professional boards are much lighter; for example, a freestyle board measures 80-110 I (18-24 gal), which makes them harder to control but faster and easier to maneuver. Professional boards are fragile, consisting of a polystyrene foam core and reinforced with a composite casing of carbon fiber, Kevlar, and fiberglass.

SAILS

The size and shape of a sail will give it particular performance characteristics. Larger sails catch more wind, so they are better in light wind conditions, while smaller sails are used in strong wind conditions.

OLYMPIC

9 ft 4 in (2.86 m)

All competitors must use a windsurfer made to identical specifications. All competitors must use a board that weighs no less than 34 lb (15.45 kg). Formulaclass boards are similar in size.



SLALOM

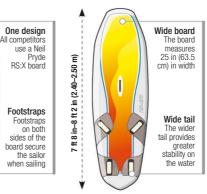
The board and sail used for slalom are designed to maximize speed and planing ability. A slalom sail is usually shorter than an Olympic sail but has more battens, making the sail taught and therefore faster.

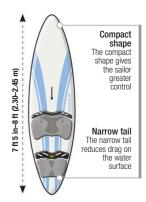


FRFFSTYIF

Maneuvering and jumping are the key features of freestyle windsurfing. Boards are therefore short in length and weigh only 11-15 lb (5-7 kg). Wave performance windsurfers have similar dimensions







STAT CENTRAL

MEN'S OLYMPIC MEDALISTS

2016 RIO DE JANEIRO
GOLD DORIAN VAN RIJSSELBERGHE (NED)
SILVER NICK DEMPSEY (GBR)
BRONZE PIERRE LE COQ (FRA)

2012 LONDON

GOLD DORIAN VAN RIJSSELBERGHE (NED)

SILVER NICK DEMPSEY (GBR)

BRONZE PRZEMYSLAW MIARCZYNSKI (POL)

2008 BEIJING

GOLD TOM ASHLEY (NZL)

SILVER JULIEN BONTEMPS (FRA)

BRONZE SHAHAR ZUBARI (ISR)

WOMEN'S OLYMPIC MEDALISTS

2016 RIO DE JANEIRO
GOLD CHARLINE PICON (FRA)
SILVER PEINA CHEN (CHN)

BRONZE STEFANIYA ELFUTINA (RUS)

2012 LONDON

GOLD MARINA ALABAU NEIRA (SPA)

SILVER TUULI PETAJA (FIN)

BRONZE ZOFIA NOCETI-KLEPACKA (POL)

2008 BEIJING

GOLD YIN JIAN (CHN)

SILVER ALESSANDRA SENSINI (ITA)

BRONZE BRYONY SHAW (GBR)

SIDELINES

5,046 The windsurfing distance record, in miles (8,120 km). Flavio Jardim and Diogo Guerreiro traveled from Chui to Oiapaque in Brazil, from May 2004 to July 2005.

The number of consecutive world titles won by Finian Maynard in speed windsurfing. Maynard was world champion from 1998–2001.

The age at which Robby Naish of the United States won his first world championship. Naish went on to claim another 22 world titles over the next 16 years in various divisions.

46.49 The speed, in knots (53.49 mph), of the 500 m world speed record in the women's division. This was set by Zara Davis of Britain in 2017 in Luderitz, Namibia.

COMPETITION REGULATIONS

Competitions for all disciplines are governed by strict regulations, primarily about who has right of way over whom. When windsurfers are on the same "tack" (turning), a windsurfer who is positioned downwind has right of way over a windsurfer who is positioned upwind. When on opposite tacks, a windsurfer on a "port tack" (wind blowing from the left side of the board) must give way to a windsurfer on a "starboard tack" (wind blowing from the right side of the board). In general, turning windsurfers must stay clear of those not turning. In racing competitions, if a windsurfer is on the inside line when rounding a buoy, they have right of way over a windsurfer on the outside line. In trick events, windsurfers coming into shore must give way to those going out. In wave performance, if two windsurfers share a wave, the first board completely on the wave sailing shoreward has possession.

SCORING

In slalom and racing events, points are awarded according to placement in a predetermined number of heats. In trick events, a panel of judges awards points for tricks executed in each run, based on the style and successful execution of the maneuvers. The winner of a heat scores 0.7 of a point, the sailor in second place two points, and so on. Scores are aggregated at the end of an event, and the competitor with the lowest score wins. In speed sailing, the average speed from a sailor's best two runs determines their placement. The sailor with the best average speed wins.

WIND CONDITIONS

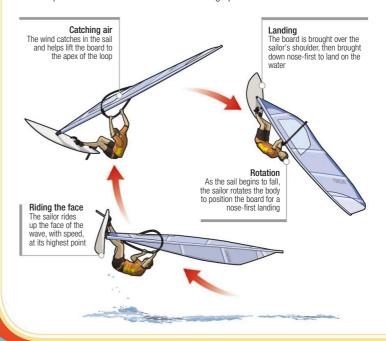
A wind speed range of 7–40 mph (11–65 kph) is best for windsurf racing and trick events, with a minimum wind speed of 7 mph (11 kph) required for most disciplines. Ideal wind conditions for racing allow sailing along or back toward the shore for the benefit of spectators.

AIRBORNE ACROBATICS

Freestyle and wave performance are the crowd pleasers of windsurfing. Accomplished sailors perform stunts and tricks in dizzying combinations with apparent grace and ease. In sailing out over the waves, windsurfers execute various loops and jumps, and when returning to shore on a wave will display a number of spins and turns. A panel of three to five judges awards points based on the style, variety, and quality of a performance.

BACK LOOP

There are three classic loops: forward, backward, and push loops. Of these, the back loop is a notoriously difficult move to execute successfully; while initiating the takeoff is relatively simple, a clean, nose-first landing is another matter. Speed, timing, and correct body and board position are fundamental. Performed by professionals, the back loop looks smooth and effortless and is a high point scorer.



SAILING TECHNIQUES

In windsurfing, the sail catches the wind to create lift, which raises the board and allows it to plane across the water's surface. The stronger the wind, the faster the board can move. A key windsurfing technique is "sheeting," which is angling the sail to increase or decrease the amount of wind in the sail, and thus control the speed of the board. "Sheeting in" (holding the sail close to the body) increases power by catching more wind. "Sheeting out" (holding the sail away from the body) decreases power by catching less wind. A key technique only allowed in certain disciplines is "pumping": in light winds, sailors repeatedly pull the sail toward the body to create wind, which can induce planing and increase speed.

BREAKING THE BARRIER

THE 50-KNOT BARRIER HAS LONG BEEN THE HOLY GRAIL OF WINDSURFING SPEED RECORDS. FASTER SPEEDS HAVE BEEN SET IN RECENT YEARS BY WINDSURFING ALONG SPECIALLY CONSTRUCTED 500 M COURSES RATHER THAN THE TRADITIONAL NAUTICAL MILE (1.51 MILES). IN 2012, FRENCHMAN ANTOINE ALBEAU, SURFING ON THE LUDERITZ CANAL IN NAMIBIA, SUCCESSFULLY REACHED A SPEED OF 52.05 KNOTS (60 MPH). KITEBOARDERS ARE ABLE TO REACH FASTER SPEEDS DUE TO THEIR SMALLER, LIGHTER EQUIPMENT, AND THE RECORD STANDS AT 57.97 KNOTS (67.71 MPH).

ADVANCED MANEUVERS

There are a variety of maneuvers available to a windsurfer, with the full repertoire mainly used by freestyle and wave windsurfers. Many maneuvers have unusual names, such as the "Vulcan," "Flaka," and "Spock." The Vulcan, also called the "Air-Gybe," is one of the most direct methods of switching direction. It involves launching the board off a small wave or swell and swinging it with the feet into the opposite direction. The Flaka is an aerial spin through 360° executed by jumping the board off a wave or swell into the wind. The Spock again involves launching off the water and landing on the nose of the board while spinning the sail. This causes the windsurfer to pivot, creating an eye-catching spin. Professionals also use variations of these moves, which are more difficult to execute.

INSIDE STORY

The first windsurfer patent was granted in the US in 1970, to Jim Drake and Hoyle Schweitzer, widely seen as the founders of modern-day windsurfing. However, windsurfing was practiced earlier by ingenious amateurs. In the 1940s, a young Australian boy built crude windsurfers out of iron canoes that he equipped with sails and booms made from split bamboo. He successfully sailed these on a river in Perth and is recognized by some as the first individual to sail a windsurfer.

GOVERNING BODIES

The International Windsurfing Association (IWA) and the Professional Windsurfers Association (PWA) are the main governing bodies of the sport. Many professional windsurfing events are organized and sanctioned by these bodies, which are also responsible for making new rules and providing support and services for windsurfers worldwide.











EVENT OVERVIEW

Kiteboarding fuses elements of surfing and parasailing to create an extreme sport in which competitors use a large kite to steer a board across water, performing tricks and jumps as they do so. The sport has gradually increased in popularity since the late 1990s, and in 2012, after a high-profile campaign, the Olympic Committee agreed to include it in the official program for the 2016 Games as a replacement for windsurfing. However, later in the same year, they reversed their decision.

STYLES

There are a number of kiteboarding styles, but the most popular competitive disciplines are freestyle, wave riding, course racing, and slalom. In freestyle, competitors perform tricks such as spins and jumps and are awarded points for their efforts by a panel of judges. Wave riding is a crossover between kiteboarding and competitive surfing, with boarders attempting to execute complicated maneuvers on breaking waves. In course racing, competitors navigate a route in the shortest time possible, while slalom racing involves multiple competitors racing along a figure-eight course.

NEED2KNOW

- Major kiteboarding competitions, along with the development of the rules of the sport, are overseen by the International Kiteboarding Association.
- The optimum wind speed for kiteboarding is 15-25 mph, up to a maximum of 40 mph.
 - In 2012, the number of kiteboarders worldwide was estimated at 1.5 million.



- Most of the Earth's prevailing winds are westerlies, so many of the best surfing areas are on western coasts, such as those of California and Cornwall, England.
- The world championship circuit, organized by the World Surf League (WSL), takes in top venues in Australia, South Africa, Hawaii. Tahiti, and Fiji.
- There are separate events for men and women in competitions at all levels.

and abdomen.

Board basics

Surf stabilizers

SURFING



EVENT OVERVIEW

Exhilarating for both participants and spectators, the object of competition surfing is to ride breaking waves for as long as possible, performing tricks and maneuvers to impress a panel of judges. The most familiar form of surfing involves standing on either a shortboard or a longboard. Variations include bodyboarding, bodysurfing, kneeboarding, surf-skiing, kite surfing, and windsurfing. The most spectacular category is tow-in surfing,



STAT CENTRAL WEL WORLD CHAMPIONS: MEN

WOL WOILD CHAMI TONG. MEN		
YEAR	NAME (COUNTRY)	
2018	GABRIEL MEDINA (BRA)	
2017	JOHN JOHN FLORENCE (US)	
2016	JOHN JOHN FLORENCE (US)	
2015	ADRIANO DE SOUZA (BRA)	
2014	GABRIEL MEDINA (BRA)	

WSL WORLD CHAMPIONS: WOMEN

YEAR	NAME (COUNTRY)
2018	STEPHANIE GILMORE (AUS)
2017	TYLER WRIGHT (AUS)
2016	TYLER WRIGHT (AUS)
2015	CARISSA MOORE (US)
2014	STEPHANIE GILMORE (AUS)

THE BOARD

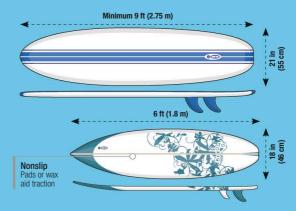
There are two main types of surfboards: the longboard and shortboard. Pro surfers use shortboards for international competition, although there is still a longboard category in the International Surfing Association (ISA) World Championships.

LONGBOARD

The heavy longboard provides greater stability than the shortboard but is harder to turn. For this reason, longboards are often used by beginners.

SHORTBOARD

The shortboard is light and streamlined to allow for tight turns. A wax covering or nonslip pads on the surface of the board give the surfer better grip.



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BREAKER RULES

Surfers take to the water either two or four at a time and ride the waves several times in 20-minute heats. The regulations may vary from event to event, but in general the best two, three, or five rides are marked by a panel of five or six judges according to the following criteria: choice of wave (the harder, the better); position on wave (the crest is best); time on wave; and quality of maneuver. In a four-surfer heat, the top two progress to the next round.

BOARDING PROCEDURES

There are two basic ways of addressing any wave: forehand, in which the surfer faces the wave, and backhand, where the surfer has his or her back to it. Getting the board position right is important, but its what the surfer does while riding the wave that counts for points and prizes. Two of the fundamental surfing techniques are outlined below.

A SURFEIT OF SURFERS

IN 2003, IN CORNWALL, ENGLAND, A TEAM OF 12 MEN AND TWO WOMEN SURFED THEIR WAY INTO THE GUINNESS BOOK OF RECORDS BY RIDING THE WORLD'S BIGGEST BOARD, A 37 FT (11 M) MONSTER WEIGHING 400 LB (180 KG).

CUTBACK

This is a turn from the top to the bottom of a breaking wave and back up again. The surfer rides to the crest of the wave, transfers their weight onto the heels, and leans back, twisting the upper body into the turn. At the bottom of the wave, the surfer swings back onto the wave again.



PUSH BACK

The surfer rides up to the crest of a breaking wave and pushes back on the heels.

TURN AWAY

Twisting the upper body, the surfer turns into the wave as the board hits the foam.

SPEEDING UP

The surfer relies on the power of her turn to pick up speed for the remount.

THE REMOUNT

The surfer pushes down on the back of the board to remount the crest of the wave.

FLOATER

The floater is a tricky maneuver that a surfer uses to ride up onto the lip of a breaking wave and then "float" back down with the foam onto the clean face of the wave. The surfer's biggest challenge is making a good landing as the board hits the wave face.



BREAKING WAVE

The surfer rides up the face of the wave to approach the breaking section.

OVER THE LIP

Instead of turning, the surfer continues to ride up onto the lip of the wave as it peels away.

SKIMMING THE FOAM

The surfer hovers on the foam, arms outstretched, as the wave breaks below the board.

FINAL ASCENT

As the board drops down onto the wave face, the surfer bends the knees to absorb the impact.

SURF SLANG

Surfing has its own language, much of which originated in the United States. Here are just a few surfing terms you might encounter when reading about the sport:

BARREL (OR TUBE) The ultimate wave-riding experience—a wave that curls over as it

breaks, leaving a hollow tube that the surfer rides through. **CRUNCHER** Any big, hard wave that is almost impossible to ride. **GLASS HOUSE** The space inside a barrel or tube.

GOOFY FOOTER Someone who rides the surfboard with the right foot forward. Left foot forward is the normal stance.

HANG FIVE (OR TEN) To place one (or both) sets of toes over the front of the board when riding a wave.

NATURAL FOOTER Someone who rides the surfboard with the left foot forward. Also known as a regular footer.

SOUP Foam, or whitewater, from a broken wave.

SIDELINES

79.98 The height, in feet, of the tallest wave to be ridden. Rodrigo Koxa achieved this feat in 2017 in Nazaré, Portugal, where a deep underwater canyon creates unusually large waves.

The time, in minutes, for the longest ride on a single wave. The record belongs to Steve King, who in February 2013 surfed the Kampar River in Sumatra, Indonesia, for 12.8 miles (20.6 km).

INSIDE STORY

Surfing was commonplace among Pacific Islanders for thousands of years before Europeans got wind of it from Captain James Cook, who observed the practice when he discovered Hawaii in 1778. Although the main surfing centers are still in the Pacific, the sport is now also popular all over other parts of the world, including Brazil, Costa Rica, South Africa, Australia, France, Ireland, Jamaica, and Spain.

THE WORLD SURF LEAGUE

The World Surf League now runs the highest level of competition worldwide, the WSL World Tour.

WINTER SPORTS



NEED2KNOW

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The early form of skiing is known as Telemark, after the Norwegian mountains where it was developed in the 1870. Telemark boots are bound to the ski at the toe only, making it easier to lift the foot and the ski when crossing flat areas.

The first downhill race using alpine skis and boots was held in 1921 in Switzerland. In 1930, the downhill and slalom disciplines were recognized as official sports. They have been Olympic events since 1936.

The word slalom comes from the Norwegian for "gentle slope."
Alpine skiers learn slalom skills first before attempting downhills.

Point and stick
Ski poles are used to help
maintain balance during tight
turns when the skier's
bodyweight is shifted from
side to side

THE COURSES

There are no set lengths for alpine-ski courses; the more famous ones have been used for decades and have remained largely unchanged in that time. Speed-event courses are designed to test competitors with a mixture of steep drops, sharp turns, and flat stretches. Slalom races are held on less challenging slopes, and the courses follow a much straighter route down the mountain. All courses are clearly marked with colored gates, through which every racer must travel. Men's races are held over longer distances and contain more gates than women's competitions.



EVENT OVERVIEW

Alpine skiing is an exhilarating sport of speed and skill. Millions of amateur skiers get a taste of the excitement every winter at the world's many ski resorts, but few of them compete in organized races. There are five official types of alpine-ski competitions. Two of the disciplines—downhill and super giant slalom—focus on speed. Slalom and giant slalom are more technical events, where a competitor's skill will win the day. The fifth "combined" event tests both speed and technique.

PLAYER PROFILE

Although it is the force of gravity that provides the main propulsion in alpine skiing, the sport requires a high level of fitness. Most of the work is done by the legs; the upper body and arms are only really involved in maintaining balance. The muscles of the lower legs are especially important, since skiers use them to lean forward.







ALPINE SKIING

DEADLY SLOPE

THE FASTEST AND MOST DANGEROUS DOWNHILL RACE IS HELD ON THE HAHNENKAMM, NEAR KITZBÜHEL, AUSTRIA. THE EVENT HAS BEEN RUN THERE SINCE 1931, WITH COMPETITORS REACHING SPEEDS OF 93 MPH (150 KPH). SKIERS RACE ON A RUN CALLED THE STREIF, WHICH BEGINS WITH THE MOUSETRAP, A 164 FT (50 M) JUMP THAT HAS PROVED FATAL ON SEVERAL OCCASIONS.

OPEN AND CLOSED

Alpine-ski courses are set out on managed slopes, or pistes, using pairs of colored flags called gates. The gates are most widely spread on the downhill courses and placed closest together for slalom races. A gate composed of flags positioned side-by-side is called an "open" gate. A "closed" gate has one flag positioned in front of the other. Open gates show the direction that the competitor must follow down the piste, while closed gates are used to force racers to turn across the fall line—the natural line of descent.

AT THE GATE

A competitor passes though an electronic gate to start the timer and enter the course. Two beeps followed by a higher-pitched tone signal each racer to begin.



Letting it slide

The course is prepared by spraying it with salt and water to melt the top of the snow and create a layer of ice, which ensures racers achieve too speeds

At the summit Downhill and super giant slalom courses start near the top of the mountain

Clear off Most races are

run on nistes ordinarily occupied by tourists; however, the steenest slones are reserved just for races

Doing the splits

The time taken to complete half

the course shows spectators whether a racer is likely to finish



lcv courses are best because they do not degrade quickly, although rutting occurs at sharp bends

Watch out

Spectators line the route, cheering racers on by ringing large cow bells

Big drop

The longest courses are 3 miles (5 km) and descend up to 3.281 ft (1.000 m) for men's races



BEND NOT BREAK

The first slalom courses were marked with bamboo poles. In the 1980s, these stiff sticks were replaced with "breakaway" gates. which are flexible plastic poles that have a hinge at the base.

THIS IS THE END

The finish line is marked by a giant gate. Often, competitors can see their course time displayed on a large screen as they approach the finish.

Flat out The lower section of a course might be a lot flatter than higher up; racers have to ensure they arrive on flats at top speed so they do not lose momentum

In the net Stretches of the

course with high drops at the side are lined with netting to stop racers from falling; pads cover solid objects that might cause injuries

WINNING WAYS

Alpine skiing events are time trials in which racers battle against the clock to complete the course in the shortest time. Downhill racers are allowed to practice on the course (to find the best racing line) in the three days prior to the competition. However, slalomists would cause too much damage to the pistes during practice, so they are limited to a one-hour course inspection.

SIDELINES

The maximum number of gates on a men's giant slalom course; 56 is the minimum number. A women's competition has between 46 and 58 gates.

The minimum number of minutes it must take to complete a downhill race. Any less than that and the course must be lengthened.

The fraction of a second to which races are timed.

The average speed, in miles per hour (120 kph), of a downhill skier.

The maximum vertical drop—the difference in yards (700 meters) between the altitudes of the start and finishof a women's downhill race.

PISTE-WEAR

Alpine skiers wear as little as possible to make themselves aerodynamic. Loose clothing creates drag, which slows the racer down. However, a racing suit must conform to a minimum air permeability—in other words, it must not be treated to make it airtight and so offer less resistance to the air.

Racers are allowed to protect parts of the body with pads. The pads must not alter the natural shape of the competitor's body in a way that might reduce drag. For example, skiers may wear back protectors. These are heavily controlled and monitored for creating any aerodynamic advantage

SKI BOOTS



HELMET

Every competitor in an alpine-ski race must wear a crash helmet. These must cover the head and ears only: spoilers or fins are forbidden.

> Strap to it The hand passes

though the strap

from below; the

between the palm

Nice curves

use curved

noles that tuck

in behind the

minimize drag

Lightweight Poles are made from

aluminum tubes

A plastic basket

sinking into the snow

stons the note

body and

Basket

stran is held

and handle

In place The helmet is kept in place by a padded chin strap



Hit me again The protective shell is designed to withstand several impacts without needing to be replaced



Well-fitting ski goggles are essential for protecting the eyes from the elements. Certain lenses also help improve visibility in low-light conditions.



POLES

Ski poles are used to balance the skier and help them shift their weight. The length of a pole depends on the height of the skier; with the knees slightly bent, the pole should reach just above the elbow.

IT'S ANCIENT HISTORY

THE WORLD'S OLDEST SKI IS APPROXIMATELY 4,500 YEARS OLD. REMAINS OF THE WOODEN RELIC WERE FOUND IN A SWEDISH BOG. SKIING IS THOUGHT TO HAVE BEEN INVENTED BY THE ANCESTORS OF THE SAMI PEOPLE FROM LAPLAND.

SKIS AND BINDINGS

Each alpine-ski event demands a certain type of ski. An alpine ski has a particular shape. When viewed from the side, it has a slight arch, or camber, at the center—a shape that focuses the skier's weight toward the tips of the skis. Modern skis also have a side cut-both edges of the ski curve inward from each end, making the ski narrowest near the central point. The curved edge cuts, or carves, into the snow easily, making turning faster.

GIANT SLALOM

The skis used in giant and super giant slalom races are hybrids of slalom and downhill skis. They are longer to produce speed but have medium-depth side cuts to make turning easier.

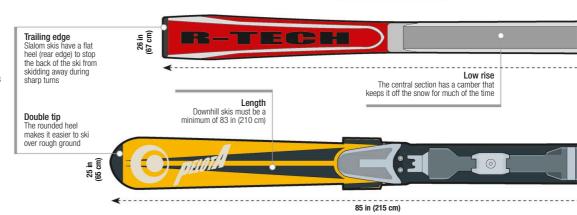
DOWNHILL

Long and wide skis produce the fastest speeds because they glide over the surface of the snow better. However, wide skis are hard to steer Downhill skis have a small side cut to aid turning.

SLALOM

The shortest alpine skis are used in slalom races. where competitors sacrifice speed for maneuverability. The side cuts are deeper than on other skis so that the ski cuts into the piste and bends into turns





MASTERING THE SLOPES

Every alpine-ski discipline requires a different set of skills. The speed events are decided by a single timed run. Mistakes from world leaders and lucky runs from unknowns often turn the leader boards on their heads. Technical racers make two runs, both on the same day, and the times are added to determine each racer's finishing place. Competitors in the combined event are placed according to the combined time of a downhill and slalom run. The super giant slalom requires a unique set of skills. Like in a downhill race, competitors have just one run to show what they can do. However, as in other slalom events, practice on the course is forbidden—a super-G course is run once, and once only.

nave just one run to show In the second run of slalom races, the 15 fastest from the practice on the the first run race in reverse order.

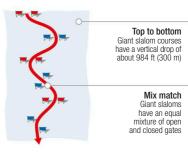
DOWNHILL

Courses are generally between 1.5 and 3 miles (2.5 and 5 km) and must take more than a minute to complete—most take about two. There are limits on steepness: men's courses must not drop more than 3,280 ft (1,000 m), while women's courses drop less than 2,300 ft (700 m).

Colored A downhill course is marked with wide gates of all the same color Keep it fast Gates are spread out to ensure high speeds, but each gate is always within sight of the next

GIANT SLALOMThe longest technical

The longest technical event, a giant slalom course is filled with twists and turns, but unlike in a slalom race, every giant-slalom gate does not require a change in direction. The number of turns is about 13 percent of the course's vertical drop in meters.



RUNNING ORDER

A competitor's starting position can have an effect on

the race. During a downhill in snowy conditions, early

racers are slowed by the fresh snow and may be beaten

The 15 highest-ranking entrants race first. Their

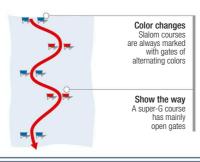
remaining racers start according to their world ranking.

starting positions are allocated by a draw. Any

by late starters. Starting first in a slalom is an advantage, because the course has yet to be rutted by previous runs.

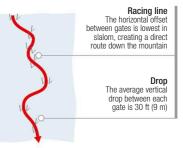
SUPER-G

This is the newest alpine sking discipline; it was introduced in 1982. Super-G merges the concepts of downhill with giant slalom. A downhill course is marked with giant-slalom gates, but these are widely spaced so that races are run at almost downhill speeds.



SLALOM

Although it is the safest discipline, slalom is also regarded as the most technically challenging alpine-ski event. Every course has combinations of gates to test the skill of the competitors, including delay gates, which direct racers across rather than down the slope.





STAT CENTRAL

OLYMPIC MEDALS (OVERALL)			
MEDALS	MEDALS COUNTRY		
105	AUSTRIA		
56	SWITZERLAND		
43	FRANCE		
39	UNITED STATES		
28	ITALY		
26	NORWAY		
23	GERMANY		
16	SWEDEN		
10	CANADA		
9	CROATIA		
9	WEST GERMANY		
5	UNITED TEAM OF GERMANY		
5	SLOVENIA		
2	SPAIN		
2	LUXEMBOURG		

WOMEN'S OLYMPIC GOLD MEDALS				
YEAR	DOWNHILL	G. SLALOM	SLALOM	
2018	ITA	USA	SWE	
2014	SL0	SL0	USA	
2010	USA	GER	GER	
2006	AUT	USA	SWE	
2002	FRA	CR0	CR0	
1998	GER	ITA	GER	
1994	GER	ITA	SUI	
1992	CAN	SWE	AUT	
1988	GDR	SUI	SUI	
1984	ITA	USA	ITA	
1980	AUT	LIE	LIE	
1976	GDR	CAN	GDR	
1972	SUI	SUI	USA	
1968	AUT	CAN	FRA	
1964	AUT	FRA	FRA	

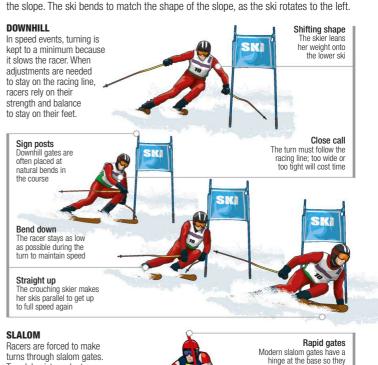
MEN'S OLYMPIC GOLD MEDALS				
YEAR	DOWNHILL	G. SLALOM	SLALOM	
2018	NOR	AUT	SWE	
2014	AUT	USA	AUT	
2010	SUI	SUI	ITA	
2006	FRA	AUT	AUT	
2002	AUT	AUT	FRA	
1998	FRA	AUT	NOR	
1994	USA	GER	AUT	
1992	AUT	ITA	NOR	
1988	SUI	ITA	ITA	
1984	USA	SUI	USA	
1980	AUT	SWE	SWE	
1976	AUT	SUI	ITA	
1972	SUI	ITA	ESP	
1968	FRA	FRA	FRA	
1964	AUT	FRA	AUT	

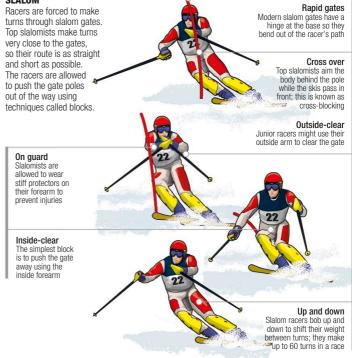
RACING TECHNIQUES

It takes several years to learn how to ski at a high level. Most world-class alpine skiers will have begun to ski before they even went to school. A very few top skiers have been winners in several events. For example, the Swiss star Pirmin Zurbriggen won medals in the downhill, super-G, giant slalom, and the combined competition in the 1980s. However, most alpine skiers concentrate on speed or technical disciplines.

TURNING

For those who have not been on skis, making turns looks complicated. It certainly takes practice to be able to do it at racing speeds, but thanks to the shape of modern skis, turning has never been easier. The latest technique is to make so-called carving turns. For example, a racer shifts his weight onto the left ski, making its outside edge cut into the slope. The ski bends to match the shape of the slope, as the ski rotates to the left.





Up and away Downhill jumps, or airs, result when the racer reaches a steep drop

Don't dangle

At first, the skis drop down and begin to point upward

Keep it down

The racer does not push off as she leaves the ground; the jump needs to be long but not high

ONE OF THE GREATS

PERHAPS THE GREATEST SKIER OF ALL TIME IS JANICA KOSTELIC, A CROATIAN ALL-AROUNDER WITH FOUR OLYMPIC GOLDS. IN THE 2006 SEASON, KOSTELIC (BORN IN 1982) WON RACES IN ALL FIVE ALPINE-SKI DISCIPLINES. SHE WON WORLD CHAMPIONSHIPS IN SLALOM AND THE COMBINED EVENT IN BOTH 2003 AND 2005. IN 2005, SHE ALSO ADDED THE DOWNHILL TITLE.

Tuck for landing

The heel, or back of the ski will land first, and the racer absorbs the shock with her knees while crouching down into a high-speed tuck position

Skid lid Although jumpers

are rarely more than a few feet above the ground, their speed makes helmets essential

Push forward

As the jump continues, the skier must keep her weight forward so she is ready for landing

Head down

The head is hunched

under the shoulders,

but the racer still needs

to be able to see!

Straighten out

The racer must keep the skis level and pointing downward to reduce drag and ensure she travels in a straight line

SUPER SPEED

The friction between skis and snow is only small, and the biggest limiter to a racer's speed are their turns and air resistance, or drag. Skiers reduce drag by making the forward surface area that is exposed to the oncoming wind as small as possible by adopting a tuck position.

Out in front

The hands are held in front of the face with the palms facing inward

Making a point

With the hands and arms, the bent knees form a forward point that cuts through the air

Flatten out

The ankles must keen the skis flat so the edges do not cut into the snow and slow the skiel

Wrap around The poles bend in

behind the body, so the baskets stay hidden from the front

Fold over The upper body folds down onto the thighs

Shin up

The bodyweight is held forward on the shins

SIDELINES

100.6 The top speed, in mph (161.9 kph), in a downhill race. The record, set in January 2013, belongs to Johan Clarey of France.

The number of people who are injured while skiing each day per every 1,000 skiers.

The minimum number of seconds left between the starts of downhill competitors.

FASTER THAN FALLING

Downhill racers are not the fastest skiers in the world; that honor goes to the speed skiers. This sport is outside the rules of normal alpine skiing: speed skis are longer and wider than racing designs, and skiers wear lightweight foam fins on the limbs and helmet to create a more aerodynamic shape. Speed skiers make straight runs down 3,280 ft (1 km) courses. Their speed is recorded halfway down, leaving the lower slope for slowing down safely. The current world record is held by Italian Ivan Origone, who reached 158.424 mph (254.958 kph) in March 2016. That is even faster than the terminal velocity of a skydiver (120 mph/193 kph).

INSIDE STORY

The first recorded ski race was held in Tromsø, Norway, in 1843. By the late 19th century, competitions were being held across Europe and North America. These early skiers were using Telemark equipment. Downhill races using alpine skis and according to modern rules have been held since 1921; the first slalom was in 1922. In 1936, alpine skiing became part of the Olympic program for the first time. Giant slalom became a standard event in 1950, and super giant slalom was introduced in 1982.

GOVERNING BODY: FIS

The Fédération Internationale de Ski (FIS; International Ski Federation) is the governing body of all ski competitions, including speed skiing, Nordic skiing (such as ski jumping and cross-country), snowboarding, and freestyle (acrobatics), as well as alpine skiing. The FIS was founded in 1924. It is based in Switzerland and has 111 national members.

FREESTYLE SKIING









EVENT OVERVIEW

The two main types of freestyle skiing are moguls and aerial, while a third variety, acro, is practiced on a more limited basis. Moguls involves skiing down a steep slope covered with "moguls" (small bumps) and jumping off two ramps, while aerial involves jumping off a ramp and performing twists and spins in midair. Acro (not an Olympic sport) is a combination of gymnastics and dance performed on a gentle slope.

GEARED UP

Competitors in each of the three disciplines use similar gear. Acro skiers, and the mogul skier shown here, have the full complement of waterproof and insulated clothing, poles for balance, twin-tip skis, helmet, and goggles. Aerial skiers wear the same clothing and skis but don't use poles.

Ski poles

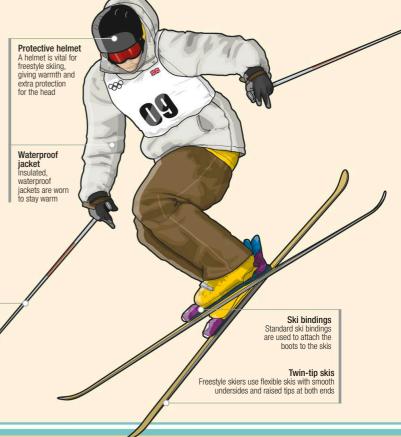
Poles are crucial for turning and propelling the skier. Acro poles must not exceed the skier's height, and mogul poles are usually 2 ft (60 cm) shorter than the athlete

Judges' stand

by seven judges,

the finish area

Fach run is scored



THREE-PISTE SUIT

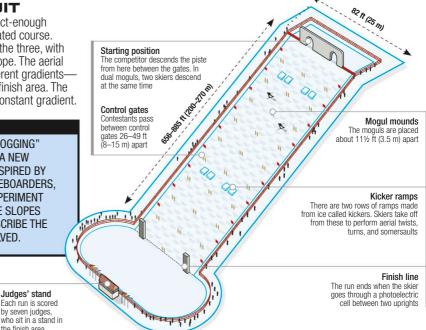
Moguls, aerials, and acro are distinct-enough disciplines to each require a dedicated course. Mogul courses are the steepest of the three, with a constant decline for the whole slope. The aerial slope has four stages, each at different gradientsthe inrun, table, landing zone, and finish area. The acro course is a single slope at a constant gradient.

HOT DOGGING

A SKIING TREND DUBBED "HOT DOGGING" BROUGHT FREESTYLE SKIING TO A NEW AUDIENCE IN THE LATE 1960s, INSPIRED BY THE MOVES AND STYLE OF SKATEBOARDERS, AMERICAN SKIERS BEGAN TO EXPERIMENT WITH JUMPS AND TRICKS ON THE SLOPES AND ADOPTED THE TERM TO DESCRIBE THE SHOWBOATING STYLE THAT EVOLVED.

MOUNTAIN MOLEHILLS

The mogul slope has a constant gradient of 24-32°. Competitors negotiate the moguls at high speed before jumping off ramps called kickers to perform aerial maneuvers.



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- The first appearance of freestyle skiing was in the 1930s in Norway, when skiers began to perform acrobatics during alpine and cross-country training.
- Freestyle skiing is one of the most dynamic forms of skiing-the ethos is very much on individual creativity and expression. It has a lot in common with snowboarding, particularly in clothing and techniques.
- Moguls and aerial are both Olympic sports. Acro was a demonstration sport in 1988 and 1992, but has not been adopted fully.

SIDELINES

The maximum number of backflips permitted in an aerial competition. Up to five twists may also be added in order to win as many points as possible for "form."

The height, in feet (18 m), that top aerial freestylers rise above the slope after lifting off from a kicker. Jumps in mogul contests are smaller in size.

The vertical drop, in feet (98 m), of the Sauze d'Oulx mogul run, which was used for the Turin Winter Olympics. Fresh snow for the moguls was produced artificially from rainwater.

The total number of freestyle skiing medals won by the United States at the 2010 Winter Olympics. Although this was the highest national total in the competition, Canada won two gold medals in comparison to the United States' one.

SKIER PROFILE

Each freestyle discipline has its own demands, but they all require physical endurance and technical ability. Some freestylists work out by bouncing on trampolines while wearing skis, and in the absence of snow during the off-season, aerial skiers practice on artificial ramps that end in swimming pools or lakes.

SKI BOOTS

Made from plastic, ski boots are incredibly stiff, with high sides to support the ankles to ensure that the feet are secured firmly to the skis.

Ski clips The boots are closed and secured by a number of clips



STYLISH GEAR

Headgear and clothing are the same in all three forms of freestyle. Acro skis are shorter and more flexible than their mogul and aerial equivalents.

PLASTIC HELMET

Helmets are nearly always worn and are required for aerial skiers Made from plastic, they are held in position with a chin strap.

SKI GOGGLES

Goggles are worn to protect the eyes from the glare of the sun, as well as to prevent snow from getting in the eyes.

SKI LENGTHS

Padded fit

Elastic strap

The goggles are

secured with an

elastic strap

Helmets come with

padding on the inside for a comfy fit

The skis used for moguls and aerial have specific maximum lengths. Acro skis may be no more than 80 percent of the skier's height.

> Ski bindinas The bindings secure the skier's boot

onto the ski

Flexible ski The ski's profile is curved, which makes it more flexible

um length: men 6 ft 3 in (1.9 m); women 5 ft 11 in (1.8 m)

AERIAL SLOPE

On the aerial course, the takeoff slope (known as the "inrun") descends at an angle of between 20° and 25°, then flattens out at the takeoff area (known as the "table"). The landing zone is built at an angle of 37°.

Judges' stand The judges sit on a

raised platform to get a good view of the jump

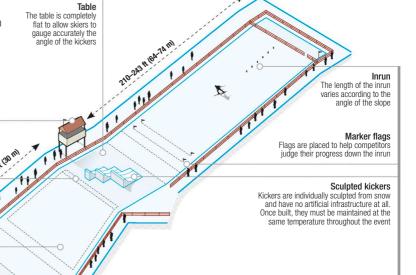
The transition from the table to the landing zone is known as the "knoll and is marked with a red line

Landing zone

The slope in the landing zone is scattered with wood shavings to give the skiers a clear view of the ground

Finish area

There are no size regulations for the finish area; it is usually built as large as possible



Boundary wall

The finish area is enclosed by fencing to

keep spectators out

MOGUL MAGIC

The goal of moguls is to get down the course as fast as possible while winning points awarded by seven judges for the overall style and technique of the descent and for compulsory elements, such as jumps. There are three scoring elements: the quality of turns around the moduls, maneuvers made in the jumps, and the overall speed of the descent.

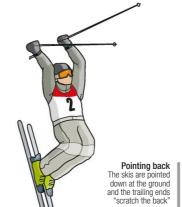
BUMPY RIDE

Skiers can go straight over the moguls, but this takes longer than twisting and turning around them. Bumps are absorbed by bending the knees.



BACK SCRATCHING

The back scratcher is a move performed in midair just after a jump, in combination with one or two other positions. The skis must stay in parallel with each other.



SPREAD EAGLED

The spread eagle is a popular midair move. The skier launches off a kicker and spreads both arms and legs as wide as possible.

Lifted high

skis or legs

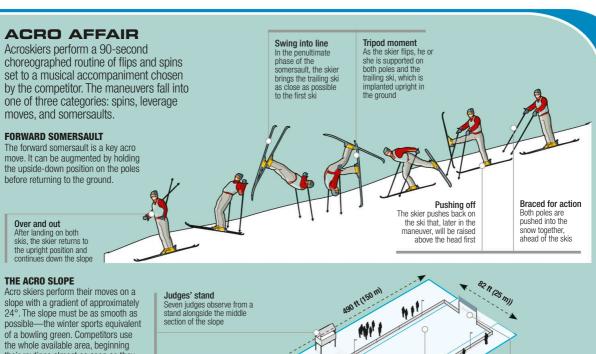
The poles must be

lifted high and wide

to avoid striking the

KNEE-TO-SHOW BASIS

IN 1994, CANADA'S JEAN-LUC BRASSARD WORE BRIGHTLY COLORED KNEEPADS TO ENSURE THE JUDGES MISSED NONE OF HIS TRICKS ON THE MOGUL SLOPE. HE TOOK GOLD, AND NOW EVERYONE WFARS THFM.



their routines almost as soon as they have left the starting line and ending right at the finish.

Finish line

A photoelectric cell between the uprights at the end of the slope

Colored edgings A colored line mark the edge of the skiing area Starting position Smooth slope Skiers begin their routine close to the Flags give a clear indication of the In complete contrast with the moguls slope, start to fit as many extent of the the descent is smooth. maneuvers into their performance area with no bumps routine as possible

MOGUL MOVES

The highlights of each mogul run are the jumps and maneuvers that are carried out at the two kickers. Competitors build up as much speed as possible before they get to the jumps. Most skiers attempt either a sequence of up to three individual moves, such as the back scratcher and spread eagle, or a single jump involving multiple twists.

540° AERIAL TURN

This impressive maneuver consists of one-and-a-half horizontal rotations performed in midair



Touchdown

The knees are bent to absorb the impact; on landing, the skier pushes off down the slope



After completing two-thirds of the move, the skier twists again for the final half-circle

No waving

The skis must stay together throughout the spin; the judges penalize deviations in either the horizontal or vertical plane

Takeoff

At the lip of the jump, the skier starts to spin by turning the head and shoulders to the right; the rest of the body will follow

AERIAL ACTION

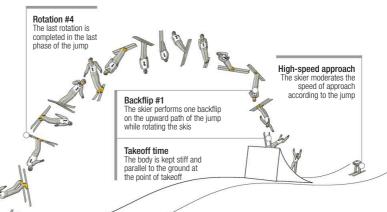
In aerial events, each skier has two jumps, which are scored by seven judges. Five judges score the takeoff, length, height, and form of the jump, while the other two score the landing. The total is multiplied by a degree of difficulty (DD) to give the total score.

DOUBLE FULL-FULL-FULL

This jump involves three "full" somersaults, with two horizontal twists on the first somersault and one on each of the other two. Three is the maximum number of somersaults permitted in competitive aerials.

Parallel lines

The skis must be kept parallel on landing, and the knees are bent to absorb the impact



STAT CENTRAL

OLYMF	OLYMPIC CHAMPIONS: MEN'S MOGULS		
YEAR	NAME	COUNTRY	
2018	MIKAEL KINGSBUR	(CAN)	
2014	ALEXANDRE BILODEAU	(CAN)	
2010	GUILBAUT COLAS	(FRA)	
2006	DALE BEGG-SMITH	(AUS)	
2002	JANNE LAHTELA	(FIN)	

OLYMPIC CHAMPIONS: WOMEN'S MOGULS YEAR NAME COUNTRY

YEAR	NAME CO	DUNTRY
2018	PERRINE LAFFONT	(FRA)
2014	JUSTINE DUFOUR-LAPOINTE	(CAN)
2010	HANNAH KEARNEY	(USA)
2006	JENNIFER HEIL	(CAN)
2002	KARI TRAA	(NOR)

OLYMPIC CHAMPIONS: MEN'S AERIAL

YEAR	NAME	COUNTRY
2018	OLEKSANDR ABRAMENKO	(UKR)
2019	ANTON KUSHNIR	(BLR)
2010	ALEXEI GRISHIN	(BLR)
2006	XIAOPENG HAN	(CHN)
2002	ALES VALENTA	(CZE)

OLYMPIC CHAMPIONS: WOMEN'S AERIAL

YEAR	NAME	COUNTRY
2018	HANNA HUSKORA	(BLR)
2014	ALLA TSUPER	(BLR)
2010	LYDIA LASSILA	(AUS)
2006	EVELYNE LEU	(SUI)
2002	ALISA CAMPLIN	(AUS)

INSIDE STORY

The first freestyle skiing World Cup was held in 1981; the inaugural World Championship followed four years later. Moguls first featured in the Winter Olympics in 1992; aerials joined the Games in 1994. Acro ski is still unrecognized by the International Olympic Committee (IOC), although it was a demonstration sport at the 1988 and 1992 Olympics.

GOVERNING BODY

The Fédération Internationale de Ski (FIS) currently has 123 member nations.

NEED2KNOW

Snowboard Cross, in which four boarders race each other downhill through a series of obstacles, was introduced at the Turin Winter Olympics in 2006.

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- In "Big Air" riders jump off a 60 ft (18 m) ramp, then spin and flip for 100 ft (30 m).
- Craig Kelly, the "godfather of freeriding," won four World Championships and three US Championships. He was killed in an avalanche in January 2003.

SPORT OVERVIEW

Developed in the United States in the 1960s, snowboarding combines the skills required for skiing, skateboarding, and surfing. Riding on a single, wide, skilike board to which both feet are attached, snowboarders are known for their speed and boldness on the slopes and their agility in snowparks.

RACING AND TRICK RIDING

Snowboarding has a variety of different elements, including downhill riding and racing, mogul techniques, tricks performed in half- and quarter-pipes, and powder riding. Racing, known as alpine snowboarding, uses skills similar to downhill ski racing. The race course is set up with gates and is called giant slalom. The object of the race is to go as fast as possible. Missing a gate results in disqualification. Parallel giant slalom consists of two boarders racing against each other on parallel courses.

EXTREME SNOWBOARDING

Light and colorful and similar to

a bicycle helmet, the helmet

protects the head in a fall

Done on near-vertical (45°-plus) mountain slopes with cliffs, deep snow, chutes, and trees, extreme snowboarding is not for the fainthearted. Competitions include racing and freestyle events that involve courses of up to 4,000 ft (2,000 m), with many natural obstacles. Entrants are judged on factors such as time and style.

Lightweight, warm, and breathable, sweatshirts

are an essential item for

comfort on the slopes or

Sweatshirt

in the snowpark

PLAYER PROFILE Aside from being daring, with a great deal of self-confidence and a sense of adventure, a snowboarder has to have excellent physical posture from which they gain strength, flexibility, and agility. As with any snow sport, balance and coordination are vital, as is quick thinking. A flair for putting on a performance is an important quality in freestylers. Goggles protect the eyes against snowblindness. They also prevent snow from getting in the eyes, which can cause temporary vision loss, dangerous at high speeds

Upper body

Body gear is designed to protect the shoulders, elbows, and spine. Dense, high-impact foam is used, along with neoprene for flexibility

Wrist quard In the event of a fall,

wrist guards reduce the likelihood of sprains or breaks



do with handedness

The feet are commonly placed a little more than shoulder-width apart. A narrower stance gives more control for turning on the slope, and a wider one is more stable for freestyle boarding

SIMON DUMONT

DUMONT SMASHED THE WORLD QUARTER-PIPE RECORD ON APRIL 11, 2008. THE 21-YEAR-OLD AMERICAN BOARDER JUMPED 35 FT 6 IN (10.8 M), EXACTLY 3 FT 3 IN (1 M) HIGHER THAN THE PREVIOUS RECORD.













the wearer warm

damage from bangs and falls. Technical

material wicks away sweat while keeping

Mitts or gloves have palm

are waterproof. They are

usually lined with fleece or

synthetic material for warmth

and finger reinforcement and





HALF-PIPE

A half-pipe is a specially constructed, U-shaped, sloping, tubular arena with curved walls and a flat bottom in which snowboarders can carry out acrobatic displays. Half-pipes originated in skateboarding parks.

HOW IS IT DONE?

Snowboarders descend one wall of the U to get up speed; this enables them to ascend the opposite wall and reach the lip, from where they jump into the air and perform moves and tricks. The farther up the pipe they start, the more jumps they can do. To use a half-pipe, riders need excellent edge and turning control. They need to be able to go backward (fakie) as well.

COMPETITIONS

Most half-pipe competitions have five judges, each responsible for a different area. Scores are given for tricks, such as spins and flips; technical merit; landing; and the height a rider attains in jumps.

End to end

Snowboarders must travel the whole length of the pipe, from the entry ramp to the exit

TECHNIQUES

42.50 K (13.78 M) In a half-pipe, a boarder employs a variety of techniques, such as a rolling edge (ascending on one board edge and descending on the other) and making a slide turn (on the snow or ice) or jump turn (in the air) at the top of the vertical

ALLEY OOP

This half-pipe trick involves an uphill turn through 180° in the air. The rider needs to be traveling at speed to achieve enough height in the air, and the board must be flat on takeoff



In the air, grab the toe edge of the board to start the

Turn your body to the front of the board. As with all jumps, draw your knees up to your body when in the air

Release the grab as the board approaches the half-pipe lip and land flat to ride away

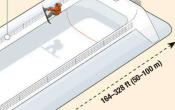
Jumps Platform or deck

impressive tricks

An experienced rider can jump to a height of up to 261/4 ft (8 m) above the flat floor of the half-pipe. where tricks begin This gives plenty of "air" to perform a series of

A flat edge runs around the edge of the half-pipe. This creates the lip (top edge)

Entry ramp Snowboarders enter the half-pipe via the ramp, which helps them to gain speed beforehand



Vertical (vert)

Straight leg

Once you have

made the grab,

straighten the

leading leg as

far as possible

INSIDE STORY

The first crude snowboards

were made in the 1950s

The upper section of the wall is vertical. The rightangled lip links the verts with the platform or deck

Transition (trannie)

This is the curved area between the floor and the vertical wall (vert)



To make an indy grab, get plenty of "air" at the lip, draw your knees up, use your trailing hand to grab the board between the bindings, and extend your leading arm.

> Leading arm Use your leading arm tó counterbalance



Boots and boards are the most basic requirements. There are two main types of snowboard: freestyle (free-riding) and alpine. A freestyle board is comparatively short and flexible with symmetrical nose and tail. Alpine boards are long, narrow, and rigid, with a distinct front and back.

SNOWBOARD

Snowboards have a light, strong, and flexible wood core with fiberglass lamination. The base is made of a porous plastic saturated with wax for a smooth. fast run, and is patterned to channel snow and water.

Toe space The toes should not be able to feel the end of the boot, but the foot should feel snug and protected

BOOTS

Freestylers use flexible boots of soft synthetic leather. Alpine rider's boots are like ski boots, with a stiff plastic outside.



Upside down

Being upside down

is part of being a

talented freestyle

Grahs assist midair

complicated tricks

snowboarder.

stability during

BINDINGS

These hold the feet on the board and do not release automatically. Bindings can be adjusted for a perfect fit.

by surfers and skaters who wanted to try a new sport. In 1965, Sherman Poppen bolted two skis together to make a "snurfer," a hybrid board that came somewhere between a skateboard and a toboggan. Jake Burton Carpenter started making fiberglass snowboards in 1979, and added bolted-on bindings for more control. Steel edges arrived in the 1980s, as did highback bindings. Snowboarding became a Winter Olympic sport in 1998.

The edges are symmetrically curved Curves assist turning. The shorter the radius, the tighter the turn A steel edge 1/8 in (2 mm) square creates board "grab"

CROSS-COUNTRY SKIING





NEED2KNOW



Competiti

Head cozy

A ski hat keeps the head

warm, and nonfogging eyewear reduces sun glare

without impairing vision

Cross-country skiing has long been popular in northern Europe and Canada. It has grown considerably in the US, along with other countries with extensive winter snow cover.

The sport is on the programs of the Winter Olympics, the FIS World Cup, and the Nordic World Ski Championships.

There are 12 cross-country skiing competitions at the Winter Olympics, six for men and six for women.

Poles apart

Freestyle poles may come up to the chin or mouth to allow for a higher arm action. Classical poles (shown right) are shorter

Competition bibs

Skiers wear their start numbers on their chest and back; numbers may also appear on the leg closest to the camera at the finish line

Handcover

Cross-country gloves are lightweight, thermal, and windproof

Ski sui

A stretchable, close-fitting Lycra suit allows unrestricted, streamlined body movement and the maximum release of perspiration

Ankle support

The boots used for freestyle cross-country skiing are relatively rigid and give more ankle support than classical boots

Fixed toe

The binding secures only the toe of the boot to the ski. The heel remains free

EVENT OVERVIEW

Cross-country skiing is probably the most grueling of the winter sports. Competitive cross-country is divided into classical and freestyle, and races are run over distances from ½ mile (400 m) sprints to 31 mile (50 km) marathons or longer. In classical competitions, skiers use a straight stride and stay within predetermined tracks, only leaving them to overtake. In the faster freestyle discipline, skiers push off on alternate skis in a style of movement that resembles skating.

Slippery stuff

Skiers apply wax to the underside of

skis to influence speed and grip, as well as to prevent the build-up of ice or dirt

COMPETITOR PROFILE

A cross-country skier needs huge strength and stamina, as well as a perfect technique. Training on snow in winter and an arduous regime of cycling, running, and roller skiing in summer build the athlete's physical and mental strength. Technique is perfected through practice on the white stuff.

COMPETITION GUIDELINES

Cross-country circuits vary enormously, but international competition guidelines recommend that a course contains uphill, downhill, and undulating terrain in roughly equal measure. The uphill section should have a gradient of 9–18 percent. For sprints, the difference between the lowest and highest points should not exceed 98 ft (30 m). For races of 9.3 miles (15 km) and more, the difference should not be greater than 656 ft (200 m). However, Norway's Birkebeiner race involves more uphill than downhill.

THE "NANNESTAD EXPRESS"

SKIER BJORN DAEHLIE HAS WON 12 WINTER OLYMPIC MEDALS. FROM NANNESTAD, NORWAY, DAEHLIE IS FAMED FOR HIS SPEED. HE WON HIS EIGHT GOLDS AND FOUR SILVERS FROM 1992 TO 1998. IN 1994, HIS RELAY TEAM MISSED GOLD BY JUST 0.4 SECONDS—AFTER A RACE OF ALMOST 25 MILES (40 KM)!

Curved tips

Cross-country skis are longer and narrower than those used by Alpine skiers, and the skis have steeply curved tips to avoid catching the snow

ALL ABOUT WAX

Using the right wax can take a skier to victory. Snow and the weather influence which wax to use. Glide wax decreases the friction between the skis and the snow, giving a skier more speed, while kick (or grip) wax increases friction between the skis and the snow and stops the skier from slipping.

FREESTYLE SKIS

The skis are shorter than those used for classical at 5 ft 7 in-6 ft 6 in (1.7-2 m), and the upward curve of the tips is not so pronounced. The skis are narrow—just 1.75-2 in (4.5-5 cm) wide.

POLES

Ski poles have to be lightweight but stiff; energy is wasted if the poles bend. They are usually made of aluminum. fiberglass, graphite, or carbon fiber.

Glide wax keeps the ski frictionless and stops

Slip and slide

dirt and ice build-up

6 ft 6 in (2 m)

CLASSICAL SKIS

Longer and more rigid skis, these spread the weight of the racer more evenly. The minimum length of skis for classical events is 6 ft 5 in-7 ft 6 in (1.95-2.3 m)

Wax to win

Glide wax is used on the front and rear of the ski; kick wax is on the middle



CLASSICAL BOOT

The classical boot is relatively flexible and similar to a running shoe, allowing for plenty of ankle movement

7 ft 6 in (2.3 m)



FREESTYLE BOOT

The freestyle boot is more rigid and gives more support to the ankle than the classical cross-country ski boot.

Pulling forward

The skier pulls on

the ski pole to

pull the body

PENALTY CLAUSE

Competitors in nonsprint classical races may be penalized for failing to allow a faster skier to overtake them at the first request, unless they are in the marked zone at the end of the course. Skiers may also be disqualified for using nonclassical techniques.

In any competition, racers will be penalized if they obstruct other skiers; make a false start; or wax, scrape, or clean their skis during a race.

Both classical and freestyle techniques are used in races known as double pursuits. In this style of race, there are two courses: one requiring classical-style skiing and the other freestyle. Between the courses, the competitors must stop in order to change gear, because the skis and poles are not interchangeable between the two styles. However, the clock keeps going, and the first skier across the finish line wins.

Light and strong The graphite and Kevlar shaft tapers to the bottom

Getting a grip

Gathering pace

left ski and pole

and right ski and pole, the skier

gathers pace

Alternating between

A plastic web or disc. called a basket, gives advantage by preventing the pole from plunging too low in to the snow

GETTING ALONG

Classical skiers may only use a diagonal stride. Freestylers can use the faster skating (or free) technique, pushing the inside edge of the ski simultaneously backward and outward at about a 45° angle.

DIAGONAL STRIDE

This technique is the workhorse of classical cross-country. The skis remain parallel to each other and remain in the tracks, apart from in marked areas

Pushing off

The skier glides one of the skis forward and plants the pole in the snow on the same side of the body.

DOUBLE PUSH

The skier plants both poles in the snow at the same time and pushes on both poles together. Both skis move forward together.

Pushing forward

The poles are planted, and the skier pushes backward against them to achieve drive

In this freestyle technique, the skier pushes out and forward so the inner edge of the ski bites the snow. The technique can be used only on firm snow but is faster than diagonal strides.

SKATING STEPS

INSIDE STORY

Cross-country skiing was probably first practiced in the Nordic countries hundreds, if not thousands, of years ago. It was the most efficient way for hunting communities to move long distances in winter as they tracked herds of elk and deer. Traditionally, wooden skis and bamboo poles with leather handstraps were used. Men's cross-country skiing was included in the first Winter Olympics in 1924, but women's events did not make an appearance there until 1952.

GOVERNING BODY: FIS

The Fédération Internationale de Ski (International Ski Federation) was founded on February 2, 1924, during the first Olympic Games in Chamonix, France, with 14 member nations. Today, 132 National Ski Associations comprise the membership of FIS.



Switching sides

snow, and the skier

with the other ski

The pole is then

pulled out of the







SLOPESTYLE

GAME OVERVIEW

Pioneered by snowboarders, slopestyle is an expressive and spectacular winter sport in which participants navigate a downhill course littered with obstacles such as rails and jumps while they attempt to pull off a range of tricks. Scores are awarded for staying upright for the duration of the course and for the most complex and ambitious tricks executed successfully. Slopestyle snowboarding and skiing were both added to the official program for the Winter Games in Sochi in 2014. The organizers hoped the sport would attract younger spectators to the Games.

NEED2KNOW

- The USA's Shaun White is probably the most successful snowboarder in the history of slopestyle, with five Winter X Games gold medals in the event.
- Canada's Kaya Turski is one of the most successful athletes in the history of slopestyle skiing—she has won eight Winter X Games gold medals.
- → There is no standardized course format for slopestyle skiing and snowboarding; a



EQUIPMENT

Apart from a slight adjustment to their bindings, snowboarders do not require any special equipment to participate in slopestyle events. Skiers on the other hand must use freestyle skis (also known as twin-tip skis) to cope with the demands of the sport.

FREESTYLE SKIS

The tips of freestyle skis curve up at both the back and the front, allowing the user to land or take off on the front or back of the ski. They are also more flexible than alpine or speed skis.



BOOTS

Slopestyle skiers use freestyle boots and position them toward the center of the ski rather than the rear. This makes it easier to manipulate the ski in midair.

BINDINGS

Skiers and snowboarders in slopestyle events will usually set a softer binding, allowing for greater flexibility on impact when landing a jump.





THE COURSE

The basic elements of a slopestyle course are the same for both skiers and snowboarders and consist of a downhill run containing a series of obstacles and challenges such as jumps and rails.

THE COMPETITIONS

Currently, the most high-profile slopestyle competition in the world takes place at the Winter X Games, an annual competition for winter action sports organized by ESPN. The competition has taken place annually since 1997 and has been held in Aspen, Colorado, since 2002.

HOW IS IT DONE?

Contestants descend the course at speed, attempting to make the most of the obstacles. They are judged on the skill and difficulty level of their tricks, how smoothly they move from one trick to the next, and the overall impression of their run as a whole.

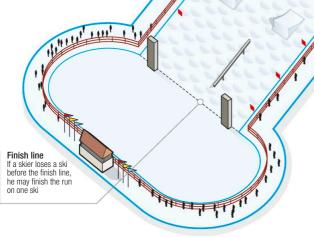
Rail
Narrow features,
these can be
straight or kinked
to provide an
extra challenge

Kicker Simple jumps built from or covered in snow

Wall
Almost vertical sides
force competitors to
skim or spin on the
wall at steep angles

Table Tables come in numerous

shapes, such as curved concave or convex "rainbows"



SCORING

Slopestyle skiing and snowboarding are judged in the same way. Competitions normally take place over two rounds, with a panel of judges awarding contestants a score for each round. In some tournaments, the judges are allocated a specific aspect of the performance—tricks or overall impression—to mark. The resulting scores are then combined. The marks given for overall impression reflect the skill with which participants move from one trick to another and the sculpting of the overall routine. Each contestant's best score over the two rounds is then ranked against the other competitors' best scores.

TECHNIQUES

In slopestyle, a creative combination of jumps, stunts, and tricks is required to achieve a high score from the judges. Each obstacle on the course is suited to a specific type of trick: ramps are used for spins (which involve rotating 360° in midair), flips (performing a front or back somersault in midair), and grabs (grabbing the skis or board while in midair). Rails are used for grinding, in which the boarder or skier jumps in the air and slides a part of the skis or board along the rail. Most basic tricks have evolved several more complex variations.

50-50

A 50-50 is a trick taken from skateboarding in which a snowboarder grinds (rides) along the length of a straight or kinked rail. The rider must gather sufficient speed before attempting to mount the rail.

MUTE GRAB

The mute grab requires the skier to become airborne off a ramp before crossing the skis and grabbing hold of one. The mute grab can be varied by grabbing the ski behind the boot, rather than in front of it.



Popping

As the rider approaches the rail, he flexes his knees and pops the board into the air and onto the rail



Balancing

The boarder rides along the rail with his shoulders positioned over the center of the board



Dismounting

As the rider leaves the rail, he flexes his knees, bracing for the landing



Creating the shape Once airborne, the skier crosses the skis to create the shape of an X



Grabbing

The skier grabs the inside of the top ski in front of the boot



Preparing to land The skis are released and straightened and the knees are flexed for landing

NEED2KNOW

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- The average jump takes between eight and 12 seconds, of which only two or three seconds are spent in flight.
- The most successful jumpers have been from Scandinavia and Japan.
- A proposal for women to compete in the 2010 Winter Olympics was rejected because too few female athletes from too few countries participate in the sport.
- Jumping was the most popular skiing spectator sport until downhill skiing took over after World War II.

ATHLETE PROFILE

Ski jumpers must have nerves of steel and a head for heights. The top athletes start jumping from around the age of 5, gradually building up confidence by jumping from higher hills. Once the basic skills have been honed, jumpers perfect each part of the jump by training on smaller hills. Endurance is vital, and most of the top ski jumpers include cross-training to build up cardiovascular fitness.

THE EAGLE HAS LANDED

EDDIE "THE EAGLE" EDWARDS ACHIEVED FAME AT THE 1988 WINTER OLYMPICS IN CALGARY, CANADA—FOR SKI JUMPING SO POORLY. ALTHOUGH THE BRITISH PLASTERER FINISHED LAST, SPECTATORS WARMED TO HIS PERSONALITY AND PASSION, TURNING EDWARDS INTO A MEDIA SENSATION.

SIDELINES

832 The distance, in feet (253.5 m), of the world record jump set by Austria's Stefan Kraft in 2017.

The number of medals won by the most successful Olympic ski jumper—Matti Nykänen of Finland, who has won 4 golds and 1 silver.

50,000 The average number of spectators that gather to watch the annual Holmenkollen ski-jumping competition in Norway.

SKI JUMPING



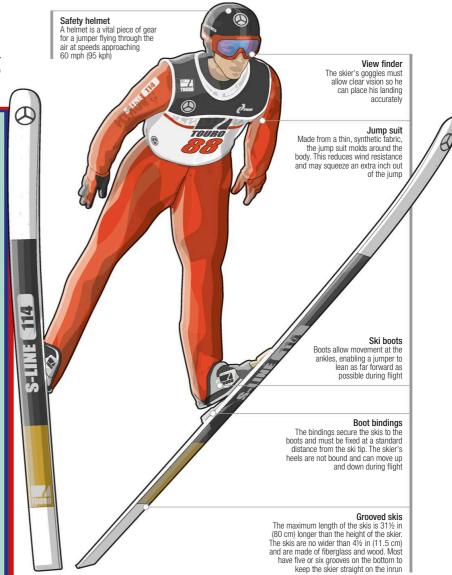






EVENT OVERVIEW

Ski jumping is a spectacular sport that involves skiing down a steep ramp, taking off, jumping as far as possible, and then landing smoothly without falling over. Its best practitioners hold their near-horizontal pose—and their nerve—as they soar through the air until bringing their skis down at the last second, to a cacophony of cheers and cow bells. Skiers in this popular and predominantly male winter sport compete not only for the longest distance jumped, but also for the style of their takeoff, flight, and landing.



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EVENTS ON THE HILL

Competitors start from a jumping ramp onto two types of ski-jumping hill. A K90 hill measures 295 ft (90 m) from the takeoff table to the recommended landing point, or K point. A K120 hill measures 394 ft (120 m). Competitions usually have two jumps in three events: an individual K90 jump, an individual K120 jump, and a team competition on the K120 hill.

FARTHER AND FARTHER

Changing techniques have enabled jumpers to fly farther and farther. At first, jumps were only about 148 ft (45 m). In the 1920s, jumpers flew 330 ft (100 m) with the Kongsberger technique—they leaned forward, bodies bent at the hip, arms extended, and their skis parallel. In the 1950s, Swiss skier Andreas Daescher brought the arms in toward the body to squeeze out an extra few feet. In 1985, Jan Boklöv of Sweden pioneered the flying V technique (below)—the skier holds the tips of the skis apart in a V-shape, thereby gaining both extra lift and stability.

Takeoff
At the takeoff point, the skier stretches out into the jump, straightens the body, and leans forward

Judges' tower
Five judges award style points from a tower next to the landing slope

Flight
During flight, the skier spreads the tips of the skis into a "V" shape to create lift and make the jump longer

Landing slope
Jumpers fly as far as they can over the

Landing
The skier lands with one foot in front of the other in the "Telemark" position.
This helps to absorb the

shock of the landing

is a gradient of 35° or more

landing slope. The angle of most slopes

Outrun

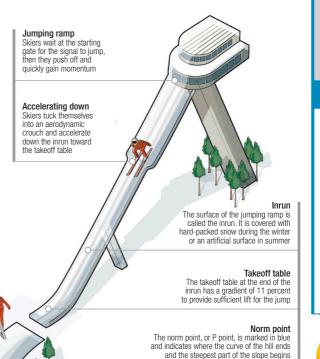
The outrun provides a safe, gently sloping area in which the skier can come to a controlled stop after the jump

K point

The K point is the lower control point. Skiers use the K point as the target distance for a safe landing. Judges award extra points for jumps that exceed the K point

RECORDS GALORE

During the 2005 World Cup finals held in Planica, Slovenia, several jumpers broke the world ski jumping record of 758 ft (231 m), set by Finland's Matti Hautamäki. Bjoern Romaeren from Norway set the new world record with 784 ft (239 m), with Hautamäki achieving the second best jump of 772 ft (235.5 m). Another of Romaeren's jumps reached 769 ft (234.5 m).



FOUR HILLS

THE PRESTIGIOUS FOUR HILLS TOURNAMENT, PART OF THE ANNUAL SKI JUMPING WORLD CUP, IS CONTESTED ON TWO HILLS IN AUSTRIA AND TWO IN GERMANY. JANNE AHONEN OF FINLAND IS THE ONLY SKIER TO HAVE WON THE TOURNAMENT FIVE TIMES.

SCORING

Judges score for distance and style. A skier who jumps to the K point is given 60 points. Two points per meter (3 feet) are added or deducted on K90 hills for longer or shorter jumps, 1.8 points for K120 hills. Five judges also award up to 20 points each for style: good body position during takeoff, flight, and landing; and steady skis in flight. The distance score and middle three style scores are combined to give the jump an overall score. The skier with the highest score for two jumps wins.

INSIDE STORY

Once a local event at Norwegian winter carnivals, ski jumping has spread throughout Europe and North America to become one of the most popular events on the winter sports calendar. Ski jumping was recognized as an official sport in 1892, when brave competitors contested the King's Cup at Holmenkollen, Norway. It remains one of the Winter Olympics' most coveted prizes.

AN OLYMPIC SPORT

Ski jumping has been an Olympic sport since the first Winter Games were held in Chamonix, France, in 1924. Norway tops the Olympic medal table with 11 golds, followed closely by Finland's 10 and Austria's and Germany's 6 gold medals.



Nordic combined has been in the Olympic Games since the first Winter Games were held at Chamonix, France, in 1924.

The individual event consists of two jumps from K90 and a 91/4 mile (15 km) cross-country race. Competitors in the sprint make one jump from K120 and ski a 41/2 mile (7.5 km) cross-country race.

In the team event, each member of a team of four jumps twice from K90 and skis 3 miles (5 km) of a 12 mile (20 km) relay.

SKI JUMPING

to about 60 mph (96 kph)

The jumper launches in to

the air from the takeoff table

Takeoff table

The jump has four main phases: inrun, takeoff, flight, and landing. The jumper approaches the takeoff table with their body crouched and arms behind their back. On takeoff, they straighten their body and lean forward, spreading the skis in a V-shape to create lift. At the end of the jump, they land with knees bent and one foot in front of the other, "telemark" fashion.

Start and inrun The jumper leaves the starting gate and accelerates

There are two jumping hills, which differ only in size. The smaller hill is also known as K90 because the horizontal distance between the takeoff table and the K point—the par landing point—is 90 m, or 295 ft. The takeoff table of the larger hill. K120, is 120 m, or 394 ft, from the K point.

COMPETITOR PROFILE

Nordic combined athletes need courage for the jumps and stamina and strength in cross-country races. Both disciplines are technically demanding. Competitors spend as much training time working on their technique as they do on maintaining cardiovascular fitness

Competitors wear skintight body suits made from thin synthetic fabrics

Ski poles

Long, straight ski poles help the skier push hard against the snow to maintain momentum

Free heels

Bindings hold the boots to the ski at the toes, leaving the heels free to "skate" across the snow



A panel of five judges watches each jump and awards points from a tower next to the landing slope

Outrun

The jumper comes to a controlled stop in the outrun and braking area

Hill height Hills vary in height but are

K point

all daunting for novices

The jumpers aim for the K point

or beyond. Extra points are

awarded for jumps that

exceed the K point

JUDGING THE JUMPS

For each jump, points are given for distance achieved and overall technique. Jumps that reach the K point are worth 60 points. The score is increased for longer jumps and deducted for shorter ones. The five judges may also award between 0 and 20 for technique, and the middle three results are taken into consideration in the final score.

Cross-country skis measure up to 6½ ft (2 m) long and have curved tips. Competitors wax the skis to help them slide easily over the snow

NORDIC















EVENT OVERVIEW

Nordic combined is a one-day winter competitive sport that combines ski jumping with cross-country skiing. Ski jumping usually takes place first, followed by cross-country. Athletes take part in individual, sprint. and team events. There are Olympic, World Cup, and World Championship Nordic combined events, and currently these are all for men only.

CROSS-COUNTRY

The cross-country starting order is decided by the results of the previous day's jumping competition, with points being converted into seconds. Most competitors race using the "skating" style, sliding each leg forward with the ski angled so its inside edge drives back against the snow. Weight is transferred entirely from one ski to the other as the skier moves. In this way, they can achieve speeds of up to 16 mph (30 kph). The first past the post in the cross-country is the overall winner.



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BIATHLON











EVENT OVERVIEW

Biathlon as a winter sport combines cross-country skiing with rifle shooting. The sport has a military origin in 18th-century Scandinavia, when accurate shooting and fast skiing were vital for soldiers patrolling the long border between Norway and Sweden. There are individual, sprint, relay, pursuit, and mass-start events. All involve racing in laps around an undulating course and firing at targets in a shooting range.

THE COMPETITION

Competitors usually start at timed intervals and ski in "skating" style against the clock, stopping to shoot at the targets. When shooting, they alternate between standing and prone (lying down) positions. Missing a target is penalized (see below). The distance of the race and number of shooting phases depends on the event.

RACE TYPES

The main event is the individual race, which is 12 miles (20 km) for men and 9 miles (15 km) for women, including four shooting phases. The sprint is 6 miles (10 km) for men or 4½ miles (7.5 km) for women, with two shooting phases. In the relay, four biathletes each ski 4½ or 3¾ miles (7.5 or 6 km) and shoot twice. The pursuit is a 7½ or 6¼ mile (12.5 or 10 km) race with four shooting phases.

NEED2KNOW

- Biathlon became an Olympic event for men in 1960, and for women in 1992. There is also a World Championship, first held in Austria in 1958, and a World Cup.
- Skis must be at least 2½ in (4 cm) shorter than the height of the skier, while the length of the poles must not exceed the biathlete's height.
- In an increasingly popular summer biathlon, skiing is replaced with cross-country running.

TARGETS

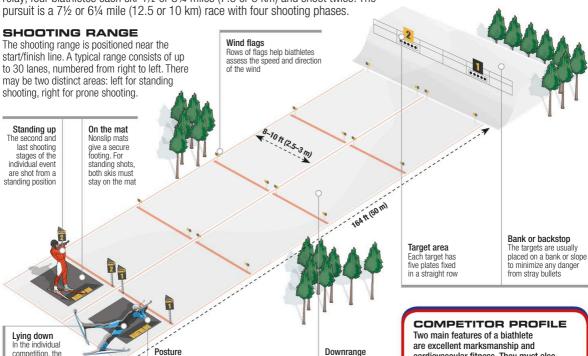
The black targets, which work electronically or mechanically, turn white when hit. They are very small, being 4% in (11.5 cm) wide for standing shooting and 1% in (4.5 cm) wide for prone shooting.

STANDING TARGETS

PRONE TARGETS







The area that is in front of the firing line

OFF TARGET

first and third

shooting stages are

shot from a prone position

Before they start to shoot, competitors must come to a complete stop and drop both ski poles. They may slow down just before the shooting phase to bring their heart rate down, which helps achieve accuracy. Penalties are given for missing a target. In the individual event, there is a time penalty of one minute for each target missed. In other events, competitors must ski a 492 ft (150 m) penalty loop for every target missed. For elite athletes, this typically adds up to about 30 seconds on the overall race time.

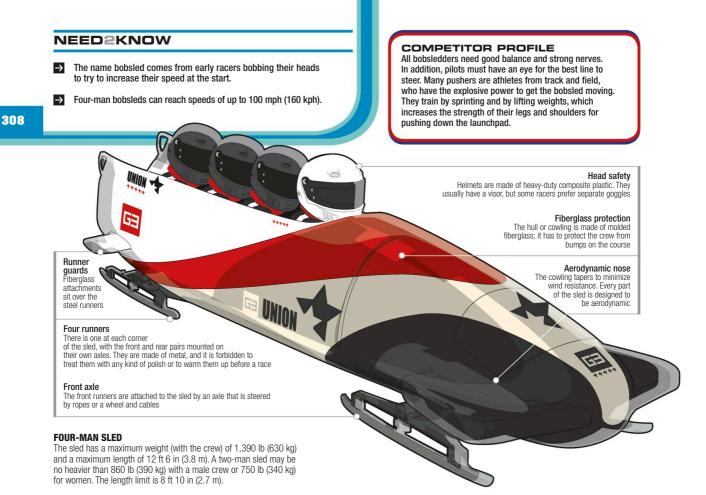
When prone, the biathlete may lean on their

elbows, but their wrists must not touch the ground

are excellent marksmanship and cardiovascular fitness. They must also have good concentration to be able to transition from the fast effort of skiing to the calm, focused work of shooting.

SHOOTING GEAR

Competitors each carry a 7½ lb (3.5 kg) small-bore rifle on their backs. These fire .22 (5.6 mm) ammunition and are loaded manually or have a five-bullet magazine.



BOBSLEDDING







EVENT OVERVIEW

Bobsledding (or bobsleighing) is one of the fastest winter sports. Teams of two men or women or four men make timed runs down steep, twisting ice tracks in steerable sleds. After a push-off by the whole team, it is the driver's responsibility to steer the best line to complete the course in the fastest time over a number of runs.

The sport is not for the faint-hearted: crews regularly undergo four, five, or six times the force of gravity on the banked curves. Bobsled crashes are spectacular and potentially dangerous. The shell of the sled protects the crew, who wear compulsory safety helmets and one-piece suits.

SIDELINES

The number of Winter Olympics competed in by bobsledder Carl-Erik Eriksson of Sweden between 1964 and 1984—the first athlete to do so. Gerda Weissensteiner of Italy also featured in six Winter Olympics, competing twice in the bobsled and four times in the luge.

The age in years of Jay O'Brien when he became the oldest-ever winner in the four-man event, taking gold for the United States in the 1932 Winter Olympics at Lake Placid.

30,000

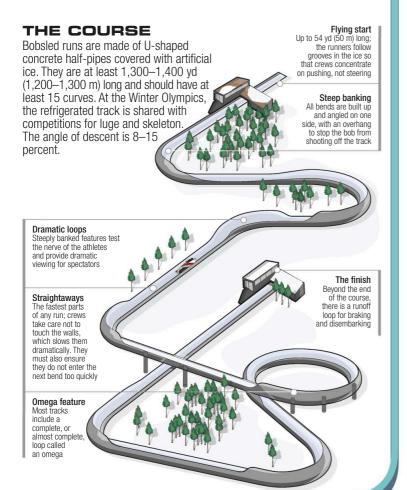
The approximate minimum cost in US dollars of a four-man Olympic-quality bobsled.

The number of Olympic bobsledding medals won by Switzerland between 1932 and 2018 (10 gold, 10 silver, and 11 bronze)—more than any other country.

The G force to which bobsledding crews may be subjected for up to two seconds as their sled corners a bend at speed.

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TRACK TALK

A seeding system decides the order of racing. Teams that have performed better in the previous competitions get the advantage of racing early in the first round, before the track is cut up by other sleds. In the second round, the order is reversed: the team with the best first descent has the last run. The race is timed from the starting line until the nose of the sled breaks a light beam at the finish. Weights can be added to bring the sled up to the combined weight for sled and crew. There is also a minimum combined weight of sled and crew.

SERIES OF RUNS

In Olympic and World two-man events, each crew makes four runs down the course over two days; women also make four runs over two days. Other major competitions are held over two runs. Olympic and World four-man events have four heats over two days.

CHILLED OUT

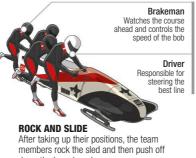
IT HAS LONG BEEN TAKEN FOR GRANTED THAT BOBSLEDDING IS BEST DONE BY COUNTRIES WITH SNOW AND MOUNTAINS. THE 1988 WINTER OLYMPICS IN CALGARY, CANADA, CHANGED THE GAME BY INCLUDING TEAMS FROM "HOT" COUNTRIES INCLUDING AUSTRALIA; MEXICO; AND, MOST NOTABLY, JAMAICA. THE JAMAICAN TEAM'S STORY WAS MADE INTO A 1993 MOVIE CALLED COOL RUNNINGS STARRING JOHN CANDY.

PUSHING OFF

A fast start is key, so bobsled athletes all wear specially designed spiked shoes to provide traction on ice. Every crew member helps push the pod using retractable handles. The driver jumps in first, followed in a four-man crew by the two middlemen; the brakeman always gets in last. Top crews aim to complete the push-off in about five seconds.



The brakeman jumps in after the driver and other members of the crew are in position; he or she must climb on board within 54 yd (50 m).



down the launch pad.



The driver steers the sled; the brakeman slows it after the finish line by moving a rear-mounted handle that lowers a line of metal teeth into the ice.

INSIDE STORY

Bobsledding was invented in the late 19th century, when Swiss tobogganers added a steering mechanism to a sled and gained control of direction. The first bobsled club was founded in Switzerland in 1897. For its first decades, the sport was largely a diversion enjoyed by the rich upper-class, who raced at Europe's leading alpine resorts. It took on a more competitive form in the 1950s and 1960s. The Olympics and World Championships were the leading bobsledding competitions until the mid-1980s, when the World Cup was introduced. This is a very demanding competition in which teams race throughout the season on a variety of tracks in different countries.

GOVERNING BODY

Fédération Internationale de Bobsleigh et de Tobogganing (FIBT) was founded in 1923, a year before four-man sledding became an Olympic sport. The first two-man medal events were held in 1932. Bobsledding for women made its debut at the 2002 Games in Salt Lake City, Utah.

NEED2KNOW

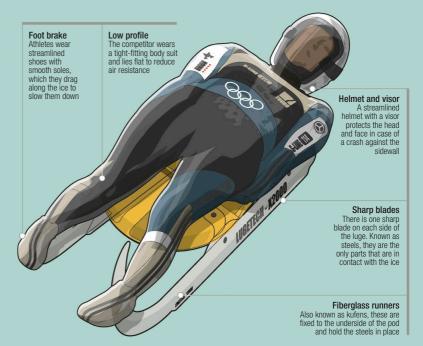
310

The International Luge Federation (FIL), based in Germany, is responsible for the sport worldwide.

- The first organized luge race was along a track between Klosters and Davos, Switzerland, in 1883. It resulted in a tie.
- Germany has had more Olympic luge champions (18) than any other country. Georg Hackl won gold in three successive tournaments: 1992, 1994, and 1998. He also won the World Championships in 1989, 1990, and 1997.

ATHLETE PROFILE

Luge racers are physically sturdy and need to withstand G forces and great stresses, particularly on their neck, abdomen, chest, and feet. They are psychologically tough and have sharp reflexes that enable them to control the runners of their luge.



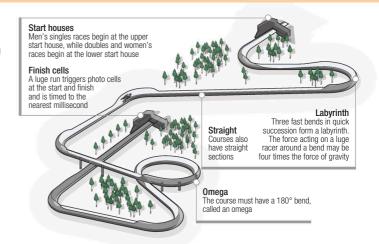
A MEGA-SLIDE

Luge tracks are mostly artificial, with a 1 in (2.5 cm) thick covering of ice. They measure between 1,100 yd (1 km) and 1,420 yd (1.3 km) for men's singles and between 875 yd (800 m) and 1,150 yd (1,000 m) for women's and doubles events. The tracks feature left and right turns, S-curves, 180° bends, and hairpins. Typically, the average gradient over this distance may be 8 percent. Sidewalls, which are also covered with a thin coating of ice, keep the luges on course as they bank around corners at hair-raising speeds. Popular in some countries in Central Europe and North America, natural tracks are created during winter on winding roads covered with ice. They have no sidewalls or artificial banks.



EVENT OVERVIEW

Luge athletes take part in the fastest sport on ice as, lying feet first on their back on a fiberglass sled, they twist and turn down a track at breathtaking speeds of more than 85 mph (135 kph). In races against the clock, men compete in singles and doubles and women in singles. These events are held in competitions, such as the World Championships and the Winter Olympics.



FIBERGLASS POD Molded pod The luge, which is French for sled. The length of a singles' luge is a fiberglass pod of variable length is 4 ft 8 in attached to two runners on (1.45 m) on average steel blades. The luge in singles events weigh no more than 51 lb (23 ka): the doubles' Steering bows luge is longer and cannot The athlete places his or her legs outside the exceed 60 lb (27 kg). steering bows

MOVING AND STEERING

To start a run, the racer sits on the luge and slides back and forth while holding onto handles on either side of the track. After a powerful push, the racer paddles the ice with spiked gloves and then lies back and steers by either applying leg pressure to the steering bows or by shifting the body weight with a movement of the head or shoulders. The race winner is usually the fastest over four (singles) or two (doubles) runs.

EVENT OVERVIEW

Although the top speeds achieved by skeleton racers are slightly slower than luge competitors, in some ways, the sport requires even more courage, because athletes travel headfirst. Skeleton events for men and women are held at World Championships and at the Winter Olympics.

SKELETON



Shoes
The soles of
skeleton shoes
have small spikes
arranged like a
brush, so the

athlete can have traction when

starting the sled





ATHLETE PROFILE

Razor-sharp reflexes are essential for a skeleton racer. Because the push phase is so important, competitors need strong legs and the ability to sprint. They also need a strong, responsive body core that shifts their weight from one side to the other while steering the skeleton.

Weight restriction

The combined weight of the skeleton and athlete must not exceed 254 lb (115 kg) for men and 203 lb (92 kg) for women, or the maximum weight of the sled has to be reduced

Head protection A helmet and visor are

NEED2KNOW

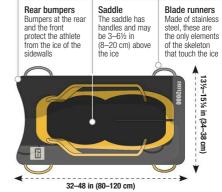
- The first competitive skeleton race was organized between the Swiss towns of St. Moritz and Celerina in 1884. The winner received a bottle of champagne.
- Olympic skeleton events—men's singles and women's singles—are timed to 0.01 seconds. There are four runs over two days, and the fastest aggregate time wins.
- The Fédération Internationale de Bobsleigh et de Tobogganing (FIBT) is the governing body for skeleton. It organizes the World Skeleton Championship.

FAST AND STEEP

Skeleton events are run on the same tracks as bobsled competitions. Male and female athletes compete on the same course and over the same distance. The track is fast and steep—it must be at least 1,312 yd (1,200 m) long, with total vertical drops that average around 380 ft (116 m).

SPEED SADDLE

The athlete lies on the steel frame and saddle, and the sled moves along on runners. The base-plate is made of fiberglass or steel, and the runners are steel. The skeleton weighs a maximum of 95 lb (43 kg) for men and 77 lb (35 kg) for women.



GETTING A WINNING START

To stand any chance of a fast time, the athlete needs a quick running start. This is called the push phase and is typically 27–44 yd (25–40 m) long.

Speed suit

This is close-fitting

and aerodynamic



At the start, the competitor runs as fast as he or she can, holding the handles and pushing the skeleton along the ice.

RACING RULES

There are two key skeleton rules. First, athletes cannot warm the runners of their sled to make them run faster. At the start of the race, the runners must be within 7°F (4°C) of the reference runner, which is exposed to the air for an hour beforehand. Second, the contestant must cross the finish line on the skeleton for the run to be valid.



The athlete leaps up from the track and forward onto the skeleton. If this move is not carried out precisely, he or she will probably lose control of the sled.

JUMP!

Streamlined position Arms are tucked in close to the body to reduce wind resistance FLOP! The racer lands headfirst and belly

down on the skeleton with the arms pulled in tightly against the side of the body for the most aerodynamic profile.

Skaters can achieve speeds of 40 mph (65 kph) on the long track. On the short track, the top speed is around 30 mph

- (50 kph).

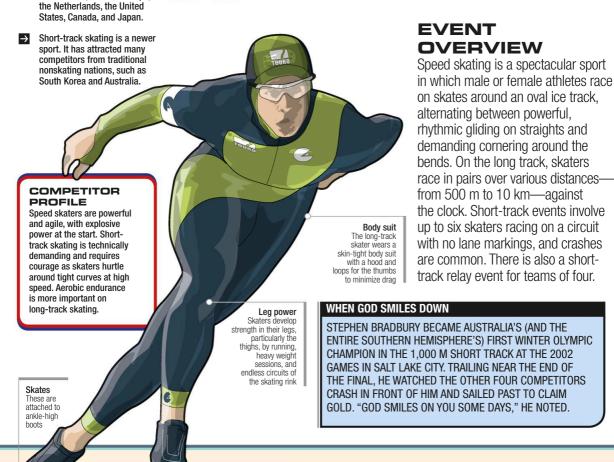
 Long-track skating is particularly popular in Scandinavia, Eastern Europe,
- SPEED SKATING











THE RINKS

The long-track rink is a 437 yd (400 m) oval; short-track courses are 121½ yd (111.12 m) long. Long-track lanes are marked with painted lines and movable blocks of rubber or wood. The blocks are 1 ft 8 in (50 cm) apart for the first and last 49 ft (15 m) of the track, and 3 ft 3 in (1 m) apart elsewhere.

LONG TRACK

There are two racing lanes on the long track. Skaters switch between the lanes every lap. Depending on the event, competitors start from different parts of the circuit.

Starting lines Straightaway Finish line Different events have different A long track has two For all but the 1,000 m starting points: (left to right) 3,000/5,000 m; 1,000 m; 1,500 m fast straightaways Crossing straight Every lap, the skaters change lanes in the crossing straight so that they both cover the same distance during the race Finish line For 1,000 m races Warm-up lane Skaters prepare for the race in the **Blocks** inside "warm-up" lane. During an A skater can touch 500 m start event, the referee the blocks marking This short event controls the race the lanes but must from this lane begins here not obstruct his or her opponent or alter the course

ALL-AROUNDERS

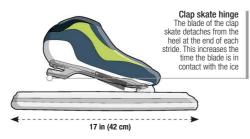
The "all-around" is the name given to a combination of long-track races held over 500 m; 1,500 m; 3,000 m; and 10,000 m. The times for each race are converted into points using a set scale. The skater with the fewest points wins the overall competition. Although the "all-around" is popular, it has been included in the Olympics only once (in the men's games in 1924) because skaters tend to specialize in particular distances.

GEARED FOR SPEED

On the short track, skaters' skintight body suits are lined with Kevlar—also used in bullet-proof vests—for protection from slashing blades. Skaters also wear helmets and guards on their neck, shins, and knees. Gloves with coated fingertips are also essential, because skaters place their hands on the ice to stay upright in rapid turns. The profile of the bottom of a speed skate's blade is flat, unlike the concave shape of a figure-skating blade.

SKATE DIFFERENCES

The blade of the short-track skate is long and thin. It is positioned diagonally across the sole and curves to help with cornering. On the long track, skaters wear clap skates. The long, straight blade is centered on the sole and hinged at the toe.



BREAKING THE RULES

Skaters can touch the blocks marking the turns but may not skate inside them. Physical contact is part and parcel of the short track, but on the long track, interfering with an opponent or skating out of lane leads to disqualification.

TRACK TECHNIQUES

Short-track skaters use small running steps to gain speed at the start. In the basic body position on the straight, the short-track skater leans the body forward, bends the knees, and swings the arms to maintain momentum. Approaching a corner, the skater crouches very low and leans into the turn, often touching the ice with the inside hand. Crossover steps make cornering easier.

On the long track, skaters make long, gliding strokes on the straightaway and keep one arm behind their backs to reduce drag. Crossover steps are used to negotiate corners.

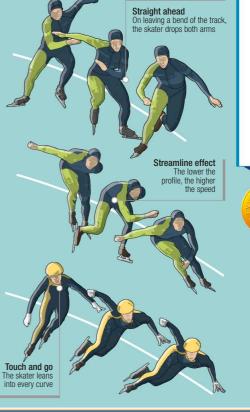
BALANCING ACT This sequence shows how a skater who is negotiating a bend compensates for having one foot off the ice by extending the arms onto the same side of the body.

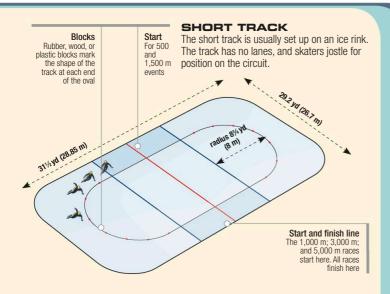
IN FULL CRY

When accelerating down the straightaways of a long track, the skater bends and crouches to lower their center of gravity and reduce wind resistance.

PASSING CONTACT

The corners on the short track are so tight that the hand closer to the inside of the course may come down so low that it scrapes the ice. No penalty is incurred for this; it is just a touching moment.





LAP COUNT

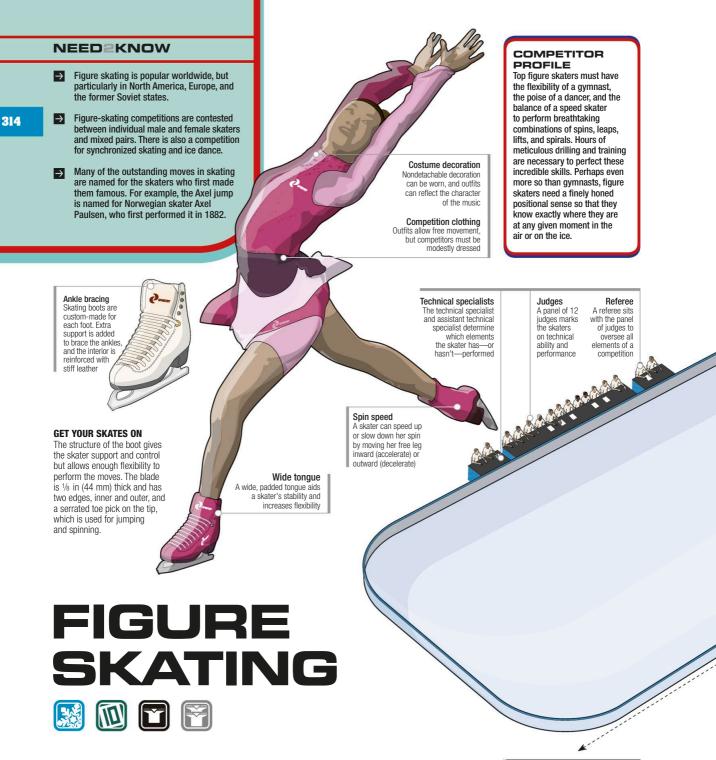
The number of laps per event is as follows: 500 M $-4\frac{1}{2}$ laps 1,000 M-9 laps 1,500 M $-13\frac{1}{2}$ laps 3,000 M-27 laps 5,000 M-45 laps

INSIDE STORY

Competitive speed skating began on frozen canals and lakes in 19th-century Europe. The International Skating Union (ISU), founded in 1892, formalized the rules. Short-track skating began in North America in the early 20th century.

INTERNATIONAL SKATING UNION (ISU)

The ISU was founded in 1892 in the Netherlands and is the oldest governing body of any winter sport. The ISU was originally a federation of 15 European countries until Canada joined in 1894.



EVENT OVERVIEW

Both technical and beautiful, figure skating is a whirl of leaps, spins, and spirals. Single skaters or pairs of skaters perform prescribed movements on the ice in front of a panel of judges, who give them marks for technical ability and artistic interpretation. Figure skaters compete in a short program of required elements that tests their technical skills and an original free skate program that allows them to explore artistic expression. Figure skating first featured at the 1908 Summer Olympic Games and became an official sport of the Winter Games in 1924.

BARBARA ANN SCOTT

IN 1942, CANADIAN BARBARA ANN SCOTT BECAME THE FIRST FEMALE SKATER TO LAND A DOUBLE LUTZ IN COMPETITION. SHE WAS ONLY 13 AT THE TIME.

THE ICE RINK

The temperature of the ice is an important factor: it is maintained at 22°F (-5.5°C), which is 6°F (3.5°C) warmer than an ice hockey rink. Colder ice is harder and slower, whereas warmer ice is faster and offers more glide and softer landings. At major competitions—such as the Winter Olympics and ISU championships—referees, judges, and other officials sit outside the rink. At lower levels, officials often sit on the ice.

Covering the ice Surface area A skater's routine must cover the The ice rink has a surface area of up to 19.375 sq ft (1.800 m sq) entire surface of the ice. Marks and contains as much as are deducted if the full area is not 1,907 cu ft (54 cu m) of ice used or if competitors perform the majority of their routine in front of the judges' bench Entrance and exit Skaters enter and leave the ice through gaps in the rink wall Surface depth The ice measures 1-1½ in (2-3 cm) in depth 1831/2-197 H (56-60 m) TECHNICAL TIMING The figure-skating programs are timed. The short program for pairs

KISS AND CRY

THEY'VE GIVEN IT EVERYTHING AND SKATED THEIR HEARTS OUT. NOW IT'S TIME TO WAIT FOR THE JUDGES' RESULTS. THE KISS AND CRY AREA IS THE SPOT BY THE SIDE OF THE RINK WHERE SKATERS AND THEIR COACHES SIT IN FULL VIEW OF THE TV CAMERAS FOR THE MOMENT OF TRUTH-AND THEN KISS OR CRY.

SKATING ON THIN ICE

Figure skaters perform two programs—short and free skate—and need to fulfill certain elements in each. Eight prescribed elements are required for the technical short program, which can include a double Axel jump; flying sit spin; combinations of double and triple jumps; and, for pairs, spirals and throws. The second part of the competition, the free-skate program, requires a balance of elements that cover the full rink area, including jumps, spins, spirals, and step sequences. Pairs are required to perform moves simultaneously, either in parallel or symmetrically. For maximum scores, skaters must link the elements together with difficult connecting steps in different holds and positions.

SCORING

The ISU Judging System was introduced in 2004 after a scandal hit the headlines at the 2002 Winter Olympics in Salt Lake City, Utah, when the judging of the figure-skating competition was alleged to have not been entirely objective. In the new system, which judge awards which mark remains anonymous.

THE ISU JUDGING SYSTEM

Every element is given a scale of value that determines how many points it is worth; a grade of execution from -3 to +3 is then applied to that value, depending on how well the element is performed. In major competitions, the marks of only seven judges determine a skater's final score. Nine judges from the panel of 12 are selected at random by a computer. The highest and the lowest marks are then deleted and the scores of the remaining seven judges are averaged to leave the "trimmed mean," which is added to the base value for the final score.

TECH TALK

Knowing what commentators are talking about helps to understand the intricacies of a skating routine and the sheer physical skill of the skaters on the ice:

TOE JUMP When the skater uses the toe pick of the blade to launch themselves into the air in, for example, a flip, Lutz, or toe loop. **EDGE JUMP** When the skater uses a particular edge of the blade of one skate to take off—for example, Axel, loop, and Salchow jumps. **SPIN** Move in which the skater pirouettes on the spot on the ice. In combination spins, the skater changes foot and position while maintaining the speed of the spin.

LIFT A technique of pairs skating in which the man lifts his partner, often overhead, and sometimes throws her in the air. **FOOTWORK** Step sequences that move the skater across the ice to link set moves while showing off their skills.

SIDELINES

and singles should last no longer than two minutes and 50 seconds,

while the free-skate program lasts four and a half minutes for men

and pairs and four minutes for women

The temperature, in degrees Fahrenheit (60°C), of the water that is sprayed on the ice rink by a machine called a Zamboni to create a smooth surface.

The number of Olympic golds won by Soviet and Russian pairs skaters since 1908.

160.000 The fine, in dollars, that disgraced American figure skater Tonya Harding paid in March 1994 for her involvement in an attack on fellow American figure skater Nancy Kerrigan at a practice session for the US Figure Skating Championships. Harding won the competition, while Kerrigan withdrew due to the injury. Harding was later stripped of her title.

The number of gold medals awarded in the 2002 Winter Olympics pairs figure-skating competition. A judging scandal resulted in both the Russian and Canadian pairs winning gold.



PERFORMING PERFECTION

Perfect execution of the technical elements in the skating programs ensures high scores. Not only do the elements have to be performed flawlessly, they also have to be performed at fast speeds; in complex flowing combinations; and, in the free-skate programs, with individual artistic expression.

JUMPS

For the spectator, dazzling jump sequences are the mark of a great skater. At the top level of competition, men perform triple or quadruple rotation jumps, while women perform triples. Jumps can be driven from the toe or the edge of the blade and performed singly or in combinations.

Axel jump
The skater
takes off
forward
from the front
outside edge
of the blade
of his left foot

SYNCHRONIZED SKATING

A skating spectacular, synchronized skating involves teams of 16 skaters (usually all women, although mixed teams are allowed) performing as single, coordinated units. Skaters need flawless skills in speed and footwork, as well as in jumps, turns, and lifts. In competition, teams perform a technical short program, including lines, circles, and other complex formations, and a creative free program, allowing competitors freedom of expression.



SPINS

Speed and control are the keys to successful, point-winning spins. The speed of the spin dictates the number of rotations the skater performs (the more the better). The ability to spin in one spot shows mastery of the technique, while looking effortless

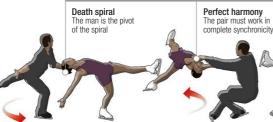
Biellmann spin The skater arches his back and catches his right foot by the blade

Spinning splits The skater raises his right leg behind him as he spins

SPIRALS

shows total control throughout the spin.

Spirals are flamboyant and rather dangerous-looking moves performed by pairs in both the short and free-skate programs. At least one full revolution must be made.



Inside, outside

The death spiral can be performed backward outside or backward inside. This means that the pair skate on the rear outside or rear inside edge of the blade

Flat out

The man holds his partner with the same arm as his skating foot and spins her around as she leans back toward the ice, aiming to bring her back parallel and her head as close to the ice as nossible



INSIDE STORY

Figure-skating competitions have been held since the 1880s, and the first World Championship (for men) was held in 1896. The women's first World Championship was held in 1906. The event first appeared at the Summer Olympics in 1908, but has since become one of the longest-standing Winter Olympic sports.

INTERNATIONAL SKATING UNION (ISU)

The ISU was founded in 1892 in the Netherlands and is the oldest governing body of any winter sport. It was originally a federation of 15 European countries until Canada joined in 1894, and today it has 57 member countries. During its history, the ISU has seen all its disciplines become official Winter Olympic sports.







NEED2KNOW

- Couples skate the compulsory and original dances in traditional closed dance holdssuch as the Kilian, waltz, or foxtrot positions-for most of the routine. In the free dance, holds are much more open, and couples are encouraged to be creative.
- Ice dancing is popular in Europe, with strong roots in the UK. In more recent years, the sport has been dominated by former Soviet countries.
- The first Olympic ice dance champions were Ludmilla Pakhomova and Alexander Gorshkov of Russia, in 1976.



Ice dancing is a couples' event with three phases of competition at the highest level—the compulsory dance, the original dance, and the free dance—and is often likened to ballroom dancing on ice. The free dance allows couples to show off their creativity. Ice dancing is sometimes contested as a group event with two competing couples on the ice together.

The first world championships were held in 1952, but ice dancing did not become a Winter Olympic sport until 1976, in Innsbruck in Austria.



TORVILL AND DEAN

complements the woman's outfit and the couple's clothing can reflect the

character of the music

GREAT BRITAIN'S JAYNE TORVILL AND CHRISTOPHER DEAN BECAME HOUSEHOLD NAMES AT THE 1984 WINTER OLYMPICS, **WOWING JUDGES TO** BECOME THE HIGHEST-SCORING ICE DANCERS OF ALL TIME. THEY SCORED 12 PERFECT SIXES FOR THEIR PERFORMANCE.

RULES OF ENGAGEMENT

In ice-dance competitions, couples must stay close together on the ice, keeping a constant distance between them. The man must lead and the woman must follow. They are judged on how well they perform set moves as a unit and how well they interpret the music in each dance. Points are awarded for the level of difficulty of an element and the quality of its execution. Points are deducted for illegal moves or elements or wrong interpretation and expression of the musical rhythm.

COMPETITION

Ice dancing is contested in three phases. The compulsory dance is chosen by the ISU, and couples are required to skate prescribed patterns to set musical rhythms and tempos. For the original dance, the couples use their own choreography (including some required elements) and music, but the dance rhythm is selected by the ISU, and the couples must dance to the strong beat rather than the weak (less obvious) beat. The free dance allows couples to choose their own music and choreography, although they must include some required elements and express their artistic skills through their interpretation of the music. Originality is rewarded by the judges. The free dance lasts for four minutes, plus or minus 10 seconds.

BALANCING ACT

The main technique ice dancers need to learn is balance. especially the man, whose job it is to lift the woman. A close second is endurance, as ice dancers need to skate at speeds comparable to those of speed skaters. Coordination is key, as delivering perfect footwork in a ballroom dance is no easy feat.

DANCING BY NUMBERS

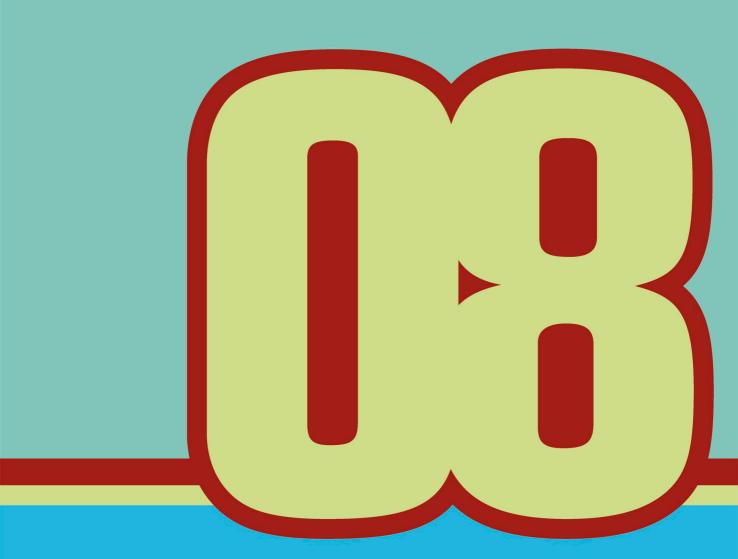
Ice dancers use patterns and step charts to learn and perfect a dance before performing it in competition. The pattern of the Westminster Waltz is shown here as a diagram, with the numbers indicating different step sequences. The rink is divided into quarters by long and short axes; the curved line—the passage of the dance—is the continuous axis, which must not cross the long axis.

The Westminster Waltz is characterized by stateliness, elegance, and dignity, and the couple tries to convey this to the judges as they perform two sequences.





TARGET SPORTS



NEED2KNOW

St. Andrews golf course in Scotland, where the sport has been played since 1574, is known as the Home of Golf.

320

- Tiger Woods was the sport's undisputed world number one for a record 281 consecutive weeks from 2005–2010.
- A game of fractions, with a very fine line separating a good shot from a very poor one, golf has a reputation for being both devilishly difficult and highly addictive.

Single glove Optional, for better

the left hand by right-handers, and

on the right hand

by left-handers

Shaft technology

Club shafts need to be both strong and lightweight; they

are usually made either of

steel or graphite

Clubheads The heads of all golf clubs

are metal, even those known for historical

reasons as "woods.





GOLF

GAME OVERVIEW

Golf is an individual sport whereby players (golfers) strike a ball with metal clubs around a course of nine, or more commonly 18, holes in the fewest shots possible. Each hole starts on a "teeing ground" and ends on a "green" containing a small, circular depression in the ground into which the ball must be sunk. Golfers take with them up to 14 clubs which are capable of hitting the ball different distances on a variety of trajectories, and use whichever of them is most appropriate for each shot.

THE COURSE

Courses vary greatly in length—anything from 1,300 yards for a par 3-hole course to more than 7,000 yards for some of the more brutal 18-hole courses, particularly in the US. These figures do not take into account the distances between the green and the teeing ground of the next hole, however, which can increase the distance traveled by the golfer to around seven miles. A round of golf can last between 3 and 5 hours depending on the amount of players, ability, and speed of play.

Fairway

The grass on the most direct route from tee to green is cut shorter than that of the surrounding areas, rewarding an accurate shot

Natural hazards

The edge of each hole may be marked by trees: these are part of the course, but golfers try to avoid getting stuck in or near them

PLAYER PROFILE

Course clothing Regular or polo shirts and pants in any color or combination of colors; the look is stylishly casual; no T-shirts or jeans are allowed

Good concentration and hand-eye coordination are vital. Upper body strength and all-around flexibility are an advantage. So, too, is confidence: golf is a game of psychology, and self-confidence can invigorate your game.

Stylish footwear

Golf shoes have cleats that provide grip but do not damage the course. The uppers are made of leather



this zone

Women start off ahead of the men; their teeing area may be directly in line with the men's equivalent or set at an angle, as here

Ladies' tee

Rough

A shot that goes off course may land in the long grass growing along the edges of the fairway, known as rough. Semirough gives way to heavy-rough on the extremes of many holes. Typically it is more challenging to hit a shot from rough than fairway



THE HOLES

Each of the 18 holes must comprise a teeing area, a fairway, a putting green, and a hole with a removable flag in it. There may be any number of surrounding hazards: these include artificial bunkers (large depressions filled with sand), and natural features, such as trees, lakes, and streams. The most economical route around the golf course is by keeping the ball on the fairway, but this is far easier said than done. Golf courses are made up of an unregulated variety of par 3, 4, and 5 holes. Par is determined by the hole's length. Par 3s can be any distance to 240 yards, par 4s 241–474 yards, and par 5s over 475 yards. When calculating par, it is assumed the player will take two putts on the green. Therefore a par 3 should require one shot to reach the green, par 4 two, and par 5 three. However, the player can make a score in any way he or she wishes.

HANDICAP

Each hole is given a par, based on its length, which is the number of strokes that are deemed reasonable for its completion, always including two strokes for putting. A player's handicap is the number of strokes over the allocated.

TYPES OF GOLF COURSE

Golf's popularity around the world is reflected in the vast diversity of the physical landscapes in which it is played. Golf course types range from the open, windswept coastal "links" of Scotland, where the game evolved, to the perfectly manicured resort courses of the Middle East, set in a sea of desert sand. Golf courses can be found in almost every environment that can afford the space. Probably the most accessible and popular types of course are the tree-lined parkland courses that are common features of many city suburbs.

The ultimate objective Putting green The area around the hole The hole is 41/4 in (108 mm) in diameter and at least 4 in has very closely cut grass which facilitates (101.6 mm) deep; in it is a removable flag often bearing smooth putting the number of the hole Sand trap Out of bounds Bunkers are strategically Land adjacent to the golf club is positioned by course designers to give players marked by a series of white posts extra problems: this one beyond which is deemed to be out of bounds. If a ball goes OB guards the right-hand side of the green a player is penalized one stroke



Par threes Four of them: holes 4, 6, 12, and 16; the shortest is 155 yd (142 m), the longest 240 vd (219 m)

Water hazard

Front nine Holes 1-9 cover a total distance of 3,735 yd (3,415 m)

If the ball lands here and is irretrievable, the player forfeits

> Par fours Ten in all: 1, 3, 5, 7, 9, 10, 11, 14, 17, and 18; lengths between 350 yd and 505 yd (320-462 m)

Par fives A total of four: holes 2 (575 yd/526 m); 8 (570 ýd/521 m); 13 (510 yd/466 m); and 15 (530 yd/485 m)

Venue for the annual Masters Tournament, one of golf's four Major Championships, the Augusta National Golf Club is one of the world's most exclusive and naturally beautiful courses. Situated on the site of a former tree nursery, Augusta is a prime example of a parkland course with lush fairways bordered by trees and shrubs from which the holes take their names.

GOLFING GEAR

A selection of clubs and a good supply of balls are the essentials for a round of golf, and the well-equipped player needs tees (see opposite page), ball markers (to mark the position of the ball if it has to be picked up), and a pitch-mark repairer. Since a golfer may be on the course for some hours. he or she may also want to take food and energy drinks, an umbrella and raincoat, a towel, gloves, and other assorted items. To carry all this gear, golfers use a specially made carry-bag or cart. For the serious golfer, a battery-powered golf cart takes over the role of the traditional caddy.

Golf clubs usually have dress rules requiring players to wear smart-casual clothing. Special golf shoes, with spiked or rubber soles to provide grip during the swing, are indispensable.

TOO MANY CLUBS

IN 2001, WELSH PROFESSIONAL IAN WOOSNAM BEGAN THE LAST DAY'S PLAY IN THE BRITISH OPEN GOLF CHAMPIONSHIP WITH A GREAT CHANCE OF WINNING. HE STARTED WELL, BIRDIEING THE FIRST HOLE, BUT ON THE SECOND TEE HIS CADDY NOTICED AN EXTRA CLUB IN THE BAG. THE TWO-SHOT PENALTY HE INCURRED PROBABLY COST HIM VICTORY IN THE END.

SELECTION OF CLUBS

A golfer can use up to 14 clubs in any combination he or she chooses. Usually this comprises 2-3 "woods" including a "driver" for maximum distance, 6-7 irons for play from the fairway and rough, 2 wedges for shots from 100 yards and in, and a putter for on the green. All clubs have a head for striking the ball, a shaft, and a rubber grip. Clubs vary greatly in price and quality as with all sports equipment—some particularly sophisticated drivers can cost more than an entire set from another manufacturer—but clubs are commensurate with quality. An expensive set of clubs will not make a good golfer, but a good player can prosper with a supposedly inferior set of clubs.

IRON

Generally used for medium length shots, irons are the most versatile clubs in a golfer's armory. They range from 1 irons (16°) loft to 9 irons (44°).



DRIVER

The driver is the

hardest club in the

bag to hit because

of its shallow,

When struck

unforgiving face.

well however it

comfortably travels

the farthest distance.

™ WEDGE

Pitching wedges, for short shots from grass, and sand wedges for bunkers have recently been joined on the market by highly lofted lob wedges.

CLUB HEAD

Traditionally wooden, then made of steel,

Hosel

of the shaft

Connects top of the

clubhead to bottom

titanium clubheads are now becoming

The area of the clubhead

farthest from the shaft is

called the toe

more common for drivers.

Because it is lighter,

Toe

clubheads can

be larger and

more forgiving.



PUTTER

Grooves

Horizontal indentations

impart spin on the ball

The most shallow-faced club in the bag, the putter is used for stroking the ball on the green and sometimes from short grass just off the green.



MORE RULES THAN MOST

Golf has many more rules than most sports—34 plus various subclauses—but this reflects the nature of the game. There is clearly more potential for an incident on a playing area of 100 acres including trees and rivers than on, say, a tennis court. The Rules of Golf are enforced by the Royal and Ancient Golf Club of St. Andrews (R&A) in all golf-playing nations of the world except for the US and Mexico, where the United States Golf Association (USGA) governs.

STRIKING THE BALL

A stroke is defined as the forward momentum of the club with the intention of striking it. If you make an attempt to hit the ball, but miss it, that counts as one shot.

ON THE GREEN

On the green only, it is permitted to mark the position of the ball, lift it, and clean it. Golfers can also brush aside loose leaves or sand that might be on their "line".

HAZARDS AND UNPLAYABLE LIES

There is no penalty for going in a bunker, but players must not ground their clubs before making contact with the ball. You are also permitted to play a shot from a water hazard, but a far more practical option is either to replay the shot from the

original position or take a drop, but not nearer the hole—both options incur a one-stroke penalty. If there is an unplayable lie, such as the ball in a bush, you can drop it at a distance of up to two club-lengths, not nearer the hole. This also incurs a one-shot penalty.

IMPEDIMENTS AND OBSTRUCTIONS

Movable natural objects—stones, leaves, etc.—are defined as loose impediments and can be moved from around the ball without penalty. Obstructions, such as bunker rakes, can be moved. If, however, the ball moves during the course of this action, it counts as one shot. Immovable obstructions are items such as fixed sprinkler heads. Free relief can be taken from these—if they interfere with the player's stance or swing—up to one club's length, not nearer the hole.

BALLS

Although there are strict rules covering the specifications of golf balls, there are many different types/designs/models to choose from, each of which performs differently in terms of spin, speed, and trajectory. Some balls have multiple inner layers around a small core, while others have a single large core.

White missile

The hard outer layer of a golf ball is covered in small dimples for aerodynamic purposes. To an experienced golfer, slight differences in the dimple pattern give each type a characteristic "feel"

The height of the tee will vary according to the club used. With a driver, the ball should be struck slightly on the upswing to impart forward spin

LOFT AND LIE

Different lies require different clubs. Balls that lie well on the short grass of the fairway have the greatest range of options. Shots that lie poorly in the rough often demand a mid- to short iron or a utility woodsomething with sufficient loft to get the bottom of the blade under the ball. When chipping onto the green over a bunker, the player will opt for a lofted irongiving maximum height and a soft landing. When there is no obstruction, a more shallowfaced club can chip-and-run the ball onto the green.

DISTANCE GUIDE		
CLUB	DISTANCE	LOFT
D	230-290 YARDS	7–11°
3-W	210-240 YARDS	13–16°
5-W	200–220 YARDS	19–21°
3	180-205 YARDS	18°
4	175–200 YARDS	22°
5	165-195 YARDS	26°
6	155–180 YARDS	30°
7	140-170 YARDS	34°
8	135–155 YARDS	38°
9	130-145 YARDS	42°
PW	120-130 YARDS	46°
SW	90-100 YARDS	56°

TRAJECTORY The flight of the golf ball is determined by the degree of loft of the club used. The driver, which has the shallowest face, propels the ball low and for a long way. Wedges, with the steepest loft, lift the ball in a higher trajectory but over a shorter distance. The diagram here shows lofts and distances for a range of irons. LOFT 23 YARDAGE 160

TYPES OF PLAY

There is more than one way of playing golf. In strokeplay, golfers record their score for each hole and add the totals at the end. In Stableford, points are awarded for scores gained on each hole. Matchplay singles is head-to-head competition played hole by hole. Fourball betterball has the same principle as singles, but is played in pairs. In foursomes, pairs compete with only one ball shared between partners.

Players mark their own scorecards, but they have to be verified by their opponent. Certain scores are given names, as below.

PAR A score equal to the par of a hole.

BIRDIE A score one less (or under) the par such as a 3 on a par four.

EAGLE Two under the par. For example, a hole in one on a par three is an eagle.

DOUBLE EAGLE Three under par, a extremely rare occurrence even for the world's best.

BOGEY One more than (over) par, for instance, a six on

DOUBLE BOGEY Two over par. Too many double bogeys result in a very poor score.

ETIQUETTE

Etiquette on the golf course ensures that everyone enjoys the game and plays in safety. Examples include: keeping quiet when a fellow player is taking a shot; raking bunkers after a shot to remove footprints; replacing divots; and not delaying other players. On the green, players should repair pitch-marks and avoid standing on a fellow player's line.

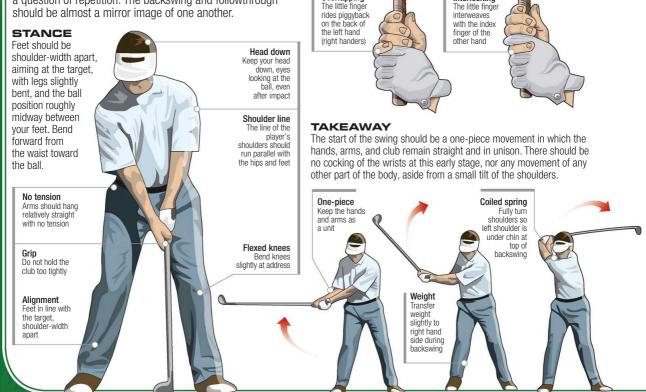
STAT CENTRAL

MAJOR WINNERS		
PLAYER	TOTAL	
JACK NICKLAUS	18	
TIGER WOODS	15	
WALTER HAGEN	11	
BEN HOGAN	9	
GARY PLAYER	9	

LPGA MAJOR WINNERS		
PLAYER	TOTAL	
PATTY BERG	15	
MICKEY WRIGHT	13	
LOUISE SUGGS	11	
ANNIKA SÖRENSTAM	10	
BABE ZAHARIAS	10	

THE GOLF SWING

All good golf swings start with a good setup and it is impossible to overstate the importance of a good grip, alignment, stance, and posture for beginners. In fact, it is possible to hit the ball well with a good setup and a mediocre swing, but you can make the best swing the world and not hit the ball consistently with a poor setup. The golf swing itself is a question of repetition. The backswing and followthrough should be almost a mirror image of one another.



Overlapping

PITCHING AND CHIPPING

For shots of 90 yards (80 m) and less players do not need to make a full swing; an abbreviated version, executed with an open stance, is more suited. Pitching shots are very much a question of "feel"—being able to judge specific distances—and this comes down to experience of play and trial and error. Chip shots are played from very close to the green and are either struck at a low trajectory, running along the ground toward the hole (a chip-and-run), or with great height and consequently a soft landing with minimal forward roll (a lob shot). Executing these types of shots well will result in many short putts, ultimately saving you a number of strokes per round.

PUTTING

Often described as "the game within the game," putting is an art in itself. Players should stand more upright than a regular shot, keep their head still, and move only their hands and arms in a solid unit. However, a good putting stroke and a good judgment of distance are not enough. Players need to have a good appreciation of the contours of the green, how the ball will "break" (move in relation to the slopes), and the speed at which it will travel after it is struck. A good understanding of these factors is known as being able to "read the green" and this is something that only comes with experience.



A good grip is a player's only means of controlling the clubhead and

bringing it into impact in a square (straight) position. There are two,

suitable for junior golfers or those with arthritic problems.

equally acceptable styles of grip (below) and a third, the baseball grip,

Interlocking

HOLE IN ONE

The Holy Grail of golf for many players, holes in one are normally only ever achieved on par 3s, but can also occur on short par 4s and often by chance. Because of their propensity to consistently hit the ball close to the flag, professionals score a much higher number of holes in one than amateurs. Many professionals' hole-in-one tallies are well into double figures.

BACKSWING

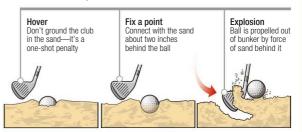
When the club is at about a 45° angle to the starting position, the player begins to cock the wrists and turn the upper body, pivoting it against the hips. It is essential the head remains still and does not sway or tilt as the shoulders turn.

DOWNSWING AND IMPACT

The downswing is essentially about mirroring, as closely as possible, the movements made in the backswing. The shoulders and upper body should uncoil as all the weight previously loaded onto the right side redistributes. The hands and arms follow, not lead, this movement to ensure the clubface reaches impact in the square (straight) position.

TROUBLE SHOTS

Of course, players do not always find themselves with a flat lie on short grass and there is little option when the player finds him or herself in, for instance, a clump of trees, than to chip the ball sideways. However, most situations can be overcome with minor adjustments to the setup. For example, when on uphill or downhill lies, redistribute your weight and alter the position of ball in your stance; on sidehill lies, aim more to the left or right of the target to compensate for the slope. Escape from bunkers is one of the shots that golfers struggle with most commonly. Remember to open the clubface and make a normal swing, making contact with the sand first, not the ball.





SIDELINES

The highest number of major tournaments won consecutively by a single player. Tiger Woods achieved this feat with the British Open, the US Open, and the USPGA in 2000, followed by the US Masters in 2001. In the modern era, a player has never won all four within the same calendar year—known as the Grand Slam of Golf.

1,097 The length, in yards (1,004 m), of the par 7 third hole at Jeongeup Course, Gunsan Country Club, South Korea, the longest hole in world golf.

The record round shot by Jim Furyk in the 2016
Travelers Championship. Shooting a round under 60 (usually about 10 under the par for the course) is a rare feat in golf. Only one LPGA player has achieved this feat so far—Annika Sörenstam, at the Standard Register PING tournament in 2001.

INSIDE STORY

The R&A and USGA oversee the governance of the sport predominantly for amateur golf. They enforce the Rules of Golf, test golf equipment for conformity, implement a handicapping system, and host national championships for men's, women's, and junior golf. Professional golf is organized by the PGA European Tour (which also encompasses some events in Africa, Asia, and Australasia) and the US Tour which organizes competition in North America. Since 1999, the International Federation of PGA Tours have run annually three World Golf Champsionship events open to the world's top ranked players.

THE MAJORS

In male professional golf, the major championships are the most prestigous tournaments of the season and the benchmark by which players are judged. There are four and they run, in order of play, as follows: The Masters, held every April at the Augusta National Golf Club, Georgia, a strictly invitational tournament run by the club; the US Open, the flagship event of the USGA, and the USPGA Championship in June; and finally the Open Championship, organized by the R&A in July.

CROQUET



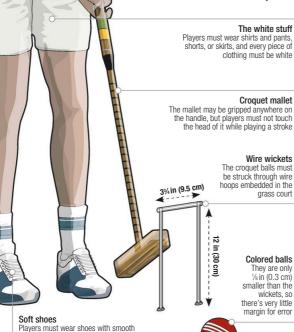






GAME OVERVIEW

Croquet involves hitting balls with a mallet through hoops embedded in the grass playing arena. The winner is the first person or team to hit a centrally located pole. Association Croquet, described here, is the version of the sport played at most international tournaments. The game offers many opportunities to punish opponents and has even been described as one of the world's most aggressive recreational activities—a far cry from its rather staid, genteel stereotype.



PLAYER PROFILE

Many of the skills required by a croquet player are the same as those needed for proficient putting at golf. Both games require good judgment of the playing surface and of the weight of each shot. The croquet lawn is smaller than many putting greens, and the balls have relatively short distances to travel, so physical strength is rarely important. The players' age is hardly a consideration either, as seasoned hands may easily outsmart younger, fitter pretenders.

NEW BALLS, PLEASE

FOUNDED IN 1868, THE FIRST NATIONAL HEADQUARTERS OF CROQUET IN GREAT BRITAIN WAS THE WIMBLEDON ALL ENGLAND CROQUET CLUB. HOWEVER, JUST NINE YEARS LATER, THE CLUB WAS RENAMED THE WIMBLEDON ALL ENGLAND CROQUET AND LAWN TENNIS CLUB AND PLAYED HOST TO THE FIRST-EVER LAWN TENNIS CHAMPIONSHIPS. AS THE POPULARITY OF TENNIS GREW, CROQUET WAS SIDELINED. THE CLUB EVEN DROPPED "CROQUET" FROM ITS NAME FOR A WHILE AND STOPPED HOLDING CROQUET TOURNAMENTS.

NEED2KNOW

A croquet match is played by two sides made up of either single players or two teams of two. Each side has two balls: one blue and black, the other red and vellow.

soles in order to minimize damage to

the manicured playing surface

- The world's leading international men's contest is the Croquet World Series for the MacRobertson Shield. The competition takes place over two weeks every three or four years between Australia, Great Britain, New Zealand, and the United States.
- In addition to the basic Association
 Croquet, there are several variant forms,
 including Mondo Croquet—played with
 sledgehammers and 10-pin bowling
 balls—and a mounted version on bicycles.

SIDELINES

The total number of paying spectators at the Olympic croquet final in 1900, the first and last time the sport was played at the Games. The event was held in Paris; nine out of the 10 croquet competitors were French; and, perhaps not surprisingly, France took all the medals in both the singles and doubles competitions.

The number of players that entered the 2012 Association Croquet World Championships. In addition to the MacRobertson big four, there were some surprises for anyone who thinks of croquet as the quintessence of Englishness: other contestants hailed from nations not usually associated with croquet, such as Japan and Sweden.

The number of times Great Britain has won the MacRobertson Shield, more than any other nation in the history of the competition; two of these victories came as part of a combined team with Ireland. New Zealand and Australia have both won the MacRobertson Shield four times.

COURT CLIPPINGS

The playing surface is a level, well-manicured lawn approximately the size of two tennis courts. Play begins from behind the balk line at one end of the court. The first hoop has a blue top and the last hoop, known as the "rover," has a red top. To remind players of the direction of play and to show spectators whether a hoop is being played forward or backward, four colored clips are placed on top of each hoop at the start of the game. The clips indicate the next point for each ball and are moved to the side of the hoop after the corresponding ball has passed through it once.

MALLET FORETHOUGHT

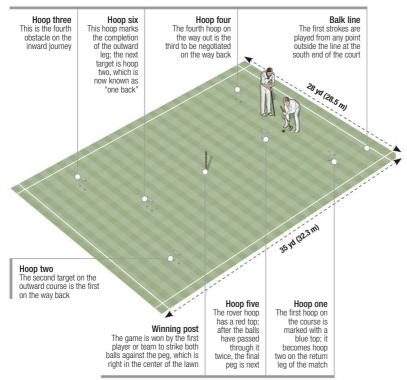
Each player has two colored balls, which must pass through six hoops twice in the correct order and direction and then hit the central peg. Croquet is a tactical game, and players can sabotage their opponent's position while completing the course.

CONTINUATION STROKES

Twenty-six points are needed to win (12 hoop points and one peg point per ball), and players normally have just one strike per turn. However, if they send the ball completely through a hoop, they get another shot ("a continuation stroke"). If the shot hits an opponent's ball ("makes a roquet"), the striker gets two more shots. He or she first places the ball by hand against the opponent's ball and then strikes his or her own ball. The opponent's ball may thus be sent out of bounds, which is how croquet got its reputation for aggression.

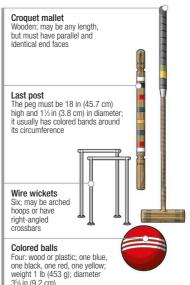
PEELINGS AND OFFSHOOTS

If the striker's ball knocks an opponent's ball through a hoop, the latter is said to have been "peeled": the other side benefits but does not get a continuation stroke. If a ball rolls off the court, it is replaced on the boundary line at the point where it went out of play.



EQUIPMENT

When not in use, the mallets, balls, hoops, and peg are stored in a long wooden box with rope handles at either end and a lid. It looks like a cross between a shipping crate and a coffin.

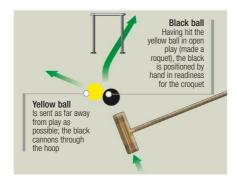


ROQUET SCIENCE

Unlike most target games, croquet actively allows players to hinder their opponents' progress. This is done in two stages. First, a player performs a roquet stroke, which simply involves striking the other player's ball. The player then picks up their ball, places it in direct contact with the "roqueted" ball, and takes a croquet stroke.

CROQUET STROKE

The purpose of the stroke from which the game gets its name is to send the opponent's ball as far off course as possible. But the best offensive players work out angles that enable them simultaneously to gain advantage for themselves. The perfect croquet is a shot that knocks the opponent's ball a long way off course and sends the player's own ball through a hoop, thus earning a continuation stroke. The diagram on the right shows a typical example.



INSIDE STORY

Croquet began in Ireland in the 1830s, later spreading to Great Britain, where it quickly grew in popularity. At the time, croquet was the first outdoor sport that could be played by both men and women on equal footing, and its popularity was sealed when a London sporting goods manufacturer began producing and selling croquet equipment. The sport soon caught on throughout the British colonies, most notably in Australia and New Zealand.

GOVERNING BODY

In England, Wales, and Northern Ireland, the Croquet Association makes the rules, awards top players' seedings, and promotes and regulates the game. 328







GAME OVERVIEW

Sometimes known as "chess on ice," curling is a game of skill, precision, and strategy. It began as a Scottish outdoor winter sport before spreading across the globe and becoming one of the highlights of the Winter Olympics. Curling is played on a sheet, or rink, of ice by two teams of four players. A team's aim is to place its rocks closer to the button—the center of a circular target—than the closest rock of the other team. One game is made up of 10 rounds, or ends, and each player delivers two rocks, making a total of 16 rocks per end. Under the direction of the "skip," the team sweeps the ice directly in front of the rock to adjust the speed and direction of each rock as it slides toward the button.

THE SHEET

The playing area is known as the sheet and has a circular scoring area, or house, at each end. The house consists of four concentric circles dissected by the center and tee lines. The largest circle has a diameter of 12 ft (3.66 m) and the smallest circle, called the button or tee, has a diameter of 12 in (30 cm). The hog line marks the point where the rock must have been released during a throw, or delivery. A rock is out of play if it crosses the back line behind the house.

TURNING THE ROCK

A rock can be made to spin as it moves across the sheet. The direction of rotation a rock is given as it is released determines how it travels across the ice. The direction of the spin determines whether the rock will curl (curve) to the left or right; clockwise spin curls right and counterclockwise curls left. The greater the amount of spin which is given, the less the rock will curl. On some ice sheets that may not be perfectly level, the rock may even travel against the spin.

KEEPING IT COOL

The surface of the ice needs to be kept at a constant temperature of 23°F (-5°C). The ice is sprayed with water before every game. The droplets freeze into tiny bumps on the surface, known as pebble. It is the friction between the stones and pebble that causes curling.

House

The scoring area; a rock must sit within the house (ring) to stand a chance of scoring points

A rock is deemed out of play if it crosses the line touching the back of the house

NEED2KNOW

- Curling has been popular in northern areas, especially Canada and Scotland, where cold weather creates the natural conditions for an ice-based sport. It is now played more widely, including in warmer countries, from Spain to China and Japan.
- Teams are made up of a lead who throws first, a second who throws second, a vice-skip who usually throws third, and a team captain called the skip who directs play and usually throws last.
- The best rocks are made from granite from the Ailsa Craig island off the coast of Ayrshire, Scotland. Olympicgrade stones cost up to \$1,500.



PLAYER PROFILE

All players need to have a fine sense of balance, good flexibility, hand-eye coordination, and control on the ice. The skip and vice-skip also need a sharp mind for tactics and strategy as they direct their teammates to deliver rocks into winning positions.

On the slide

A player does not use his arm to propel the rock. The speed of a throw depends on how hard he thrusts himself forward with the trailing leg. After releasing the rock, the player continues to slide

Handle sensor

At elite level, the handles contain sensors that indicate whether a rock has crossed the hog line before being released. A green light flashes at the base of the handle it the release is good and flashes red for a foul throw



Lead shoe

A "slider," a shoe with a smooth Teflon sole, is worn on the lead foot during delivery. At other times, the curler wears a thin rubber "gripper" over the slider for traction

Ailsite granite stones called "rocks" weigh a maximum of 44 lb (20 kg). The bottom of the rock is concave and the running surface is a circle $\frac{1}{4}$ - $\frac{1}{2}$ in (6–12 mm) wide

Broom

A versatile piece of equipment, it is used to melt the ice indicate where to aim the rock, or balance the curler during throws

Hack

Rubber footholds

curler pushes off

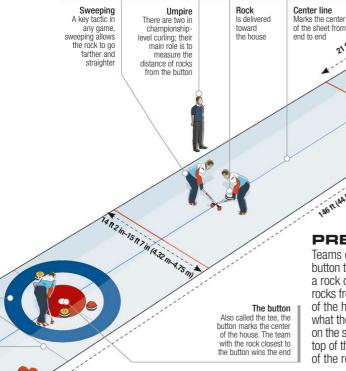
Hog line

called hacks at either

end of the sheet; the

from the hack when delivering the rock

The rock must be released before the hog line and must cross the hog line at the other end of the sheet to remain in play



PRECISION AND TEAMWORK

Teams deliver their rocks to try and get as many as possible closer to the button than their opposition's nearest. This may involve attempting to place a rock close to the button but could be placing guards to stop opposition rocks from reaching the button or playing takeouts to knock their rocks out of the house. The skip decides the tactics and instructs his or her players what they should do. The sweepers control the speed and direction of rocks on the skip's instruction. Vigorously sweeping just ahead of the rock melts the top of the ice. The thin layer of water created lubricates the running surface of the rock, which allows it to travel farther and straighter but not faster.

146 ft (44.5 m)

21 ft (6.4 m)

The player crouches on the slider shoe and pushes against the hack with his other foot. He slides with the rock, controlling its speed, direction, and rotation, before letting go just before it crosses the hog line. Once the rock is released, it must not be touched by a broom or player.

ON THE ICE

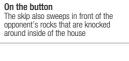
Rocks can curve, or curl, up to 61/2 ft (2 m) to the side as they glide down the rink. The curling is caused by the bumpy pebble surface on the ice. Melting the pebble by sweeping stops the rock from curling. As a game progresses, the pebble rubs away, and rocks may curl more or less than previously.

IN THE HOUSE

Inside the house, the skip helps sweep the rock to its desired resting place, either closest to the button or in a blocking, or guarding, position to prevent the opponent's rocks reaching the button. The last rock to be thrown is called the hammer. The team with the hammer is more likely to win the end.







ROCK STEADY

Alternating between teams, each player delivers two rocks until all 16 have been thrown. The team with the rock closest to the button wins. They score one point for each rock closer to the button than any of their opponent's rocks, and only one team scores in each end.

DRAW

A draw is a throw that lands the rock in the house. A guard sits in front of the house to block opponent's shots. A raise shot promotes a rock into the house from outside or one in the house closer to the button.



TAKEOUT

A takeout is a shot that removes another rock from play-ideally, the opposition's! A raise takeout is when the thrown rock uses an intermediate rock to take out the target rock.



Direct hit The incoming

Raise shot

knocked into a

winning position

by a teammate's

This rock has been

closer to the button

rock strikes the opponent's stone and knocks it out of the house



Curling originated in Scotland, where the outdoor game was popular between the 16th and 19th centuries. The Royal Caledonian Curling Club, curling's oldest society, was established in 1843. The first world championships were held in 1959 (1979 for women); men's and women's events have featured in the Winter Olympics since 1998.

GOVERNING BODIES

The Royal Caledonian Curling Club, the original governing body for curling, and the World Curling Federation (WCF) are based in Scotland. The WCF runs the World Men's and World Women's Curling Championships, as well as the World Junior Curling Championships, and has 50 national members.









LAWN BOWLING

NEED2KNOW

- Lawn bowling is one of the most popular games in the world for senior citizens, but at a competitive level, the sport is dominated by younger players.
- Bowls is most popular in Australia, Canada, New Zealand, the United Kingdom, and UK territories.
- All but one of the men's indoor bowls world champions have come from England, Ireland, Scotland, or Wales. The 1992 winner was an Australian



Lawn bowling—a.k.a. bowls—is a precision sport in which players roll slightly asymmetrical balls, called bowls, along a green. The winner is the person whose bowls land closest to the

target—known as the "kitty" or "iack." (0)



Although bowls were traditionally made of wood or rubber or a composite, modern bowls are made of lignite. They are designed to travel a curved path, referred to as their bias, produced by the asymmetrical shape of the bowl. The jack is perfectly spherical and usually colored white.

The bowls are black or brown, weigh about 3.3 lb (1.5 kg), and are 4½-5½ in (12-14.5 cm) in diameter. The bowls are not quite round—their bias gives them a slight bulge on one side.



THE GREEN

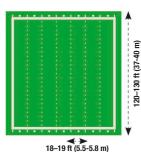
Bowls is usually played on a manicured grass or synthetic surface known as a bowling green, which is divided into parallel playing strips known as rinks. An indoor variation on carpet is also played. Outdoor greens have a uniform length but may be of varying widths, depending on the number of rinks. Indoor greens are usually smaller, their dimensions being set by organizers.

PLAYER PROFILE

Lawn bowling is an easy game to learn and is played by just about anyone-men and women, old and young.

The best bowlers have great hand-eye coordination and

are very strategic thinkers.



Formal flourish Although a player's attire is not a significant part of the

> Rubber mat Bowlers must stand

with at least one foot on a rubber mat in the

center of their rink

game, in competitions, men

will usually wear white clothes and a tie

LAWN RULES

In the simplest singles competition, on the toss of a coin, one player begins by placing his rubber mat and rolling the jack to the other end of the green. Once the jack has come to rest, it is aligned to the center of the rink before the players take turns to roll their bowls. A bowl is allowed to curve outside the rink boundary but must come to rest

within the boundary to remain in play.

After the competitors have delivered all their bowls—four each in singles—the distance of the closest bowl to the jack is determined. Then a point is awarded for each bowl the winning competitor has between the jack and his opponent's closest bowl. This passage of play is known as an end.

BOWL DELIVERY

There are several types of delivery. For a right-hander, a "forehand draw" is aimed to the right of the jack and curves in to the left. The same bowler can deliver a "backhand draw" by turning the bowl over in his hand and curving it the opposite way. A "drive" involves bowling with force with the aim of knocking either the jack or a specific bowl out of play.

SCORING

Scoring systems vary—either the first to a specified number of points or the highest scorer after a number of ends. Some competitions use a "set" scoring system, with the first to seven points awarded a set in a best-of-five match.

SIR FRANCIS DRAKE

THE MOST FAMOUS STORY IN LAWN BOWLS INVOLVES SIR FRANCIS DRAKE. ON JULY 18, 1588, DRAKE WAS INVOLVED IN A GAME AT PLYMOUTH HOE WHEN HE WAS NOTIFIED THAT THE SPANISH ARMADA WERE APPROACHING. HIS IMMORTALIZED RESPONSE WAS THAT "WE STILL HAVE TIME TO FINISH THE GAME AND TO THRASH THE SPANIARDS, TOO." HE THEN PROCEEDED TO FINISH THE MATCH-WHICH HE LOST-BEFORE EMBARKING ON THE BATTLE WITH THE ARMADA—WHICH HE WON.



NEED2KNOW

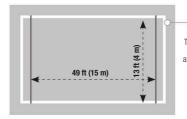
- Pétanque is generally associated with southern France, particularly Provence, from where it originates. It is the most played sport in Marseille.
- The casual form of the game of pétanque is played by about 17 million people in France—mostly during their summer vacations.
- The International Pétanque Federation was founded in 1958 in Marseille and has about 600,000 members in 94 countries on five continents. It is the fourth largest sports federation in the whole of France.

THE BOULES

Boules are traditionally made of steel and have a chrome outer finish. They each weigh 1½–1¾ lb (650–800 g) and have a diameter of 2¾–3 in (71–80 mm). The jack is made of wood or synthetic material and has a diameter of 1–1¾ in (25–35 mm). On the sides, they bear engravings indicating the manufacturer's or player's name and the weight of the boule.

THE TRACK

The game is normally played on hard dirt or gravel but can also be played on grass or other surfaces. The dimensions shown below are the recommended minimum.



Flat surface
The game can be
played almost
anywhere there is
a flat surface

PLAYING BY THE RULES

The game is played in singles or by teams of two or three. The side that wins the toss starts the game by drawing a circle on the playing field 14–20 in (35–50 cm) in diameter. Both feet must remain inside this circle, touching the ground, when the player is throwing.

The player then throws the jack to a distance of 20–30 ft (6–10 m) from the starting circle. The jack must be visible (not, for example, buried in gravel) and at least 3 ft (1 m) from any boundary; otherwise, it must be thrown again.

A player from the same team plays the first boule, trying to place it as close to the jack as possible. Then the opposing team must get one of its boules closer to the jack, and they keep playing until they succeed. When they do, it is back to the first team for them to do better. When one team runs out of boules, the other team plays its remaining boules.

GAME OVERVIEW

Pétanque is a form of boules where the goal is to throw metal balls as close as possible to a small wooden ball called a cochonnet ("piglet"). The game is normally played on hard dirt or gravel but can also be played on grass or other surfaces.

PLAYER PROFILE

No special skill is required to play pétanque, and people of all ages and sexes play against each other. The game is simple, relaxing, lots of fun, and very sociable. Games are usually played in good spirits and often while players are enjoying a cool drink. At competition level, the very best players tend to be excellent strategists and have great hand-eye coordination.

POINTING AND SHOOTING

Players may choose to place or "point" a boule—get it as near as possible to the jack—or "shoot" it—attempt to displace another boule. A successful pétanque team has players who are skilled at shooting, as well as players who only point.

For obvious reasons, the pointers play first—the shooter or shooters are held in reserve in case the opponents place well. In placing, a boule in front of the jack has much higher value than one at the same distance behind the jack, because the pushing of a front boule generally improves its position. At every play after the very first boule has been placed, the team whose turn it is must decide whether to point or shoot.



ROLLING IN

This is the easiest shot to play. The ball is thrown about halfway down the track and rolls the rest of the way.



ROLLING IN FOR A HIT

With this shot, you land your boule early and make it roll along the ground into your opponent's boule.



SHORT LOB

This shot requires quite a high trajectory with just the right amount of backspin on the boule.



LONG LOB

Going in high is the only way when the ground is rough. The boule lands just about where you want it to lie.



SHOOTING IN

This shot is played fairly low and hard and enables you to move your opponent's boule out of position.



CARREAU

This is the hardest shot in pétanque. Hit the opponent's boule and make sure that yours sits in its place.

10-PIN BOWLING



GAME OVERVIEW

Worldwide, 10-pin bowling is possibly second in popularity only to soccer as a participation sport. While for millions of people this indoor sport is a great way to relax and socialize, it can also be extremely competitive. Bowlers roll a heavy ball along a smooth lane and try to knock down as many of the 10 pins as possible. Points are awarded for the number of pins demolished. Bonuses are given for a "strike"—when every pin is knocked over in one attempt.

PLAYER PROFILE

The only essential characteristic is the ability to learn, through endless practice, the techniques of ball control. Age is no barrier: American Dick Weber was 72 when he won a 2002 Professional Bowlers' Association Senior title.

60 ft (18 m)

NEED2KNOW

The game emerged in the US in the early 1900s. The first British centers opened in London in 1960.

Sure footing

sole to permit sliding

The shoe on the leading foot has

a rubber sole to give traction; the

one on the back foot has a leather

One of the sport's annual competitions is the Weber Cup. Team Europe competes against Team USA in the equivalent of golf's Ryder Cup.

PINS AND BALLS

Pins and balls were once made simply of wood, but the former are now synthetic or plastic-coated wood, while the latter are made of plastic, urethane, epoxy, or a combination of these materials. For recreational 10-pin bowling, balls come in various weights to suit the strength of the player.

THE BALL

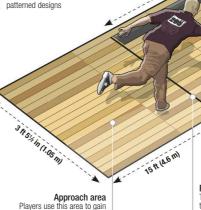
A full-size competition ball weighs 16 lb (17.25 kg). Its surface is entirely smooth apart from grip holes for the thumb, middle finger, and ring finger.



THE PINS

The pins are all of uniform height and should be 4% in (11.4 cm) wide at the belly. They each weigh 3 lb 6 oz-3 lb 10 oz (1.47-1.64 kg).

15 in (38.1 cm



Bowling ball

Balls are traditionally plain black

speed and leverage on the ball

before it is bowled

but may now be finished in any

color and sometimes have

Foul line

The arm may go beyond this mark, but if the player touches it, the ball bowled counts as zero

LIFE IN THE FAST LANE

The bowling lane is made of 39 planks of polyurethane or wood. On either side of it are semicircular gutters to collect off-target balls. Most public bowling centers have retractable guard rails that can be lowered into place on the lane side of the gutters; these are normally brought down only to assist young children who lack the strength to control the balls. Contestants must release the ball before reaching the foul line, and, having bowled, they must not overstep onto the lane.

After every turn, the balls are automatically returned to the approach area along a raised, sloping trackway mounted on the right-hand side of the lane.

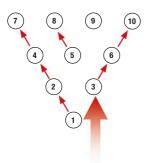
LANE LAW

In competitive 10-pin, each player has 10 frames, each of which consists of two attempts to knock down as many pins as possible. One point is scored for every pin that is knocked down. Contestants who demolish all 10 pins at the first attempt are awarded a strike, for which they earn a score of 10 points plus a bonus of the total of their next two shots. If the player knocks down all 10 pins in two attempts, he or she is awarded a spare and earns 10 points plus a bonus of the pins knocked down on the next shot. If there is still at least one pin standing after the second attempt, it is called an open frame.

Pin point The pins are arranged to form a triangle, with the apex facing the bowler and four pins in the back row. The pins stand 12 in (30 cm) apart (measured from the center of each pin). After each frame, the pins are automatically reracked by a machine known as a pinsette Smooth surface The surface of the lane is polished with oil before a competition to keep friction to an absolute minimum. The amount of oil used depends on the type of event The low road A ball that enters the gutter cannot leave it again; it runs straight down the

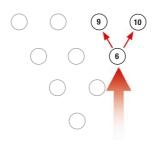
BALL CONTROL

Because it is physically impossible for the ball itself to strike every pin, the player needs to create a chain reaction of one pin hitting its neighbor, and so on, to get a good score. Experienced bowlers curve the ball's trajectory, or "roll a hook," to achieve maximum effect. The ball starts on a straight course but then curves to the left or right as it approaches the pins. Players whose first throw does not travel according to plan may end up with two or more remaining pins (7 and 10, for example) that are almost impossible to be knocked down with a single ball. In this instance, the player will knock down one of the remaining pins and settle for an open frame.



A PERFECT STRIKE

The ideal shot need hit only pins 1, 3, 5, and 9 (for right-handers) because these pins can then take out all the others. The same should also be true of a shot that hits pins 1, 2, 5, and 8 (for left-handers). It is usually important to avoid hitting pin 1 head-on.



side, missing all of the pins

MOP-UP OPERATION

In this example, the bowler failed to knock down all the pins on the first attempt; three (6, 9, and 10) were left standing. The player delivers a straight ball just to the right of pin 6, which in turn knocks down 9, and the ball continues and demolishes 10.

BOWLING ON THE BIG SCREEN

TEN-PIN BOWLING HAS FEATURED IN NUMEROUS POPULAR FILMS, INCLUDING THE COEN BROTHERS' *THE BIG LEBOWSKI* (1998), WHERE A DOPED-UP HIPPIE BOWLER IS DRAWN INTO A WEB OF CRIMINALITY. IN A 1996 FEATURE, WOODY HARRELSON IS AN EXBOWLER IN THE LOUD, RUDE, AND CRUDE FARRELLY BROTHERS' FLICK *KINGPIN*.

STROKERS AND CRANKERS

Bowlers will always argue over the best method of delivery, and the reality is that each has its masters. Many top players use the graceful and stylish stroker, while others prefer the powerplay of cranking. And in East Asia, the spinning or "helicopter" delivery is popular.



STROKER

The stroker is the classic style of hook bowling. The player's sliding foot stops just before the ball reaches the lowest point of the swing, and his or her shoulders are square at the point of release.



CRANKER

The bowler produces the maximum amount of spin on the ball. When delivering the ball, he or she quickly pulls the arm through, bending the elbow to keep the hand behind and under the ball.

THE PERFECT GAME

Bowlers who score a strike every time they throw will score 30 points per frame. If they then get another strike in the 10th and final frame, they are awarded two extra balls. If these are also strikes, the bowler scores the maximum 300 points and has played the perfect game. In 1997, a Nebraska student became the first person to accomplish three consecutive perfect games in an approved series. Perfect games remain rare occurrences.

INSIDE STORY

There are many historical references to bowling, but the first indoor bowling alley was not opened until 1840—Knickerbockers in New York City. Today, the sport is played in more than 100 countries.

The game developed greatly in the second half of the 20th century. While still a relaxed leisure activity for millions, it is now also a recognized competitive sport played by highly paid full-time professionals. Positions on the world ranking system are determined by players' performances in the American, Asian, and European tours.

GOVERNING BODIES

The World Tenpin Bowling Association (WTBA) governs the sport internationally, while the United States Bowling Congress (USBC) and the British Tenpin Bowling Association (BTBA) control the game in their respective countries.

5-PIN BOWLING









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GAME OVERVIEW

Individuals or teams take turns rolling a ball at a group of pins: whoever knocks over the most pins after an agreed number of attempts wins the match. The game began as a gentle alternative to 10-pin bowling but soon acquired a devoted following of its own.

NEED2KNOW

- The pins are 25 percent smaller than those used for 10-pin bowling, and the ball can be held in the palm of the hand.
- → The game originates fromand is still almost exclusively confined to-Canada. There, some public bowling alleys offer both 5-pin and 10-pin.
- Canada has three main annual knockout competitions: an open event, a youth challenge, and a doubles tournament. There is also a league.

EQUIPMENT

Originally carved out of maple wood, 5-pin bowling pins are now almost invariably massproduced from plastic. The balls are made of solid rubber. Historically, they were of a uniform design and color, but since 1990, players have been allowed to personalize their balls with engravings and ID.

BOWLING BALLS

Unlike its 10-pin bowling equivalent, the 5-pin ball has no finger holes, so maintaining a good grip is important



Easy to grip The 5-pin ball weighs 3½ lb (1.6 ka) and is

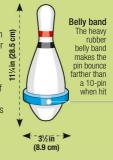
V-formation

V-formation

At the start of every frame, the pins

SHAPELY PIN

The 5-pin bowling pin is shorter and thinner than the equivalent used in 10-pin bowling. The ring around the bottom of the widest part of its circumference lowers the center of gravity.



60 H (18.29 m)





ATLATL

SPORT OVERVIEW

Atlatl involves using a sling device of the same name to throw a dart or light spear at a target. It combines the physical demands of the javelin in athletics with the accuracy of darts.

NEED2KNOW

- Sling devices were used in many parts of the world until they were superseded by bows and arrows. Atlatl (pronounced "ott-lottle") is an Aztec word. The Aztecs were using the weapon for hunting in the 16th century.
- The International Standard Accuracy Competition (ISAC), established in 1996, is a standardized event for atlatlists from around the world.
- Top players can hit targets from distances of up to 325 ft (100 m).

THROWING THE DART

The thrower, or atlatlist, holds the shaft by the handle and grips the dart, usually with his or her thumb and forefinger. As if throwing a javelin or a spear, the thrower brings their arm back and then swings it forward. Finally, with a flick of the wrist, the dart is released at the target.

ATLATL EVENTS

Atlatl events take place around the world. particularly in the United States and Europe. Contests are held on dedicated ranges or in open country; each target is set at a different distance from the firing line, both for variety and to test a range of skills. The winner of an event scores the most points after shooting at all the targets.

Get a grip

The thrower holds the atlatl

by the handle

SLING DEVICE

An atlatl is a sling device composed from a shaft of wood. Any type of wood can be used. At one end is a handle and at the other a means of holding the dart.

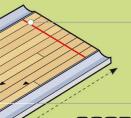
Large dart The dart resembles a large arrow and is at least 4 ft (1.25 m) long Holding a dart A dart fits into a hook, pin, or



HITTING THE TARGET

The targets may be any shape or size but are usually similar to archery targets; others bear the outlines of wild animals. They all have marked areas that score varying numbers of points.

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Foul line

Players must release the ball before they reach this mark

Height restriction

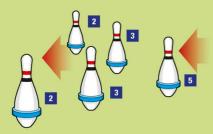
To ensure that balls are rolled, not thrown, a perspex sheet is placed across the lanes at a height of 6 in (15 cm)

SCORING

Players play 10 frames per game, with up to three attempts per frame. If a player gets a strike (knocks down all five balls at once), his or her scores on the next two attempts count double. The maximum game score is 450.

DECREASING VALUE

The foremost pin in the V-formation counts five points; the two behind it score three points each; the backmarkers are each worth two points.



LANE DISCIPLINE

Players must not overstep the foul line at the start of the lane: any violation incurs a 15-pin penalty, which is deducted at the end of the game.

SKITTLES









GAME OVERVIEW

Skittle players or teams take turns to use a ball to knock down a diamond-shaped set of 9 skittles (small bowling pins) at the end of an alley. The player or team that scores the most wins the match. Skittles has many variations and local rules. It is a traditional game that is popular in pubs in parts

of England, and is also played in Germany and Austria. Some rules vary according to region.

VARIATIONS

Skittle alleys always have a smooth surface, often wooden, and are usually 21–36 ft (6.4–11 m) from the throwing mark to the front pin. Skittles vary in size and shape, and may

PIN LAYOUT

At the start of each turn, the 9 skittles are set out in a diamond pattern; they should be positioned no more than their own length apart.

include a kingpin. The pins are 6–16 in (15–40 cm) high and may weigh up to 6 lb 10 oz (3 kg). Balls also vary (one rare game uses a discus-shaped cheese) and are usually made of hardwood or rubber. They should be 4–6 in (10–15 cm) in diameter.

Depending on the local rules, the ball may be rolled along the floor, bowled underarm (either with or without a bounce), or simply thrown at the skittles. A match usually consists of 12 hands (turns), and each hand comprises three throws. A point is gained for every skittle knocked over, so the maximum score per hand is 27.

HORSESHOE PITCHING









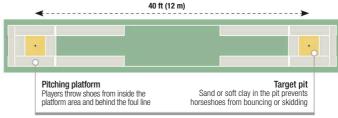
GAME OVERVIEW

Two players or two teams of two players take turns tossing horseshoes at stakes in the ground. The winner scores the highest number of points or near misses. Horseshoe pitching is very popular in parts of the United States.

LAW AND SCORE

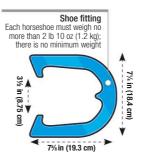
Competitors stand at opposite ends of the playing area and aim their horseshoes at the stake next to their opponent's throwing position. They change ends after every turn, which consists of two throws.

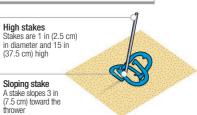
A ringer (a horseshoe that lands around the stake) normally counts as three points. The exception is when both players throw a ringer on the same turn, in which case nothing is scored. On each turn, the closest horseshoe to the stake (a near miss) scores one point. The winner is normally the first to 21, although some matches are played in sets.



PLAYING AREA

A stake stands in the center of the target pit at each end of the playing area. There is a pitching platform on each side of a target pit.





PITCHING A SHOE

The horseshoes used in modern horseshoe pitching are usually about twice the size of a real horseshoe. A player stands inside one of the two pitching platforms beside the target pit and pitches at the stake at the far end. For a throw to score points, the stake must be wholly inside an imaginary line between the ends of the horseshoe.

GAME OVERVIEW

With its roots in the game of billiards, snooker is a sport where two players use cues and a cue ball to pocket as many colored balls as possible on a table with six pockets. Each of the balls has a point value and must be pocketed in a particular order. The player with the highest number of points wins the frame (game). Each match consists of an agreed odd number of frames, the winner being the player who secures the most frames.







SNOOKER

THE TABLE

A snooker table is made of a wooden frame within which sits a slate bed that is covered by a wool-based cloth known as the baize. The table has six pockets with curved openings: two at the top cushion ("spot" end) corners, two at the bottom cushion ("baulk" end) corners, and two in the middle of the side cushions (the center pockets).

THE BAULK AND THE D

The area between the bottom cushion and a line (baulk line) 29 in (74 cm) along the table is known as the baulk. At the center of the baulk line is a semicircle with a radius of 11½ in (29 cm) that is called the D.

Baulk line The green, brown, and yellow balls are spotted along this line Cue ball This can be placed anywhere within the D when breaking off

PLAYER PROFILE

As well as good hand-eye coordination, a snooker player needs to have a steady arm and a firm wrist to achieve total control of the cue and enable shots to be played with accuracy and precision. Mental agility, tactical awareness, and technical consistency are other useful attributes.



NEED2KNOW

- Snooker balls were originally made from ivory, with African ivory considered superior to the Indian variety due to its more even density. Despite their popularity, ivory balls were prone to losing their shape.
- The first player to score a maximum 147 break on television was Steve Davis at the Lada Classic in Oldham in 1982.
- The inaugural World Snooker Championship was held in 1927, and it was won by the organizer, Joe Davis.

EQUIPMENT

Aside from a table, a triangle, balls, and cues, very little equipment is needed for a game of snooker. Bridges, spiders, and extensions are special items used to help players execute difficult shots, while chalk adds control to the tip of the cue. For practical purposes, an overhead lamp provides additional lighting over the table.

CUES

These tapered shafts of wood come in one or two pieces and are traditionally made to a standard length of 4 ft 10 in (147 cm), though slightly shorter varieties are also available.

Cue length

Under official rules, a snooker cue must be at least 3 ft (91.4 cm) long

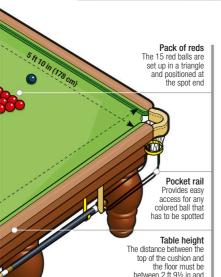
BRIDGES AND SPIDERS

Usually constructed from a wooden shaft with a brass or nylon attachment, bridges and spiders come in a range of shapes and sizes to suit different hard-to-reach shots.

Rest assured

The bridge rests on the table and provides a raised area over balls adjacent to the cue ball





THE BALLS

Modern snooker balls are made of a plastic called phenolic resin. In addition to the nonvalue white cue ball, there are 21 other balls on a snooker table: 15 reds (worth 1 point each), plus one each of yellow (2 points), green (3 points), brown (4 points), blue (5 points), pink (6 points), and black (7 points). Full-size balls measure 2½6 in (52.5 mm) in diameter, but smaller balls can be used on reduced-sized tables.



TRIANGLE

Made of plastic or wood, a triangle is used to place the 15 red balls in their correct position on the table at the start of a frame. A tournament triangle is mounted on rollers for ease of positioning.





CHALK

This is applied to the cue tip, with the thin film of chalk providing grip on the ball when it is struck.

REFEREE

The referee has a variety of roles in a snooker game, including the placing of the balls in their correct position at the start of a frame and repositioning colored balls—other than reds—after they have been pocketed during a frame (known as "spotting"). The referee also rules on foul shots; supplies bridges, spiders, and extensions when needed; and cleans a ball.

2 ft 10½ in (85.1 cm and 87.6 cm)

POCKET ROCKET

RONNIE "THE ROCKET" O'SULLIVAN IS THE MOST NATURALLY GIFTED PLAYER TO HAVE EMERGED IN THE SPORT FOR A GENERATION. SINCE TURNING PROFESSIONAL IN 1993, HE HAS WON EVERY MAJOR TOURNAMENT AT LEAST ONCE. EQUALLY ADEPT AT PLAYING RIGHT- AND LEFT-HANDED, THE CHARISMATIC O'SULLIVAN HAS SET NEW STANDARDS IN THE SPORT.

PLAYING BY THE RULES

At the heart of the sport of snooker is the sequence that the balls must be pocketed. A red ball has to be pocketed alternately with a colored ball until all the reds have been cleared from the table. After this, the colors must be pocketed in ascending order of their value—yellow, green, brown, blue, pink, and black.

FOULS

Foul shots generally incur a penalty of four points, which are added to the tally of the opposing player. Fouls can take place for a number of reasons, including a player striking the ball with both feet off the ground (at least one foot has to be on the floor at all times), hitting a ball that is not "on" (an "on" ball is one that is valid for a player to strike, whether red or another color), and missing a ball completely. A few fouls incur a seven-point penalty, and these include using an object to measure the distance between balls and using any ball other than the white as a cue ball.

BALL PLAY

There are a whole set of regulations regarding what can and cannot be done with the balls at any given time. One example is a touching ball, a situation that arises after a player plays a shot and the cue ball stops next to—and is touching—one of the other balls. In this case, a player has to strike the cue ball away from the touching ball without moving it; otherwise, a foul will be called.

SIDELINES

147 The maximum number of points that can be scored on a snooker table if every red ball pocketed is followed by a black.

The number of times Joe Davis won the World Championship (1927–1940 and 1946).

The number of consecutive century breaks scored by John Higgins in his match against Ronnie O'Sullivan at the 2005 Grand Prix, the first time this had been done at a major tournament. The feat was equaled by Shaun Murphy when playing against Jamie Cope in the 2007 Welsh Open.

105,000,000

The number of Chinese television viewers who watched live as countryman Ding Junhui beat Stephen Hendry in the 2005 China Open.

TECHNIQUES AND TACTICS

A good stance is a key factor in being able to attain the balance needed to play shots with confidence, and this can be achieved by bending your front leg but keeping your back leg straight. Hold the cue with enough grip so that you are fully in control of it, but not too tightly—you will then be in an ideal position to place the cue in the "bridge" (hand position on the table) and line up a shot. Once you have decided which ball you are going to attempt to strike (the "object" ball) and what type of spin you are hoping to impart, pull the cue back and then forward into the cue ball in one smooth motion.

CUEING

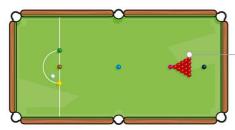
An effective cueing action will provide you with consistently accurate shots that will enable you to accumulate the points needed to win a frame. Keep your arm over the cue, and as you are about to strike the ball, ensure that the elbow with which you are holding the cue is in a straight line with the cue. Maintaining this position through the shot will enable you to hit the ball straight.

OPEN BRIDGE

Place your hand flat on the table and position the cue between your raised thumb and index finger. Raise your palm to follow through on a shot or keep it flat to screw the ball back.

CLOSED BRIDGE Again, put your hand flat on the table. but this time feed the cue under your index finger and move your thumb up so that there is a complete circle around the cue. The cue should be able to move smoothly through the circle. BREAKING

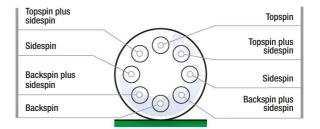
The break takes place at the start of each frame, with the basic premise that the player breaking must strike one of the red balls. A good break will see the cue ball hitting a red ball with the minimum disruption to the pack of reds and then come back up the table to rest as close to the baulk cushion as possible. This will then put pressure on the opposing player.



Corner ball Strike the base of the pack, but ensure you apply sidespin to return to a safe position back up the table

SPIN

The most important technical ability in snooker is using spin to control the direction of the cue ball and its final resting position. Striking the cue ball in different areas will generate one of three types of spinbackspin, sidespin, and topspin—that each have a particular effect on the behavior of the ball.



SWERVE

Swerve is a skill that can help get a player out of a tricky situation or even make a difficult pocket. The shot is played by lifting the back of the cue and hitting down on the cue ball either just left or right of center. Combined with spin, it is an effective weapon in a player's armory.





Object ball With a little luck and a lot of practice you should be able to hit the object ball and either steer yourself out of trouble or make a pocket

BUILDING A BREAK

The most important aspect of amassing points in one visit to the table is thinking ahead to the next shot and the cue ball position needed to get on that shot. You may forego an easy shot in order to get position on or pocket a ball of higher value. Getting balls into pocketable positions is also vital, so a shot that opens up the pack of reds can pay rich dividends.

SAFETY SHOTS

It's not just about pocketing the balls. In certain situations, it is more beneficial to play a shot that will leave the cue ball in a difficult position for your opponent and open up the possibility of them playing a foul stroke. The ultimate safety shot is a "snooker," when the consequence of the stroke you have just played is that your opponent is now unable to get a direct line to a red or colored ball that they must play. Frames can easily be won with strong safety play.

INSIDE STORY

Snooker developed out of variants of the game of billiards that were played by British Army officers stationed in India in the 1870s, with colored balls added to games previously consisting solely of 15 reds and a black. The word snooker itself came from a term for a new army recruit and was reputedly first used in 1875 by a Colonel Neville Chamberlain to describe the (inexperienced) players of this new game.

GOVERNING AUTHORITY

Snooker's governing body is the World Professional Billiards and Snooker Association (WPBSA). It has a commercial arm known as World Snooker that runs the professional tournament circuit and negotiates television rights around the world. The body has had great success in developing the East Asian market, where the sport is rapidly gaining in popularity. This is due partly to the rise through the ranks of a number of high-quality players from the region, such as Ding Jinhui from China and James Wattana from Thailand.

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NEED2KNOW

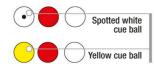
- Carom billiards tables are heated to warm up the cloth and thereby enable the balls to travel faster across the playing surface.
- Other names for carom billiards include straight rail, French billiards, and carambole.
- Early versions of billiards were first played in the 15th century.

SCORING

In carom, a "count" (point) is scored each time a player hits both the object ball and their opponent's cue ball in one stroke. In English billiards, this is known as a "cannon" and is worth 2 points. Extra points are scored by pocketing or going in off the red ball (3 points) or your opponent's cue ball (2 points). A single stroke can amass different types of points. For example, a cannon followed by pocketing the red will secure 5 points.

THE BALLS

Both carom and English billiards use just three balls: two cue balls (one white and one spotted white or yellow ball) and one red object ball. Each player is assigned their own cue ball that they keep throughout the game.

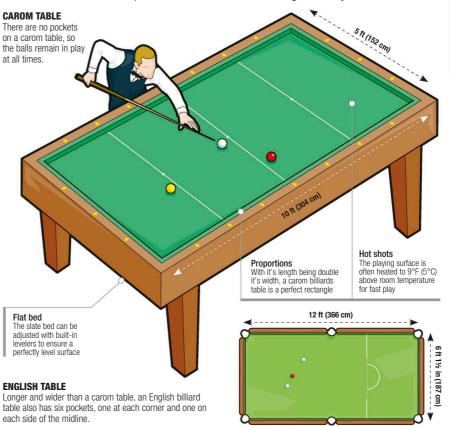


GAME OVERVIEW

There are many different types of billiards, the most popular forms being carom billiards and English billiards. A carom table has no pockets, with scoring achieved by striking two balls into one another. An English table does incorporate pockets, and scoring takes place either in the carom style or by pocketing the balls.

THE TABLE

A billiards table is made up of a raised flat slate bed that is covered with fine woolen cloth. The playing surface is surrounded by cushioned edges that are flush around the table for carom but have six pockets set within them for the English variety.



PLAYING BY THE RULES

At the start of a game of carom billiards, the balls are placed on three spots on the table: the red ball on the foot spot, the opponent's cue ball on the head spot, and the breaker's cue ball no more than 6 in (15 cm) from the center spot on the head string. The only rule is that the breaker must hit the red ball first. Foul shots include striking the wrong cue ball and playing two safety shots in succession. These incur a penalty of missing a turn and losing any count that resulted from the foul stroke.

In English billiards, the red ball is positioned on a spot at the top of the table and the breaker's cue ball is placed within the D. (The opponent's cue ball is left off until their turn.) Penalty points are added to the opponent's score for failing to strike a ball (1 point) and for pocketing the cue ball without hitting a ball (3 points).

STRINGING

This is the method used to determine the order of play in English billiards (known as lagging in carom). Before a game, the players take an as-yet-unassigned cue ball each and hit it from the baulk line so that it rebounds off the top cushion. The player whose ball stops closest to the baulk cushion has the choice of which cue ball to use and the option of shooting first.

NEED2KNOW

- The most widely played form of pool is the version known as 8-ball. The most popular form of the sport in the United States is 9-ball pool—it attracts TV coverage and sponsorship money for competitions.
- Pool was named after the poolrooms, or betting parlors, in the United States during the 19th century. Tables for playing pool helped patrons pass the time between horse races.
- Pool matches can be over any number of games, but the World Pool Association 8-ball final winner is the first to 17 games.

OBJECT BALLS

In all forms of pool, the cue ball is white and the object balls are colored and usually numbered. In 8-ball pool and blackball pool, there are 15 object balls: those numbered 1 to 7 have different solid colors, while balls numbered 9 to 15 are white with different-colored stripes and the 8-ball is solid black. (The numbers on the 6- and 9-balls are underscored to avoid possible confusion.) One variation of 8-ball pool that is common in Great Britain uses 7 red and 7 yellow balls without numbers except for a numbered black.

Players of 9-ball pool use 9 of the numbered object balls—1 to 8 are solid colors and the 9-ball is striped. In the game of 14:1 continuous pool, the 15 object balls are numbered.

POOL





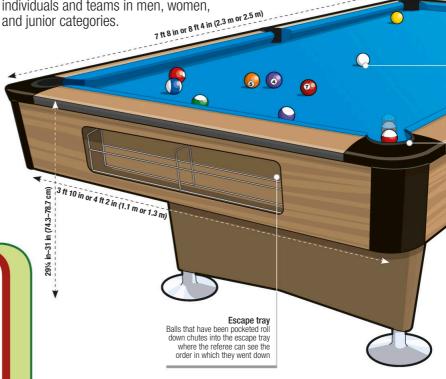


SPORT OVERVIEW

Popular in clubs and bars around the world, pool is a cue sport played with a set number of balls on a dedicated table with 6 pockets. Various forms include 8-ball, 9-ball, blackball, and 14:1 continuous pool (straight pool). Rules may vary from place to place. There are many local, national, and world championships for individuals and teams in men, women,

COMPETITOR PROFILE

Pool players need to develop a steady cueing action and good arm-eye coordination to enable them to hit the white ball at exactly the right speed and direction. They also need to be able to judge angles perfectly in order to pocket the object balls and to put the correct spin on the white ball to control its subsequent position precisely.



STAT CENTRAL

WPA \	WPA WORLD 9-BALL CHAMPIONS	
YEAR	NAME	(COUNTRY)
2018	J. FILLER	(GER)
2017	C. BIADO	(PHI)
2016	A. OUSCHAN	(AUT)

WEPF WORLD 8-BALL CHAMPIONS		
YEAR	NAME	(COUNTRY)
2018	MICK HILL	(ENG)
2017	MICK HILL	(ENG)
2016	SHAUN CHIPPERFIELD	(ENG)
2015	MICK HILL	(ENG)
2014	TOM COUSINS	(WAL)
2013	TOM COUSINS	(WAL)
2012	JOHN ROE	(ENG)
2011	ADAM DAVIS	(ENG)
2010	MICK HILL	(ENG)
2009	PHIL HARRISON	(ENG)
2008	GARETH POTTS	(ENG)

Cue tip
The cue tip may
be no more than
½ in (14 mm) in
diameter

Cue shaft
The wooden shaft must
be at least 39½ in
(1 m) long. It may have
an internal ferrule for
weight and balance

Chalk cube
Players apply chalk
to the tip of their cue
for "true" contact
with the white ball





Bridge for support

To help them with shots that are hard to reach, players use a bridge (also known as a rake or crutch) to support their cue Racking up In 8-ball, a triangle is used to arrange the object balls at the start of each game



FAIR AND FOUL

In 8-ball pool, the player who pockets the first ball must continue pocketing balls of the same type (either solids or stripes). A player who pockets all seven of their balls can then try to pocket the black. Whoever pockets this 8-ball in a nominated ("called") pocket wins the game. In 9-ball pool, players have to hit the lowest numbered ball on the table but do not have to pocket the balls in sequence. The 9-ball must be pocketed last. In 14:1 continuous pool, players call a ball and a pocket, scoring a point each time they achieve it.

Players continue shooting until they either fail to pocket an object ball or commit a foul—for example, by pocketing the white ball or an opponent's ball. Any player who prematurely pockets the 8-ball in 8-ball pool or the 9-ball in 9-ball pool automatically forfeits the game.

Rubber cushions The height of the triangular-shaped rubber cushions is between 62.5-64.5% of the width of the ball Cue ball The cue ball is slightly smaller than the others so that, if it is pocketed, it misses the chute and is brought back into play Big mouth The mouth of a corner pocket is about 41/2 in (11.6 cm) wide. The mouth of a side pocket is about 51/4 in (13 cm)

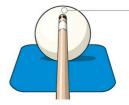
SPIN & SWERVE

Pool players, like snooker players, can spin the cue ball in a number of ways. As they pocket an object ball, they may apply topspin, backspin, or sidespin to help them gain a good position for their next shot. Sometimes, the path of the cue ball is blocked by an opponent's ball or by the 8-ball, preventing a player from hitting their object ball easily. Skilled players get around this by hitting the ball off-center, causing it to swerve: the farther to the left or right of center, the greater the deviation. This is known as "putting side on it." To swerve around a ball that is very near the cue ball, players use the massé shot (from the French "to rub"), hitting the white off-center with a downward movement.

DO THE HUSTLE

HUSTLERS HANG OUT IN POOL HALLS LOOKING FOR PLAYERS WHO THINK THEY ARE BETTER THAN THEY ACTUALLY ARE. THEY SUGGEST A GAME, LOSE IT, THEN PLAY ANOTHER ONE FOR MONEY. AT THIS POINT, THEY START PLAYING WELL, COMPREHENSIVELY BEAT THEIR OPPONENT, AND POCKET THE STAKES. THE "ART" WAS IMMORTALIZED BY PAUL NEWMAN IN THE MOVIE THE HUSTLER.

Topspin makes the white ball run on after it has hit the object ball. Players hit the cue ball above its "equator," causing it to revolve forward on its axis faster than normal.



Run on For topspin players hit the cue ball

BACKSPIN

Backspin makes the white ball move backward after hitting the object ball. Players hit the cue ball below its "equator," causing it to return toward them.



Pullback For backspin, players hit the bottom of the

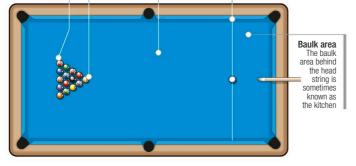
Corner balls The two corner balls at the base of the 8-ball rack must be of different types

Foot spot The apex ball sits on the foot spot when the balls are racked in

8-ball

Playing surface Baize made of 85% combed worsted wool and no more than 15% nylon

Head string The opening break is made from behind the line of the head string



SIDELINES

626 The number of balls pocketed consecutively without a miss by one player in a single session. This record-high run was achieved by US champion John Schmidt in 2019 as part of a year-long attempt to break the previous world record.

The number of finalists (from more than 40 countries) in the men's 2018 World Pool Championships in Qatar. The competition opened with 16 groups of eight; the top four in each went forward to a knockout. The first prize was \$40,000.

INSIDE STORY

Eight-ball pool is most popular in Great Britain and Europe, where it is played in clubs and pubs, as well as in dedicated pool halls. Variation in the rules of 8-ball, particularly in Britain, include positioning the black on the foot spot when the balls are racked at the start of a game and giving two shots to an opponent after committing a foul. The World Eightball Pool Federation (WEPF) was set up in 1992 to unite the various organizations who promote 8-ball pool, to set criteria for the players, and to organize an annual World Championship.

WORLD POOL-BILLIARD ASSOCIATION (WPA)

The WPA was a founding member of the World Confederation of Billiard Sports (WCBS) in 1990. The WPA organizes a World 9-ball Championship and an annual World 8-ball Championship that rivals the event organized by the WEPF.









Follow-through After the throw, the arm is fully extended

Nonthrowing hand The player holds the remaining darts with their points in his palm

NEED2KNOW

- Although the target score is usually 501, it can also be 301, 601, 801, or even 1,001.
- The throwing line is known as the oche (pronounced "okky"), from the French "ocher," to cut a groove.
- More than 6 million people regularly play darts.
- The quickest way to get 501 is in 9 darts.
- Darts is a popular TV sport, with audiences of up to 5 million in countries such as Britain and the Netherlands.

GAME OVERVIEW

In this enthralling and popular game, two players—male or female—take turns throwing three arrowlike projectiles at a circular board. The target area is divided into a total of 62 sections, each of which counts a different number of points when a dart sticks in it. The object is to score exactly 501 in fewer throws than the opponent, with the last dart hitting one of the sections that scores double points or, less commonly, the bull'seye. The game is mainly about accurate aim and steel nerves, but it is also about mathematics: players need to be able to work out how best to reach the target score.



Darts still has a close link with bars, although professionals no longer drink or smoke while playing. Today, younger players are increasingly drawn to the sport. Concentration and hand—eye coordination are keys to success, along with being able to repeat the same movement countless times with only tiny adjustments.

Personalized shirts

Loose-fitting shirts may be personalized with the player's name on front and back or in national colors

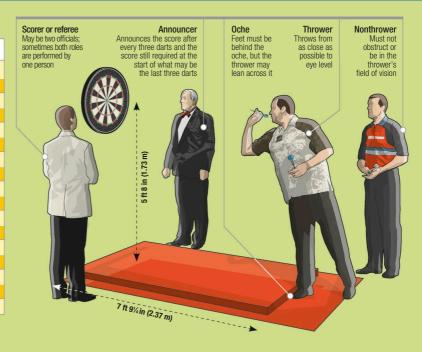
Toeing the line A throw does not count if the player oversteps the oche

HARROWING ARROWING

ALL PLAYERS DREAD "DARTITIS," OR THE YIPS, A NERVOUS CONDITION THAT PREVENTS THEM FROM THROWING SMOOTHLY. NO ONE KNOWS WHAT CAUSES IT—OR HOW TO CURE IT. ONE HIGH-PROFILE VICTIM WAS FORMER WORLD CHAMPION ERIC BRISTOW, WHO WAS EVENTUALLY FORCED TO GIVE UP THE GAME.

STAT CENTRAL

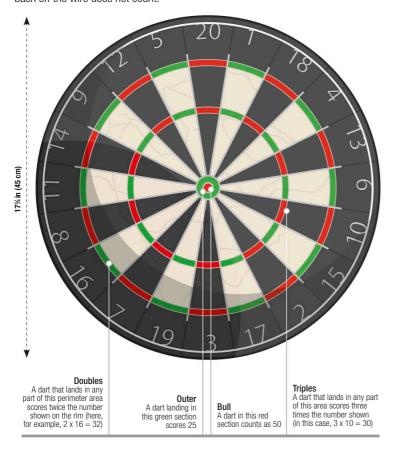
TOP CHECKOUTS		
SCORE	OUTSHOT	
170	TRIPLE 20, TRIPLE 20, BULL	
167	TRIPLE 20, TRIPLE 19, BULL	
164	TRIPLE 20, TRIPLE 18, BULL	
161	TRIPLE 20, TRIPLE 17, BULL	
160	TRIPLE 20, TRIPLE 20, DOUBLE 20	
158	TRIPLE 20, TRIPLE 20, DOUBLE 19	
157	TRIPLE 20, TRIPLE 19, DOUBLE 20	
156	TRIPLE 20, TRIPLE 20, DOUBLE 18	
155	TRIPLE 20, TRIPLE 19, DOUBLE 19	
154	TRIPLE 20, TRIPLE 18, DOUBLE 20	
153	TRIPLE 20, TRIPLE 19, DOUBLE 18	
152	TRIPLE 20, TRIPLE 20, DOUBLE 16	
151	TRIPLE 20, TRIPLE 17, DOUBLE 20	
150	TRIPLE 20, TRIPLE 18, DOUBLE 18	
149	TRIPLE 20, TRIPLE 19, DOUBLE 16	
148	TRIPLE 20, TRIPLE 16, DOUBLE 20	



343

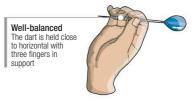
BOARD DISCUSSION

The bed of a dartboard is made of cork, sisal, and synthetic materials to give it a "bristle" appearance. Wire separates each scoring section; a dart that lands within a section scores the points, even if it bends the wire out of place. A dart that bounces back off the wire does not count.



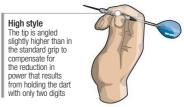
CHECKOUT TIME

For the first few darts, players try to score as much as possible, normally going for triple 20 each time. Nearing zero, they often try to leave themselves 32, so they can throw at double 16. This is the checkout of choice because a narrow miss that scores a single 16 leaves them on double 8; if that fails and they get a single 8, they can go for a double 4; if the same thing happens again, they are still left with a double 2.



STANDARD GRIP

The shaft is gripped between the thumb and index finger and steadied on the middle and third fingers; the little finger is withdrawn slightly out of the way.



PENCIL GRIP

The dart is held between thumb and forefinger alone. This common variant of the standard grip is used by many leading players, including 16-time world champion Phil "The Power" Taylor.

ARROWS OF DESIRE

The maximum permitted weight of a dart is 1.8 oz (50 g). The pointed tip may be made of brass (the cheapest material), alloys of nickel and silver, or tungsten (the most expensive). The shaft is made of plastic or solid aluminum. The flight is detachable and replaceable; it is either tough nylon or flexible plastic.



INSIDE STORY

Darts may have developed from archery—early dartboards had concentric targets, as in archery, and darts is still known as "arrows." Darts was a regional game in Britain until the rules were codified in the 1920s. The sport enjoyed a heyday in the 1930s—helped when King George VI and his wife, Queen Elizabeth, were photographed throwing darts in a pub near Windsor. The sport's next boom came in the 1970s, with the introduction of TV games, the emergence of the first darts stars, and the establishment of the World Darts Federation (WDF) and the British Darts Organization (BDO). The WDF now has 70 member nations.

PROFESSIONAL DARTS CORPORATION (PDC)

In 1992, one of the world's leading players, Phil Taylor, led 15 other top players out of the BDO to form a rival body, the Professional Darts Council (PDC). The PDC has held its own world championship since 1994. It now runs a thriving tour with competitions as far afield as Blackpool and Las Vegas. Top BDO player Raymond van Barneveld defected to the PDC in 2006.

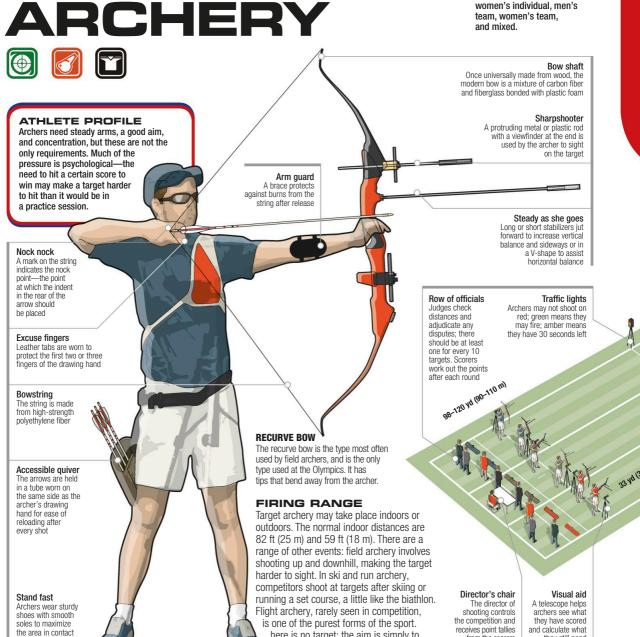
with the ground

GAME OVERVIEW

Archery today is far removed from its roots in hunting and warfare. As a modern sport, it involves two or more archers competing against each other to get the highest score by hitting a target that is usually circular, but may also be the outline of a wild animal. Most competitions are held in several stages, at each of which the archers shoot from different distances to display their versatility. Round targets are marked in rings: the closer the ring to the center, the greater the number of points for a hit. On animal targets, the top scoring areas are those in which a blow to a real animal would be lethal. The winner of an archery tournament is the contestant with the highest points total after a previously agreed number of shots.

NEED2KNOW

- The World Archery Federation is the world governing body for archery and has held annual world championships since 1931.
- Archery for hunting and warfare has been practiced for at least the last 5.000 years. As a sport, archery developed from military training exercises.
- There are five Olympic events, all over 70 m: men's individual. women's individual, men's team, women's team,



here is no target: the aim is simply to

fire an arrow as far as possible.

from the scorers

they still need

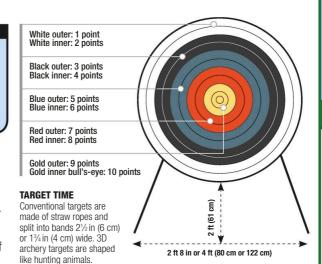
A ROBIN HOOD

ONE OF THE RAREST ACHIEVEMENTS IN ARCHERY IS SPLITTING THE SHAFT OF AN ARROW ALREADY IN THE TARGET WITH A LATER SHOT. ARCHERS WHO PERFORM THIS FEAT—KNOWN AS "A ROBIN HOOD," AFTER THE LEGENDARY 12TH-CENTURY ENGLISH BOWMAN—GET TO KEEP THE ARROWS AS A PROUD TROPHY OF THE FEAT.

FLIGHT CONTROL

In FITA tournaments, archers have a fixed amount of time to shoot 12 rounds (a total of 36 arrows) at targets between 33 and 98 yd (30 and 90 m) away. Scores are updated after six arrows at longer distances and three at shorter distances.

An arrow touching two colors or a dividing line scores the higher value, and one that rebounds from or passes through the target counts only if it leaves a clear mark. In the event of a tie, the winner is the archer with the most scoring hits.



Nock

A V-shaped indentation in the end of the shaft holds the arrow steadily in place on the bowstring

Fletching display

Once made of feathers, modern flights are made of plastic; they help arrows maintain speed and direction

Shaft structure

Arrows used to be made from wood but are now usually made of carbon fiber or an alloy of carbon and aluminum

Top tip

The sharp point screws onto the arrow so that it can be adjusted forward or backward, as the archer prefers

60 m line Only used in ³⁻¹⁶ vd (2.5-15 m) per larger women's events 70 m line 60 m line 90 m line Only men shoot at this range 50 m line 70 m line 30 m line The outdoor Olympic range for men The shortest distance for both men outdoor range and women and women

INSIDE STORY

Archery featured in the Olympics from 1900, but was dropped after 1920 because there were no internationally agreed rules. The establishment of FITA in 1931 changed all that, and the sport was reintroduced at the 1972 Games for both men and women. FITA was established by seven countries. It was renamed World Archery in 2011, and now has more than 160 member countries.

ON TARGET

Archers with a dominant right eye hold the bow in their left hands, and vice versa. Each shot takes only about 15 to 20 seconds from loading to firing, but holding the bow and pulling the string is still tiring. Archers rest ("let down") their bows in between shots to conserve their strength.

PREPARATION FOR SHOT

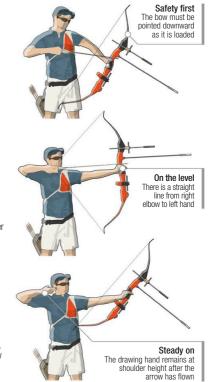
The archer stands with the leading shoulder toward the target and the feet set shoulder-width apart. He or she points the bow at the ground and loads the arrow by placing the front of its shaft on the arrow rest and the bowstring into the V-shaped nock at its fletching end.

DRAWING AND TAKING AIM

Holding the string between the index and middle fingers, or the index and middle and ring fingers, the archer pulls it back, raises the bow, and looks down the sight at the target. This position is held at the "anchor point." Some bows have a clicker that sounds when the archer reaches the right draw length.

FOLLOW THROUGH

As the archer prepares to fire, his or her bowstring hand should be resting against the cheek. The arrow is fired by relaxing and straightening the fingers of the drawing hand. Once the shot has been made, the archer "lets down" the bow to rest and reaches into the quiver for the next arrow.



NEED2KNOW

- Pistol shooting debuted in the first Olympic Games of 1896. The events have evolved as the manufacturing of guns has developed and changed.
- Some nations with strict gun control laws do not televise shooting events.
- Target pistol shooting in its modern form is the conservationist's alternative to pigeon shooting.
- There are five pistol events in the Olympic Games.

COMPETITOR PROFILE

Pistol shooters need extraordinary powers of concentration and mental focus to remain relaxed under pressure, since any nervous tension in the shooting arm could cause the shot to go off center of the target. Shooters also need strength and stamina.

Eye protection

Competitors wear shatterproof safety glasses or similar protection to guard their eyes during the event

Free hand

The nonshooting hand must not be used in any way; it is usually tucked into a pocket or belt

SIDELINES

The number of national federation members from five continents that are affiliated with the International Shooting Sports Federation.

The number of Olympic golds won by German sportsman Ralf Schumann, the most successful pistol shooter to date in the 25 m rapid-fire event. His victories came in 1992, 1996, and 2004.

The world record score for the 50 m pistol event, set by South Korean shooter Jin Jong-oh at the 2014 World shooting Championships. A perfect score is 600; a score of around 570 is considered to be world-class.

PISTOL SHOOTING







SPORT OVERVIEW

In this sport, competitors stand and, with one hand, fire a pistol at a circular target divided into 10 concentric rings. The nearer to the center the shots land, the higher they score; the center (the bull's-eye) scores 10. The sport takes place on a shooting range. There are a number of events that are distinguished by the type of pistol used and the distance the competitor stands from the target.

Ear protection Contestants wear earplugs, earmuffs, or some other form of ear protection while in the vicinity of the firing line

Shooting arm
The arm that holds the pistol
is extended and must be
completely unsupported

Competitor's gun

Three types of pistols are used, depending on the event

Competitors' clothing

No specific clothing is required, but garments that would help immobilize the arms, legs, or body are not allowed, and only low-sided shoes without ankle supports can be worn

SHOOTING RANGE

Pistol shooting events take place on a shooting range. Safety is of paramount importance, and officials are on hand to check the competitors' pistols, check the targets, and sometimes take note of the scores after each round of shooting.

CONCENTRIC RINGS

The target is composed of concentric rings. The numbers are the points scored when a shot hits the ring. Shots hitting a line are awarded the higher point. Targets and the central ring (the 10th ring) vary in size.

Outer rings Rings scoring 1 to 6 are white Inner rings Inner rings Rings scoring 7 to 10 are black



Shooting station Each shooting station is 4 ft 1 in

ch shooting station is 4 ft 1 in by 8 ft 2 in (1.25 by 2.5 m)

Group of competitors

A group of competitors will all compete at the same time. In Olympic finals, there will be six to eight competitors at the shooting station

346

TYPES OF PISTOL

Different types of pistol are used for the different events—the 10 m air pistol, the 25 m pistol, and the 50 m pistol. A pistol's caliber is the diameter of its barrel. For safety reasons, the ammunition must be made of lead or a similarly soft material. Regulations only allow open sights on the weapons, so mirrors, optical sights, and telescopic sights are all prohibited. Officials carefully check each competitor's weapon before an event begins to make sure the pistol complies with the event's regulations. If a competitor's weapon malfunctions during an event, he or she has 15 minutes to repair or replace it.

10 M AIR PISTOL

Competitors use .177 in (4.5 mm) caliber pistols that fire lead pellets at targets 32¾ ft (10 m) away. The maximum allowable weight of the pistol is 3 lb 3 oz (1.5 kg). The diameter of the 10-ring is ½ in (11.5 mm).



25 M PISTOL

The same requirements govern the women's 25 m pistol and the men's 25 m rapid-fire pistol events. The guns have a caliber of .22 in (5.6 mm) with a maximum weight of 3 lb (1.4 kg). The diameter of the 10-ring in the rapid fire target is 4 in (10 cm).



50 M PISTOL

Competitors use .22 in (5.6 mm) caliber pistols, which have a special customized grip but no maximum weight regulation. The precision target stands 165 ft (50 m) away and the diameter of its 10-ring is 2 in (5 cm).



Target distance

The targets are 10 m,

25 m, or 50 m away from the competitors. depending on the event 164 H (50 m) SS R TO M Length of the range Competitors' targets The target range has no stipulated overall length but Each competitor has his or her own target to will be more than 164 ft (50 m) fire at A competitor is long to allow sufficient room penalized if one of their for targets to be set up for shots accidentally hits the 50 m pistol event a neighboring target

OLYMPIC EVENTS

There are five Olympic pistol shooting events—two for women and three for men. The 10 m air pistol event, which first featured in the Olympic Games in 1988, includes both men and women (in separate events). Men shoot 60 shots within 105 minutes, while women shoot 40 shots within 75 minutes. Women compete in the 25 m pistol event, firing two rounds of 30 shots. Men compete in the 25 m rapid-fire pistol event, which also consists of two rounds of 30 shots. Men compete in the precision 50 m pistol event, firing 60 shots within 120 minutes.

OVERALL WINNER

In each event, all competitors take part in a qualification round, from which the best eight (or six for 25 m Rapid-Fire Men event) proceed to the final. The scores they achieve in the qualification round are added to their final round; whoever has the most points overall is the winner.

PERFECT SCORES

Scoring in the events can be complicated, but competitors aim for perfect scores. For example, in the 25 m rapid-fire event, the perfect match score is 600 for qualification rounds, and a score of 592 is categorized as world-class.

ONE-HANDED CHAMPION

KAROLY TAKACS WAS A MEMBER OF THE HUNGARIAN PISTOL SHOOTING TEAM WHEN, IN 1938, HE LOST HIS RIGHT HAND IN A GRENADE EXPLOSION. HE TAUGHT HIMSELF TO SHOOT LEFT-HANDED AND BECAME HUNGARIAN PISTOL SHOOTING CHAMPION IN 1940. HE WENT ON TO WIN GOLD MEDALS IN THE RAPID-FIRE PISTOL EVENT AT THE OLYMPIC GAMES IN LONDON IN 1948 AND AGAIN IN HELSINKI IN 1952.

INSIDE STORY

Along with other target-shooting disciplines, pistol shooting is governed by the International Shooting Sports Federation (ISSF), which was established in 1998 and was formerly the International Shooting Union (ISU). The ISSF supervises the World Championships every four years, two years after the Olympic Games. Pistol shooting events in the World Championships are organized for individuals and teams in men, women, and junior categories. The ISSF also supervises World Cups, Continental Championships, and Continental Games. The introduction, in 1989, of a new electronic scoring system eliminated paper targets at final competitions and enabled spectators to know results immediately. A new television era was born at the Olympic Games in Barcelona in 1992, when viewers all around the world witnessed coverage of the shooting events for the first time.

INTERNATIONAL SHOOTING SPORTS FEDERATION (ISSF)

The target shooting sport throughout the world is governed by the International Shooting Sports Federation, which is based in Germany.



SHOTGUN SHOOTING







EVENT OVERVIEW

Shotgun shooting is an event where competitors use a smooth-gauged (unrifled) shotgun to shoot at clay targets that are released from a machine called a trap. Clay Target shooting can be broadly split into three categories—trap, skeet, and sporting. Trap and skeet are both performed at the Olympic Games, while sporting involves shooting at targets designed to simulate those found in nature.

Sleeveless jacket

No specific clothing is required, but shooters tend to wear a loose sleeveless jacket with large pockets in which to store their cartridges. Shooters generally wear a fairly loose-fitting T-shirt or shirt so their arm movements are not restricted

Shooting position

In all shotgun shooting events, the competitors fire at the targets from a standing position

COMPETITOR PROFILE

Shotgun shooters need to focus, both mentally and physically. They need excellent hand-eye coordination and visual-spatial skills. They need to be able to anticipate the trajectory of a fast-moving target and shoot slightly ahead of it so they can hit it.



NEED2KNOW

- The modern sport of shotgun shooting (both trap and skeet) derives from the custom of shooting birds—in particular, pigeons and pheasants—for sport.
- Skeet shooting was invented in 1915 as a recreational sport. Live pigeons were used at first, but they were eventually replaced with clay targets.
- Trap shooting has been part of the Olympics since 1950, whereas skeet shooting appeared at the Games for the first time in 1968.
- The word "skeet" is derived from an old Scandinavian word that means "shooting." The term was adopted by the sport in 1926.

SPORTS CONTROVERSY

IN 1992, CHINA'S SHAN ZHANG BECAME THE FIRST WOMAN TO WIN A MIXED-SEX SHOOTING EVENT IN THE OLYMPIC SKEET. THE EVENTS WERE SUBSEQUENTLY SEGREGATED, AND SHAN WAS NOT ALLOWED TO DEFEND HER TITLE.

shooting stations, but unlike the trap field, they are set in a straight line.

THE OLYMPIC SKEETFIELD

A standard round of 25 targets are shot from eight stations in a semicircle. At the ends of the semicircle are the high and low trap houses from which targets are released on a fixed trajectory and within defined limits. A set combination of single and double targets are shot from each station and scored on the basis of 1 point per target hit, and the shooter is only allowed one shot at each target. All shooters on the squad (up to six people) must have completed the station before moving to the next one.

Single and double targets The round features both single and double targets. A single target is released from either the high or the low trap. Doubles mean that targets are released simultaneously from both the high and the low trap

COMPETITION

There are currently five shotgun shooting events at the Olympics, but the schedule of events has changed in the past. There have been more events in the past; the women's double-trap event was dropped after 2004. The World Championships feature a greater range of events, including skeet, trap, and double trap for both men and women.

High trap house

Targets from the high trap house emerge at a height of 10 ft (3.05 m) and can travel about 213 ft (65 m)

Target crossing point Targets properly released must pass through a circle located above the

target crossing point

Position 8 The eighth shooting station is the largest-it is 351/2 x 73 in (90 x 185 cm), while the other stations are 351/2 x 351/2 in (90 x 90 cm)

Positions 1 to 7 The competitor will start

at station one and progress from station to station. These stations are 261/2 ft (8.1 m) apart

Low trap house

The low trap house releases targets at a height of 3½ ft (1.05 m). The targets may travel at about 55 mph (88 kph)

TRAP FIELD

In the trap event, six shooters (a squad) are on the field at any one time. The targets are released immediately on the shooter's call, but the shooter does not know which trap in a group of three will release the target. The target reaches an exit speed of about 80 mph (130 kph). Each shooter is permitted two shots at each target. Each shooter fires in turn from the shooting station until 25 targets (a round) have been shot at by all of the squad members.

Clay targets

The traps are set to shoot out the targets at a variety of heights, speeds, and angles (between 0 and 45 angles, to both the left and right). The competitors can take two shots at each target

Target distance

The trench containing the target-pullers is 49 ft (15 m) away from the shooting stations

Shooting stations

There are five shooting stations. Each is served by three traps (hence there are a total of 15 traps in the trench)

Target-puller trench

The trench contains 15 target-pullers, arranged in five groups of three. The trench is 6½ ft (2 m) deep and 6½ ft (2 m) wide

Field width

The total width of the field of play is

SIDELINES

198 The current world record score for double-trap shooting. This record was set by Great Britain's Peter Wilson at a World Cup event in 2012 and is the combined score out of 200 from the qualifying round and final. A perfect score in the qualifying round would be 150; the highest score recorded so far is 148. This score has been achieved by several shooters, so there is no overall record holder.

The distance, in meters, the targets in double-trap shooting are set to travel when released from the trap (equivalent to 180 ft). Double-trap shooters generally hit the targets from a distance of 82-131 ft (25-40 m).

The number of shotgun events that have been discontinued at the Olympics. This includes live pigeon shooting. Clay targets were substituted for live birds, but the traps tried to simulate the erratic patterns of birds in flight.

The maximum number of seconds between a skeet shooter calling for the target and the target being released. The time interval is deliberately random to increase the difficulty of the shooting challenge.

The number of gold medals won by Russia at the ISSF world championships since 1897. The World Championships are held in a different country every four years, two years after each Olympic Games.

EQUIPMENT

Competitors in shotaun events commonly use 12-gauge shotguns that fire cartridges containing small pellets. Guns for trap shooting are the heaviest at around 9 lb (4 kg), have the longest barrels, and have a single trigger for rapid firing. Shotguns used for skeet shooting weigh about 61/2 lb (3 kg) and a shorter barrel for better maneuverability. Double-trap guns are similar to those used in trap, but the pellets have a wider spread.

CLAY TARGET

The saucer-shaped "clay" target is actually made from pitch and chalk. They are approximately 4 x 1 in (110 x 25 mm); most are colored for better sighting





close-range shooting. Trap shotgun barrels are longer

Barrel length Shotguns for skeet have a shorter barrel for quicker,

The choke (constriction at the end of the barrel) can be tailored to the range of the a wider shot pattern, as the targets are

Barrel choke

targets. Shotguns for skeet shooting give shot at closer range; shotguns for trap give a tighter shot pattern

SHOTGUN

Shotguns differ from pistols and rifles, as they are smoothgauged rather than rifled and are sometimes built with more than one trigger. In shotgun shooting events, the guns are loaded with two cartridges.

SHOTGUN CARTRIDGES

The cartridges are loaded with buckshot (lead pellets) and weigh 7/8 oz (24 g). The exit speed of the cartridge will be close to 950 mph (1,530 kph).



The trap releases the targets automatically via a microphone system that responds to the shooter's call. Traps can be modified to adjust the height, throwing angle, and speed of a target. Some traps can hold as many as 400 targets



RULES AND REGULATIONS

In the Olympic competition, there are preliminary rounds from which six competitors proceed to the final. For the men's skeet and trap events, there are five rounds of 25 targets followed by a final round of 25 targets. In the women's skeet and trap events, there are three rounds of 25 targets culminating in a final round of 25 targets. In the double trap (contested by men only), there are three rounds of 50 targets leading to a final round of 50 targets.

In Olympic skeet shooting, competitors have one shot at each target, and there is a delay of up to three seconds before the clay appears. In trap shooting, contenders can take two shots at each target. In double trap, two targets are released simultaneously, so the shooter takes one shot at each.



INSIDE STORY

Shotgun shooting with clay targets first emerged in the 1880s. Shotgun shooting featured at the first Olympics in 1896, and the lineup of events has changed frequently since then. The first World Championships featuring shotgun shooting were held in 1897.

The International Sports Shooting Federation (ISSF) is the governing body of shotgun shooting. The ISSF holds world championships every four years (two years after the Olympics), featuring more events than the Olympics.

SCORING

One point is scored for every target hit. To qualify for a hit, the target must be seen to be broken—the referee must see at least one piece fall from it. The referee indicates a target "dead" or "lost" and the scorer marks a "/" or "X" for dead and the figure "0" for lost. The targets used in finals rounds also contain a powder that is more easily seen by spectators and on television when the target is hit.

STAT CENTRAL

OLYMPIC SKEET CHAMPIONS	
YEAR	NAME (COUNTRY)
2016	GABRIELE ROSSETTI (ITA)
2012	VINCENT HANCOCK (USA)
2008	VINCENT HANCOCK (USA)
2004	Andrea Benelli (ITA)
2000	MYKOLA MILCHEV (UKR)
1996	ENNIO FALCO (ITA)
1992	SHAN ZHANG (CHN)
1988	AXEL WEGNER (GDR)
1984	MATTHEW DRYKE (USA)

OLYMPIC TRAP CHAMPIONS		
YEAR	NAME (COUNTRY)	
2016	JOSIP GLASNOVIĆ (CRO)	
2012	GIOVANNI CERNOGORAZ (CRO)	
2008	DAVID KOSTELECKY (CZE)	
2004	ALEXEI ALIPOV (RUS)	
2000	MICHAEL DIAMOND (AUS)	
1996	MICHAEL DIAMOND (AUS)	
1992	PETR HRDLICKA (CZR)	
1988	DMITRI MONAKOV (USR)	
1984	LUCIANO GIOVANETTI (ITA)	

RIFLE SHOOTING









EVENT OVERVIEW

The aim of the competition is to shoot as many bullets into the center of the target within a specific time frame. The shooters must take account of the number of shots they fire and the amount of time they have to do so, both of which are governed by distance. There is a qualifying round, followed by a final, and the winner is determined by adding a competitor's qualification and final scores together.

NEED2KNOW

- Rifle shooting is administered by the International Shooting Sports Federation (ISSF). There are six rifle-shooting classes at the ISSF World Championships and three at the Olympics: 50 m Rifle Three Positions, 50 m Rifle Prone, and 10 m Air Rifle.
- Dismayed by the lack of marksmanship shown by their troops. Union veterans Colonel William C. Church and General George Wingate formed the National Rifle Association (NRA) in 1871.
- Only bullets made of lead or similar soft material are permitted in competition shooting. Tracer, armor piercing, and incendiary ammunition are prohibited.
- Women were first allowed to compete in Olympic shooting in 1968. Mexico, Peru, and Poland each entered one female contestant.

COMPETITOR PROFILE

Rifle shooters need to have extraordinary powers of concentration and mental focus. They also need to be able to control their breathing and hold their hands and body very still for sustained periods of time. Their eyesight must be extremely good, as should be their judgment of the elements.

Patched up The jacket and pants worn by shooters are made of canvas and leather with nonslip rubber pads to aid steadiness

Tunnel vision Sun visors and other devices are sometimes affixed to the sides of shooting glasses to keep the wind and sun out of the shooter's eyes

Wooden stock This part of the rifle can be wooden, metal, plastic, or

fiberglass. It is the part of a rifle to which the barrel. action, and trigger are attached and when the shooter supports the gun

Gun metal The barrel is the heaviest component of the rifle. It is usually

made from steel

Out of sight The foresight must not extend beyond the apparent muzzle





For rifle, pistol, and running target events, shooters fire at round black aiming areas displayed on white backgrounds. The 50 m rifle target (right) is divided into 10 concentric scoring zones or rings. Targets are electronic with a computer system to instantly score each shot. Television monitors enable spectators to see the impact point of each shot fired.

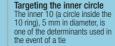
Missing numbers The 9- and 10-point

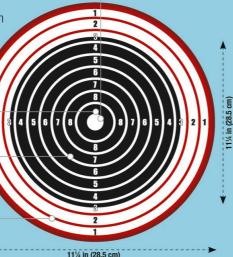
zones are not marked with a number

Magic numbers

Scoring ring values 1 to 8 are printed in the scoring zones in vertical and horizontal lines at right angles to each other

The thickness of the circles separating the scoring zones is between 0.2 mm and 0.3 mm





OLYMPIC SCORING

In the final round of Olympic competition, the 10 rings on the target are subdivided into "decimal" score zones (10.0 to 10.9), the highest score for a shot being 10.9.

Score 10.9

10 Ring: width 3/8 in (10.4 mm) Inner Ten: 3/16 in (5 mm)

Score 10.8

9 Ring: width 1 in (26.4 mm)

Score 10.7

8 Ring: width 11/2 in (42.4 mm)

Score 10.6

7 Ring: width 21/2 in (58.4 mm)

Score 10.5

6 Ring: width 3½ in (74.4 mm) Score 10.4

5 Ring: width 35% in (94.4 mm)

Score 10.3

4 Ring: width 4½ in (106.4 mm)

Score 10.2

3 Ring: width 45% in (122.4 mm)

Score 10.1

2 Ring: width 5½ in (138.4 mm)

Score 10.0

1 Ring: 6 in (154.4 mm)

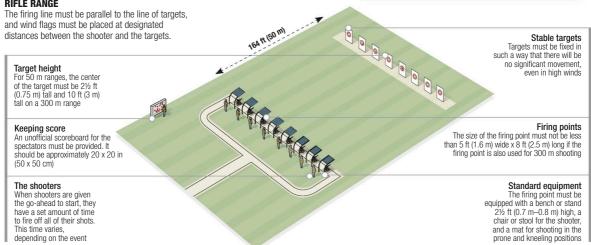
WHERE THEY SHOOT

New outdoor ranges must be constructed in such a way that the sun is behind the shooter as much as possible during the competition day. Also, 164 ft (50 m) ranges should have at least 148 ft (45 m) open to the sky, while the 984 ft (300 m) ranges should have at least 950 ft (290 m) open to the skies.

TARGET EVENTS

Shooting events are divided into four different groups: shotgun, rifle, pistol, and running-target events. The rifle events are held on shooting ranges with competitors for both and women aiming at targets from distances of 10 m, 25 m. 50 m. and 300 m.





EQUIPMENT

All rifles chambered for rimfire .22" (5.6 mm) Long Rifle cartridges, and .314" (8 mm) ammunition are permitted, provided they do not exceed 171/2 lb (8 kg) for men or 14 lb (6.5 kg) for women, with all accessories used including palm rest or hand stop. In the 10 m air rifle event, any type of compressed air or gas rifle that fires .177" (4.5 mm) caliber ammunition can be used, as long as it weighs 12 lb (5.5 kg).

RIFLE SIGHTS

Only "metallic" sights are permitted, which have no lenses or system of lenses

extension below

the rifle by the

the fore-end that

aids the support of

(8 mm) caliber

The rifle ammunition

CARTRIDGE

must be between .22' (5.6 mm) and .314"

Igniting the cartridge

The striking pin hits the rim

of the cartridge to ignite it

.22 (5.6 MM) RIFLE

This rifle is a small-gauge, single-loaded rifle in .22' Long Rifle (5.6 mm) caliber. One of its many features is a shaped stock incorporating adjustments to suit the individual, which include a hook-type butt plate and a palm rest.

Metal sight

Colored filters are permitted and the rear sight has fine adjustments for windage and elevation

Palm rest Gun sling A palm rest is any attachment or

Looking glass The sight cannot be

enhanced in any way

Maximum sling width is 11/2 in (40 mm)

The barrel tube

The rifled barrel improves accuracy over long distances Foresight Length of front sight tunnel must be 2 in (50 mm), and its diameter needs to be



.177 (4.5 MM) AIR RIFLE

The main air-rifle competition is the 10 m 60 shot for men and the 10 m 40 shot for women. Rifles are usually single shot with a rifled barrel and a wooden or synthetic stock.

Rear sight Breech capacity Any sight not The gun is single containing a shot so no system of lenses magazine needed is permitted

Max velocity Bullet velocity is up to 485 fps (148 mps)

Barrel length The maximum length of the barrel is 30 in (76 cm)

Light metal butt plate The modified profile provides an advanced anatomical fit

RULES AND REGULATIONS

In all events, the format is the same—only the number of shots fired and the time in which to take the required number of shots will change. In the 50 m Rifle 3 Position Men's competition, the shooter fires 40 shots each in the prone, standing, and kneeling positions at a target 164 ft (50 m) away. The center 10 must be hit at a distance of 64 ft (50 m) within a time limit of 45 minutes in the prone position, 75 minutes in the standing position, and 60 minutes in the kneeling position. The best eight shooters qualify for the final. The final consists of 10 shots in the standing position with a time limit of 75 seconds per shot.

TECHNIQUES AND TACTICS

In the 50 m Rifle 3 Positions, illustrated below, shooters fire shots from three different positions: prone, standing, and kneeling. They have to take into account the climatic conditions at the time, utilizing the wind flags on the range while being mindful of the time restrictions that are placed on each shooting position.

STANDING

In the standing position for all rifle events, the rifle is held with both hands and rests on the shoulder. The left arm may be supported on the chest or hip. The maximum changeover time between positions is 10 minutes for 50 m rifle events.



KNEELING

When kneeling, the right-handed shooter may touch the ground with the toe of the right foot, the right knee, and the left foot. The left knee may support the left elbow, but the point of the elbow must be no more than 4 in (10 cm) past or 6 in (15 cm) behind the point of the knee



PRONE

This is the first position that the shooter adopts A shooter may not let the rifle rest against or touch any object. The right-handed shooter's left



Regulation footwear The maximum thickness

of the shoe sole at the toe must be 1/4 in (10 mm) and the upper part of shoe material must be 1/8 in (4 mm)

Approved clothing Only one shooting jacket, one pair of shooting pants, and one pair of shoes may be approved for each shooter for all rifle events

Trigger happy Shooters can use both electronic and traditional triagers

Official length The barrel can be no longer than 30 in (762 mm) from breech face to the end of the barrel

WOMEN'S 50 M RIFLE 3 POSITIONS

STAT CENTRAL

L		
	NAME (COUNTRY)	OLYMPICS
	BARBARA ENGLEDER (GER)	RIO 2016
	JAMIE LYNN GRAY (USA)	LONDON 2012
	DU LI (CHN)	BEIJING 2008
	LIOUBOV GALKINA (RUS)	ATHENS 2004

MEN'S 50 M RIFLE 3 POSITIONS

NAME (COUNTRY)	OLYMPICS
NICCOLO CAMPRIANI (ITA)	RIO 2016
NICCOLO CAMPRIANI (ITA)	LONDON 2012
QIU JIAN (CHN)	BEIJING 2008
ZHANBO JIA (CHN)	ATHENS 2004

MEN'S 50 M RIFLE PRONE

NAME (COUNTRY)	OLYMPICS
HENRI JUNGHÄNEL (GER)	RIO 2016
SERGEI MARTYNOV (BLR)	LONDON 2012
ARTUR AYVAZIAN (UKR)	BEIJING 2008
MATTHEW EMMONS (USA)	ATHENS 2004

OLYMPIC RIFLE/SHOTGUN EVENTS

50 M RIFLE 3 POSITIONS (3X40 SHOTS) MEN

50 M RIFLE PRONE (60 SHOTS) MEN

DOUBLE TRAP (150 TARGETS) MEN

SKEET (125 TARGETS) MEN

TRAP (125 TARGETS) MEN

50 M RIFLE 3 POSITIONS (3X20 SHOTS) WOMEN

SKEET (75 TARGETS) WOMEN

TRAP (75 TARGET) WOMEN

OLYMPIC BLOOD SPORT

OSCAR SWAHN WAS ALREADY 60 YEARS OLD WHEN HE WON HIS FIRST OLYMPIC GOLD MEDAL. HE WON THE RUNNING DEER SINGLE-SHOT EVENT AND TOOK HIS SECOND GOLD OF THE GAMES THE NEXT DAY IN THE TEAM EVENT, SWAHN ALSO EARNED A BRONZE MEDAL IN THE RUNNING DEER DOUBLE-SHOT CONTEST. TARGETS, RATHER THAN LIVESTOCK, ARE SHOT.

INSIDE STORY

Shooting originated as a means of survival, since it was practiced in order to hunt game for food. In the 19th century, however, as the Industrial Revolution made hunting for food less necessary for many people, shooting evolved into a sport. The sport was first popular in English-speaking countries, notably England and the United States, as well as Ireland and South Africa.

SPORTS on WHEELS



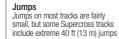


TRACKS & RAMPS

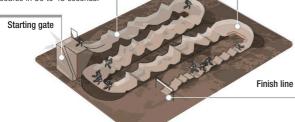
BMX races take place on specially built dirt tracks. Riders complete one lap of the circuit and contend with various jumps and turns as they progress to the finish line. Ramps are used in freestyle BMX events, of which the "vert" ramp is perhaps the most extreme example (see below).



A typical BMX track consists of a starting gate, a dirt track that includes jumps and banked and flat corners, and a finish line. Riders complete the course in 30 to 45 seconds.



Banked turn Banked turns or corners are called "berms"



VERT RAMP

Ramps used in freestyle events are usually "vert" ramps—a half-pipe with a vertical section at the top of the ramp. The tallest ramps may be up to 13 ft (4 m) tall, with a 3 ft (1 m) vert section







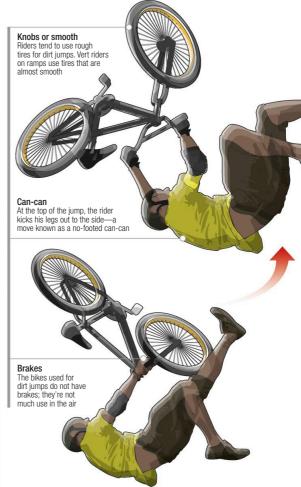






EVENT OVERVIEW

Developed in the US in the late 1960s, BMX (bicycle motocross) is a pedal-powered version of motocross. BMX may resemble adults racing on children's toys. However, the small, sturdy bikes allow not just rough-terrain racing on dirt tracks, but also freestyle events on flat terrain or over huge jumps, when riders perform awesome acrobatic tricks.



FLIPWHIP

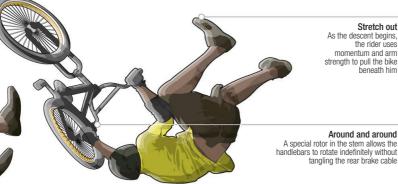
Riders pull some amazing tricks on dirt jumps. In the flipwhip, the rider flips the bike backward in the air while maintaining enough forward momentum to land and continue the routine.

NEED2KNOW

- → The Union Cycliste Internationale (UCI) is the international governing body for BMX events.
- → BMX pioneer Scot Breithaupt organized some of the first races in Long Beach, California, in 1970.
- → BMX racing was selected as an Olympic sport for the 2008 Summer Games in Beijing, China.

FREESTYLE ARENA

Freestyle events have five disciplines, based on where riders do their tricks: street, park, vert, trails, and flatland. Street riders improvise in the urban landscape—steps, rails, and slopes—while park riders use pipes and ramps in skate parks. In vert competitions, riders use a large half-pipe with vertical sides to perform jumps or do tricks on the lip of the pipe. Trails are a series of dirt jumps where riders perform tricks. Flatland is the purest form of freestyle: a bike, a rider, and a piece of flat ground with nothing to help—or hinder—him or her but imagination and skill.



Stretch out

the rider uses momentum and arm strength to pull the bike beneath him

Around and around

DIRT JUMPS

The dirt jump is a popular trails freestyle event where riders make a series of jumps over a mound of dirt. While airborne. the rider pulls a trick to impress the judges. The judges mark jumps according to the rider's style and the level of difficulty. At the end of the competition, the rider with the most points wins.

URBAN GAMES

Freestyle riders often see BMX as a way of life rather than a competitive sport, but many riders still take part in major international contests such as the BMX Freestyle Worlds, which were first held in 1986; the Metro Jams; the Backyard Jams; and the X-Games.



RACING RULES

In a typical track competition, eight riders race in a series of qualifying heats, called motos. The riders in each moto race against riders of a similar age and ability. In world competition, the elite or pro category consists of top-level riders aged 19 and over. Riders aged 17 and 18 compete in the junior category. After the elimination heats, the fastest four riders progress to the finals, called mains. The fastest rider in the mains wins the overall competition.

TURN A TRICK

Tricks are divided into four main styles: base, grind, aerial, and lip tricks. Base tricks are basic moves and include bunny hops; wheelies; and fakie, or riding backward. Riders use footpegs to perform grind and lip tricks on railings or the edge of a half-pipe. Aerial tricks on dirt jumps and vert ramps combine huge height with acrobatic twists and turns.

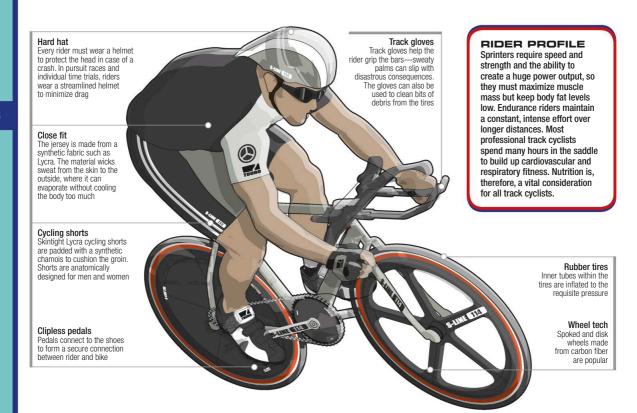
FLATLAND

Flatland riding is probably the most technically demanding of all the freestyle BMX sports. The rider here is "scuffing" the rear tire to keep the bike moving as he pulls a trick.



INSIDE STORY

BMX was developed in the 1960s by young Americans who wanted to use their bicycles to copy motorcycle riders. The sport rapidly caught on among the skateboard generation. Today, the sport is so popular that it has spawned an industry. Many riders earn a living from their bikes, and the best pros are international celebrities, earning huge sponsorship deals from bike manufacturers and clothing companies.



EVENT OVERVIEW

Track cycling comprises a number of different races that take place on a closed, banked circuit called a velodrome. The sport originated in Europe as winter training for road cyclists but soon became a spectator-friendly sport in its own right. Today, race formats vary from individual races against the clock to group events that end in breathtaking sprints off the final bend. Short-distance events are tests of sprinting ability, while endurance events take place over longer distances.

THE HARDEST RIDE

THE MOST COVETED PRIZE IN TRACK CYCLING IS THE HOUR RECORD, OF WHICH EDDY MERCKX SAID ON HIS RECORD-BREAKING ATTEMPT IN 1972, "THAT WAS THE HARDEST RIDE I HAVE EVER DONE." COMING FROM THE WINNER OF 11 GRAND TOURS AND 3 WORLD CHAMPIONSHIPS, THAT WAS REALLY SAYING SOMETHING!

NEED2KNOW

- There are 10 track events currently on the Olympic Games program. From the London 2012 Games onward, male and female riders each compete in five events.
- The UCI organizes a series of World Cup races and a one-off World Championships.











TRACK CYCLING

SIDELINES

147,000,000

Total cost in dollars to build the velodrome for the 2016 Rio Olympic Games.

42 The average steepest gradient, in degrees, of a typical track. The track is banked to allow racers to ride the 180° bends without slowing down.

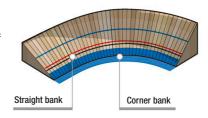
The number of gears on a track bicycle. Rather than start in an easy gear and change to harder gears, riders must start the race in a high gear, requiring a huge push to get the pedals turning.

359

A velodrome track is a banked oval circuit consisting of two straights connected by two 180° bends. The black pole line that runs around the track defines the length of circuit, which varies from 164–547 yd (150–500 m) and may be between 8–10 yd (7–9 m) in width, depending on the velodrome. Since January 2000, major events such as the Olympic Games and World Championship races have been held exclusively on 273 yd (250 m) tracks.

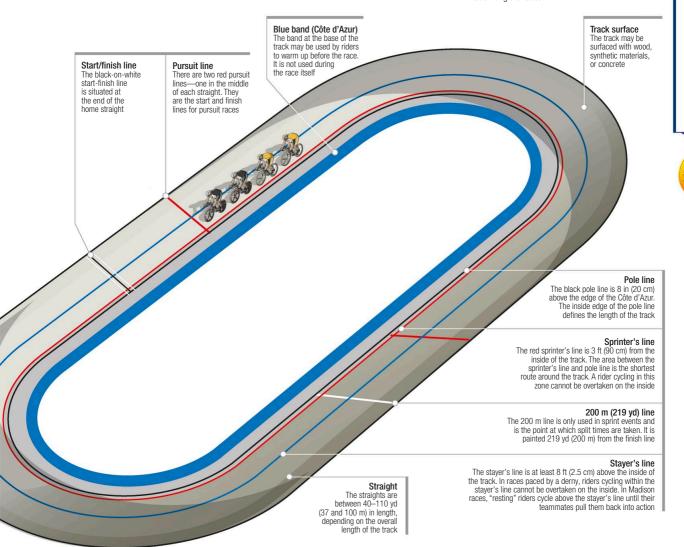
CYCLING SCIENCE

Track designers aim to build the banking of the track at precisely the right angle. Straight sections have a relatively gentle angle, but the angle must be sufficiently steep on the bends to allow riders to keep their bikes close to 90° to the track surface at speeds of up to 45 mph (70 kph). If there was no banking on the track, the riders would either be forced to deviate from the shortest path around the track or slow down dramatically.



BANKING ANGLES

The banking angle depends on the length of the track. On a standard Olympic 250 m track, the angle can be as steep as 45°, while on a 400 m track, it's around 22°. Even on the straights, the track slopes at an angle of about 12°.



INDOORS, OUTDOORS

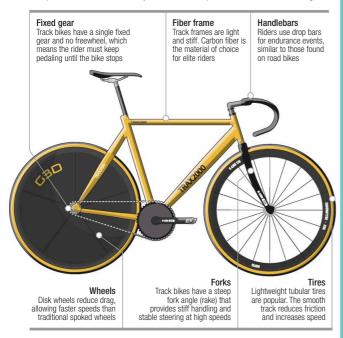
In the heyday of track cycling in the early 20th century, most velodromes were built as indoor arenas. Not only did an indoor track guard against bad weather and offer a smoother ride for the competitors, but they also made ideal venues for late-night revelers and socialites who would come and watch the six-day races in the early hours, when most pubs and bars were closed. More recently, specially built velodromes are more commonly built outdoors to reduce construction costs.

THE KEIRIN

Originating in Japan in 1948, the keirin is a sprint over 1½ miles (2 km). Up to eight riders cycle behind a moped called a derny. The derny paces the first few laps of the race. The riders then sprint to the finish line. In Japanese, Keirin means "fight," and the races often live up to the name, with high-speed crashes common.

TRACK BIKES

Two types of bike are used on the track: a pursuit bike for endurance events and time trials, and a standard bike (shown below) for shorter sprints and points races. At the highest level of competition, bike frames are made from ultra-light carbon fiber or titanium, with a single fixed gear and no brakes. However, aluminum and steel frames are a much cheaper alternative. The main difference between the two types of bike is in the aerodynamics. Pursuit bikes generally have a highly efficient—but less comfortable—aerodynamic position, while standard track bikes are strong and lightweight and more suitable for quick sprints. Pursuit bikes may have tri-bars to help keep the front of the body as small as possible to reduce drag.



TRACK EVENTS

There is a range of formats of track races. The races are either sprint events, ranging from 550 yd (500 m) to 1.25 miles (2 km), or endurance events, which can be up to 38 miles (60 km). The Olympic program has included different events over the years and was revised ahead of London 2012 to achieve gender parity, with men's and women's races in each of the following:

INDIVIDUAL SPRINT Also known as the "match" sprint, this race pits two riders against each other over three laps of the track. The rider who starts on the inside lane leads for the first lap. The individual sprint is a game of "cat-and-mouse" until the final 220 yd (200 m), when one rider breaks for the finish line to steal the victory.

TEAM SPRINT Two teams of three riders sprint over three laps. Each rider must lead for one complete lap.

TEAM PURSUIT Track cycling's blue-riband event, the team pursuit involves two teams of four riders racing each other over 2.5 miles (4 km), with the victorious quartet advancing to the next round.

KEIRIN A mass-start race where riders are paced by a "derny" moped up to a speed of 31 mph (50 kph), then left to race alone for two laps.

OMNIUM In cycling's equivalent of the heptathlon and decathlon, 24 riders contest six different events—three sprints and three endurance races—with the strongest overall rider taking the win. Events included are a 273 yd (250 m) "flying lap" time trial, a points race (18 miles/30 km for men, 12 miles/20 km for women), an elimination race, a pursuit race (2.5 miles/4 km for men, 1.8 miles/3 km for women), a scratch race (9.3 miles/15 km for men, 6.2 miles/10 km for women), and a time trial (1.093 vd/1 km for men, 546 vd/500 m for women).

FROM TRACK TO ROAD

CHRIS BOARDMAN IS PERHAPS THE MOST SUCCESSFUL CYCLIST TO MAKE THE TRANSITION FROM TRACK TO ROAD. HE STARTED HIS CYCLING CAREER AS A TIME-TRIAL SPECIALIST, WINNING A HOST OF BRITISH NATIONAL TRACK TITLES BY THE AGE OF 23, AND AN OLYMPIC GOLD IN 1992 FOR THE INDIVIDUAL PURSUIT. TURNING PROFESSIONAL IN 1993, BOARDMAN WENT ON TO WIN THE PROLOGUE STAGES OF THE EPIC TOUR DE FRANCE ROAD RACE IN 1994, 1997, AND 1998. HE RETIRED FROM THE SPORT IN 1999.

TRACK RULES

In international track meets such as the Olympics and World Championships, track cycling is governed by the rules of the Union Cycliste Internationale (UCI), which is the world governing body for all cycling sports. Domestic competitions are run according to the rules of the relevant national governing body.

OUT OF POSITION

In the early 1990s, Scottish cyclist Graeme Obree developed a unique riding position with his chest tucked low over the handlebar and his elbows up at his sides. He used this "crouch" or "tuck" position to break the nine-year-old World Hour Record in 1993 and to win the individual pursuit World Championships in the same year. When the UCl banned the position, Obree experimented with a new "superman" position, in which his arms were fully extended in front of his body; in 1995, he used it to win the individual pursuit World Championships. When English cyclist Chris Boardman set a new hour record in 1996 using the same superman position, the UCl banned the superman position from competitive track cycling.

WORLD HOUR RECORD

In addition to races, velodromes also stage many cycling world record attempts. The World Hour Record is one of the most coveted titles. The goal is simple—cycle as far as you can in one hour—but the rules governing the record are anything but. The problem lies with the rapid advances in bike technology. When the great Belgian cyclist Eddy Merckx set a new hour record 30.715 miles (49.431 km) in 1972, he did not have aerodynamic gear such as disk wheels and tri-bars. So the UCI now recognizes two hour records: the official "UCI Hour Record," which uses Merckx's bike as a standard, and an unofficial "Best Human Effort" record, which allows the use of the latest in bicycle technology.

SIDELINES

34.23 The distance, in miles (55.9 km), cycled by Belgian cyclist Victor Campenaerts when he broke the UCI Hour Record in 2019.

The distance, in inches (20 cm), a rider is legally allowed to roll back in a standstill before being disqualified from the individual sprint.

5,000 The capacity of the Olympic Velodrome in Rio, the venue for track cycling at the 2016 Games.

STAT CENTRAL

TRACK RECORDS

FASTEST MAN OVER 1,000 M (1,100 YD)

ARNAUD TOURNANT 58.875 SEC (2001)

FASTEST WOMAN OVER 500 M (550 YD) ANNA MEARES 33.010 SEC (2012)

GREATEST DISTANCE IN ONE HOUR

VICTOR CAMPENAERTS 55.9 KM

* UCI "BEST HUMAN EFFORT" RECORD

SLIPSTREAM

Drafting is an important element of most cycle races. When drafting, a rider sits a few inches behind the rear wheel of the leading racer. The leader does all the work to overcome the forces of drag, while the drafting rider saves up to 40 percent of his or her energy output by riding in the leader's slipstream. Sometimes, a group of cyclists will bunch together to form a "paceline." Each rider takes a turn at the front, towing the pack behind. The leader then drops off, and the rider behind takes a turn at the front, setting the pace. Riders who do not contribute get a free ride but are likely to receive stern words from the rest of the pack.



Standing start The rider powers out of the starting block from a standing start

TRACK TECHNIQUES

The time trial is the only track event where

block. Once the back wheel is fixed in the

the rider starts the race from a starting

starting block, a clock placed in front

of the rider counts down 50 seconds

block is then released, triggering the chronometer. A transponder on the bike

registers the time as the rider crosses

the finish line. The timings are accurate

before the start. At the end of the countdown, the brake on the starting

to one hundredth of a second.

TIMING THE

TIME TRIAL

Riders use a range of different techniques according to the event they are competing in. Individual efforts such as the time trial are exhibitions of strength, speed, and stamina, so there is little room for tactical game play. Other races are a battle of wits, with riders jostling for the best position.



HELPING HAND

One of the most remarkable sights at a Madison race is the changeover. While one member of the team of two riders is racing. the other team member catches their breath by cruising at the top of the track until it's time to race again. Then he or she rides back down onto the racing line, where the racing partner uses a handsling to propel the nonracing partner up to speed.



Up to speed

The derny paces the

to 28 mph (45 kph)

riders at speeds of up

laps of the keirin, has a flying start, so riders sprint to catch up with it. The derny steadily increases the speed, then withdraws, leaving the riders to fight it out over the last two laps.

STANDING STILL

The individual sprint, also called the match sprint, is a three-lap race between two riders. The rider on the inside—decided by the toss of a coin-must lead the race on the first lap. Taking the lead is seen as a disadvantage, because the trailing rider then has the chance of launching a surprise attack. When the final sprint starts, the trailing rider also has the advantage of riding in the opponent's slipstream. On the second lap, therefore. the leading rider will often slow to a complete stop, balancing on the bike in an attempt to force the opponent to the front. On the final lap, one of the riders will crack and sprint for the finish line. The individual sprint is decided on the best of three heats. The winner then progresses to the next round.



Finely balanced Riders balance over the bike and may gently rock back and forward

Pedal power The pedals are kept in a horizontal position, with the bars at a slight angle

INSIDE STORY

Track racing originated in response to the overwhelming popularity of the bicycle at the end of the 19th century. Track events brought the excitement of road racing to the confines of a closed circuit. It also became a popular method of training for road cyclists. The first documented track race took place in Saint-Cloud, France, in 1868, and velodromes soon cropped up all over Europe and the United States. Mirroring the great road races, some of the early track events were monumental challenges of endurance, including 24-hour races and the notorious Six Days, in which teams of two took turns racing over six days and six nights. Sprint events were also popular, and the individual sprint and track time trial featured in the first Olympic Games in Athens in 1896.

UNION CYCLISTE INTERNATIONALE (UCI)

Founded in 1900, the Union Cycliste Internationale (UCI) is the governing body for all cycling, from BMX to the track. The UCI organizes the Track Cycling World Cup Classics series and the annual Track Cycling World Championships and collaborates with the International Olympic Committee (IOC) on the Olympics. Each year, the UCI also publishes elite rider rankings for each event.

NEED=KNOW

- → Road racing is popular all over the world, but the most prestigious professional races take place in continental Europe.
- There are many different road racing formats, including multiday stage races, one-day Classics, time trials, and criterium races.
- The Union Cycliste Internationale (UCI) is the sport's international governing body.
- Elite riders compete in the UCI World Tour, a series of ranking races held around the world from January to October.

ROAD RACING



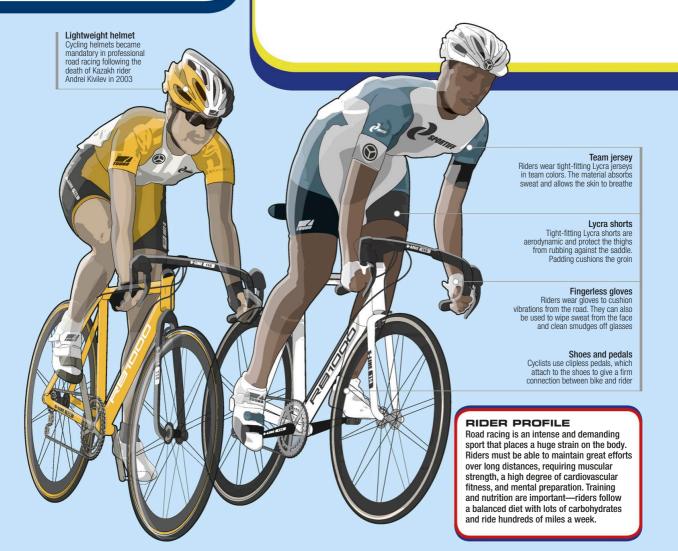






SPORT OVERVIEW

Road racing is one of the toughest of all sports. In the major stage races, such as the world-famous Tour de France, elite riders compete at the limits of physical endurance, covering thousands of miles in just a few weeks. A rider must be able to sit in the saddle for hours at a time, accelerate to speeds of 50 mph (80 kph) or more, and climb the steepest mountain slopes. But the strangest part of the sport is that most riders would sacrifice all of this effort to help a teammate win the race.



OPEN ROAD

A road race takes place on normal roads. With the exception of time trials, riders start together in a mass bunch. The race takes place over a set course, which varies in distance depending on the type of race. The goal is to cross the finish line first. Riders race in teams of eight to 10 cyclists, and team members cooperate to help their leader win the race.



The peloton is the name given to the main group of riders in the race. When there is an attack, the riders in the

Peloton

peloton organize the chase

Race director

The race director organizes the whole event and keeps track of the race from a car that follows the lead riders

TOUR CARAVAN

THE PUBLICITY CARAVAN ADDS A CARNIVAL ATMOSPHERE TO THE TOUR DE FRANCE, A PARADE OF SPONSOR VEHICLES TRAVELS THE SAME ROUTE AS THE TOUR, HANDING OUT FREE GIFTS TO SPECTATORS AS THEY WAIT FOR THE RACERS TO ARRIVE.



BIKE TECHNOLOGY

Form and fitness are the benchmarks of success in the ProTour, but riders also owe much to developments in bike technology. Carbon fiber and high-grade metals such as titanium are commonly used for the bike frame, reducing weight but retaining stiffness and strength. For the time trial, riders use certain bikes that offer greater aerodynamic advantage over conventional road bikes.

ROAD BIKE

Professional road racers use bikes that are built to be light and strong and comfortable enough to be ridden for hours on end. Quick-release attachments allow wheels to be swapped guickly in case of punctures.

COMMUNICATION

The directeur sportif radios orders to the team during the race. Riders strap a radio under their jersey and place an earpiece in one ear.

TIME-TRIAL BIKE

Breakaway

from the field. Cooperating

others to break away from the main peloton is the

hest method to gain time and win points

with a few like-minded

Used for individual and team time-trial races, time-trial bikes are built for out-and-out speed. Comfort is sacrificed for an aerodynamic riding position, while bigger gears are used to enable the rider to go faster.





STAT CENTRAL

TOUR DE FRANCE WINNERS		
WINS	WINNER (COUNTRY)	
5	JACQUES ANQUETIL (FRA)	
5	EDDY MERCKX (BEL)	
5	BERNARD HINAULT (FRA)	
5	MIGUEL INDURAIN (SPA)	
4	CHRIS FROOME (GBR)	
3	PHILIPPE THYS (BEL)	
3	LOUISON BOBET (FRA)	
3	GREG LEMOND (USA)	
3	ALBERTO CONTADOR (SPA)	
2	LAURENT FIGNON (FRA)	
2	BERNARD THÉVENET (FRA)	
2	FAUSTO COPPI (IT)	
2	GINO BARTALI (IT)	
2	SYLVERE MAES (BEL)	
2	ANTONIN MAGNE (FRA)	
2	LUCIEN PETIT-BRETON (FRA)	

UCI MEN'S WORLD CHAMPIONSHIPS YEAR WINNER (COUNTRY) ALEJANDRO VALVERDE (ESP) 2018 2017 PETER SAGAN (SVK) 2016 PETER SAGAN (SVK) 2015 PETER SAGAN (SVK) MICHAL KWIATKOWSKI (POL) 2014 2013 RUI COSTA (POR) 2012 PHILIPPE GILBERT (BEL) 2011 MARK CAVENDISH (GBR) 2010 THOR HUSHOVD (NOR) CADEL EVENS (ESP) 2009 2008 ALESSANDRO BALLAN (ITA) 2007 PAOLO BETTINI (ITA)

MEN'S OLYMPIC ROAD RACE		
·		
YEAR	WINNER/NATIONALITY	
2016	GREG VAN AVERMAET (BEL)	
2012	ALEXANDER VINOKOUROV (KAZ)	
2008	SAMUEL SANCHEZ (ESP)	
2004	PAOLO BETTINI (ITA)	
2000	JAN ULLRICH (GER)	
1996	PASCAL RICHARD (SUI)	
1992	FABIO CASARTELLI (ITA)	
1988	OLAF LUDWIG (GDR)	
1984	ALEXI GREWAL (USA)	
1980	SERGEY SUKHORUCHENKOV (URS)	
1976	BERNT JOHANSSON (SWE)	
1972	HENNIE KUIPER (NED)	

MEN'S OLYMPIC TIME TRIAL		
WINNER/NATIONALITY		
FABIAN CANCELLARA (SUI)		
BRADLEY WIGGINS (GBR)		
FABIAN CANCELLARA (SUI)		
	WINNER/NATIONALITY FABIAN CANCELLARA (SUI) BRADLEY WIGGINS (GBR)	

RACE FORMATS AND SERIES

There are several different race formats, ranging from three-week stage races to hour-long criteriums. The most prestigious elite races are grouped together in the UCI World Tour, including the Grand Tours, the spring Classics, as well as some smaller races. Riders and teams accumulate points in the series, and at the season's end, those with the most points take the win. The other major contests are the UCI World Championships, which take place annually, and the Olympics, contested every four years.

STAGE RACES

Stage races are the ultimate in cycling endurance. Each stage is either a day-long point-to-point race or a team or individual time trial. The rider who completes all the stages in the guickest time is the winner. The most prestigious three-week stage races—the Giro d'Italia, Tour de France, and Vuelta a España— are known as the Grand Tours.

CLASSICS

The Classics are one-day, one-time races held in the spring before the Grand Tours take place. They are usually long races, up to 170 miles (270 km) in length, and often feature grueling climbs or difficult surfaces, such as the cobblestones of Paris-Roubaix.

TIME TRIALS

There is no hiding in the bunch in this so-called "race of truth." In the individual time trial, competitors ride individually against the clock. Most stage races also include team time trials, in which the whole team races as a unit.



INDIVIDUAL TIME TRIAL

The individual time trial is a tough test of strength and endurance fought against the clock.

CRITERIUMS

A criterium, or crit, is a high-speed race held in a closed-off city center or on a specially built cycling circuits. The circuit is usually less than 3 miles (5 km), and the race is held over a set time (commonly one hour) or a set number of laps. In addition to the overall victory, riders can win cash prizes, called primes, for intermediate sprints.

THE TOUR DE FRANCE

The Tour de France is the original, toughest, and most prestigious cycling race on the planet. First raced in 1903, it consists of 21 day-long stages over flat, fast roads or vertigo-inducing mountain passes, circumnavigating the French nation and covering around 2,175 miles (3,500 km) in the process. The ultimate prize is the "maillot jaune"—the yellow jersey worn by the rider who completes all the stages in the shortest accumulated time.

FASHION STATEMENT

The leading rider in each category wears a colored jersey and defends it until the peloton finishes the Tour in Paris. The strongest riders go for the overall victory, climbers focus on the "king of the mountains," sprinters challenge for the points competition, and riders under 25 fight for the best young rider award.



YELLOW JERSEY

The maillot iaune is awarded to the highest placing rider in the general classification.



GREEN JERSEY

The green iersey goes to the rider with the most points in the sprint competition.



The polka dot iersev is awarded to the king of the mountains—the hest climber.



POLKA DOT JERSEY WHITE JERSEY

The white iersey goes to the highest placing young rider in the general classification

MEET THE TEAM

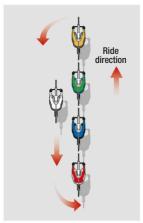
Most teams are organized around the leader, a dominant rider who has the best chance of winning the race. The priority for the other riders in the team is to support their leader. Within each team, there will be strong climbers and sprinters, time-trial specialists, and domestiques—the workers who guard against breakaways and supply the team with food and water during the race. Top-level teams also have a range of support personnel, including the directeur sportif, mechanics, doctors, and general assistants called soigneurs.

CONTROLLING TACTICS

Road racing is as tactical as it is physically demanding. In a typical race, one or a group of riders may launch a breakaway, in which they cooperate to escape from the peloton and gain as much time as possible. Cooperation in the peloton then plays an important part in determining the result of the race. Riders from some teams will organize a chase, while other teams may slow the pace deliberately to help a teammate in the breakaway gain ground.

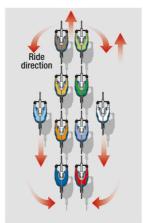
DRAFTING

Drafting is the most important way to save energy during a race. The rider at the front of a group uses up a lot of energy to overcome the forces of drag. By sitting on the back wheel of the leading bike, the drafting rider can save as much as 40 percent of the energy used to cycle at exactly the same speed. Cycling etiquette demands that each rider takes a turn at the front to share the workload, forming what is known as a paceline (see below).



SINGLE PACELINE

In a single paceline, all the cyclists ride in single file. One rider takes a turn at the front and then drops to the back. The next rider then moves up to take his or her place.

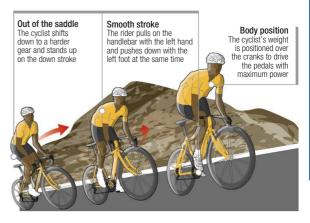


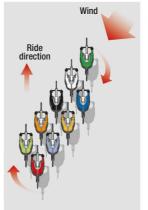
DOUBLE PACELINE

Most common in team time trials, double pacelines have two parallel lines of riders. Two riders take a turn at the front and then peel off. The riders behind move up to take their place.

HILL CLIMBING

Good climbing ability is crucial in multiday stage races, since inclines are the most likely point at which time may be lost or gained. How well a rider climbs depends largely on their power-to-weight ratio. A lighter rider does not need to generate as much power as a heavier rider because they carry less weight to go up the hill. For this reason, most of the top climbers are lean and light, whereas specialized sprinters are more muscular and tend to suffer on mountain stages. On long climbs. riders generally stay seated and maintain a high cadence (pedal rate) all the way up the hill. Climbing out of the saddle is reserved for short hills, steep gradients, or an attack to drop a weaker rider.





ECHELON

The echelon is a type of paceline used in strong crosswinds. Riders form diagonal lines across the road and peel away from the direction of the prevailing wind.

ARMSTRONG'S SHAME

CYCLING HAS A HISTORY OF DOPING SCANDALS. NONE BIGGER THAN THAT INVOLVING LANCE ARMSTRONG, A SEVEN-TIME WINNER OF THE TOUR DE FRANCE, IN 2012. THE UNITED STATES ANTI-DOPING AGENCY FOUND HIM GUILTY OF SUSTAINED AND SYSTEMATIC DOPING AND STRIPPED HIM OF ALL HIS TOUR DE FRANCE TITLES. IN 2013, AFTER YEARS OF DENIAL, ARMSTRONG CONFESSED TO DOPING IN AN INTERVIEW WITH OPRAH WINFREY.

SIDELINES

The record number of Tour de France stage wins, held by Eddy Merckx, the Belgian cyclist and all-around cycling legend.

38,155

The minimum wage (in dollars) for a pro cyclist. Top riders earn \$1 million or more.

123,900

The average number of calories burned by a typical racer during the three-week-long Tour de France.

The minimum permitted weight, in pounds (6.8 kg), of a professional road bike, according to UCI regulations.

INSIDE STORY

The history of road racing is almost as long as the history of the bicycle itself. The first road race took place in 1869, between Paris and Rouen in France. By the time the first Tour de France was held in 1903, road racing was already a men's Olympic sport, and its popularity had spread across Europe. Following on from the success of riders from the United States and Australia, road racing has reached out to a wider audience, but recent doping scandals have brought the sport into disrepute.

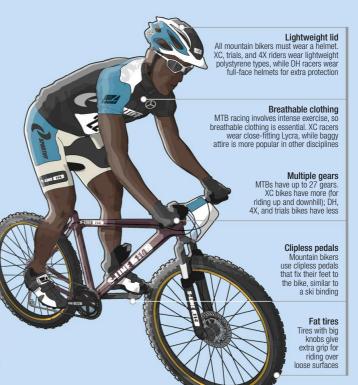
Founded in 1900, the Union Cycliste Internationale (UCI) is the international governing body for all cycling sports. The UCI is based in Aigle, Switzerland.

NEED2KNOW

- There are four main disciplines of competitive mountain biking: cross-country (XC), downhill (DH), four-cross (4X), and trials. Endurance racing, a long-distance form of cross-country racing, is also growing in popularity.
- Each discipline has an annual World Cup—a series of races held in locations around the world—and a one-off annual World Championship. Both are sanctioned by the UCI (Union Cycliste Internationale).
- XC racing has been an Olympic sport since 1996, but the other disciplines aren't included in the Olympics.
- The origin of the mountain bike (MTB) is hotly contested. with cyclists in several countries claiming it as their own. But most accept that the "clunker" bikes built by Californian cyclists in the late 1970s were the creative impetus behind the birth of the sport.

RIDER PROFILE

Each branch of mountain biking requires different physical attributes. XC racers need a high level of cardiovascular fitness and stamina to last the whole race; DH and 4X racers must have good upper- and lower-body strength for jumping the bike and delivering intense bursts of pedaling, and trials riders need perfect balance and impeccable bike-handling skills.



MOUNTAIN BIKING







SPORT OVERVIEW

Mountain biking is the most recent form of cycling to emerge. From its late-1970s origins to the experimentation of the 1980s and the first UCI-sanctioned World Championships in 1990, it has rocketed in popularity and became an Olympic sport in 1996. Although the sport has diversified. its essence is in pitting the rider's technical and physical skill against the trail.

HIGH-TECH GEAR

In its short lifetime, mountain biking has seen more technological quantum leaps than any other branch of cycling. From carbon fiber and titanium frames to hydraulic disc brakes and internal gearbox transmissions, the quest for lighter, faster bikes has fueled huge innovation. Nothing epitomizes this more than suspension—once dismissed as heavy and unnecessary, no bike is now complete without it.



SUSPENSION FORK

Front suspension allows the bike to be ridden faster over rough terrain.





CROSS-COUNTRY

Racing cross-country is arguably the most popular type of competitive grassroots mountain biking due to the lack of specialty equipment and skills compared to other disciplines. Riders race against each other over an undulating circuit for a fixed number of laps—first across the line takes the victory. A recent variant of XC racing is the mass-start endurance event, ranging from 6-, 12-, and 24-hour races; to nighttime "dusk-til-dawn" races; 25-, 50-, 75-, and 100-km "marathons"; and multiday multistage events.

SIDELINES

The best score for a trials rider, awarded for a "clean" round. Dabbing the ground with one or both feet or running out of time carries a penalty of 5 points—the worst possible score.

The vertical height gain, in feet (19,500 m), 63.980 of the TransAlp race-more than twice the height of Mount Everest. One of the toughest multiday mountainbike stage races, competitors race for eight days across the Alps.

The amount of suspension travel, in inches (254 mm), of a typical downhill full-suspension mountain bike.

DOWNHILL AND 4X

Downhill racing is the mountain-biking equivalent of downhill skiing—each rider races individually, against the clock, down a course that runs from the top to bottom of a hill, and the rider with the fastest time wins. Choice of tires and suspension can be crucial, as can the precise line taken over the course seconds can be won and lost by cutting corners or jumping obstacles. Four-cross is a DH variant with four riders racing against each other on a short, downhill course, with jumps, drops, and bermed corners thrown in to test the riders' skill.

TRIALS

Mountain bike trials is a form of competition that tests poise, nerve, and artistry. Riders compete in two classes, for bikes with 20" or 26" wheels, and negotiate a series of obstacles without touching the floor with their feet, using bunny hops, wheelies, stationary trackstands, and other balletic maneuvers. Riders are judged for skill, style. and invention, and penalized for dabbing their feet.

ARISE, SIR BART

THE FIRST MAN TO BECOME AN OLYMPIC MOUNTAIN-BIKING CHAMPION WAS BART **BRENTJENS AT THE** ATLANTA GAMES IN 1996. HE WENT TO THE GAMES A COMMONER, BUT SOON AFTER RETURNING TO HIS NATIVE HOLLAND WITH THE GOLD MEDAL, HE WAS REWARDED WITH A KNIGHTHOOD.

BUNNY HOPPING

One of the most fundamental techniques of mountain biking is the bunny hop. It can be used in any riding situation to jump over rocks, logs, or other obstacles, saving valuable time in a competitive race. It's also crucial for trials riding, as it allows the competitor to hop from one obstacle to the next.



COAST ALONG

Ride along at a steady speed, level your cranks, and stand up out of the saddle in a crouched position.



LIFT THE FRONT WHEEL

Push on the bars, then pull up sharply in one smooth movement and throw your weight to the rear of the bike.



TUCK THE BACK WHEEL

To clear the obstacle, lift the back wheel by tucking your feet up beneath you and toward the back of the bike.



TOUCH DOWN SMOOTHLY

Land with both wheels touching the ground at the same time. Absorb the impact with your elbows and knees.

CLIMBING HIGH

Cross-country mountain biking takes place on hilly, often mountainous terrain, so riders must be able to climb efficiently, as well as descend quickly. Although standing up while pedaling delivers short bursts of speed, the best method is to stay seated and pedal smoothly, conserving energy.

EFFICIENT ASCENDING



INSIDE STORY

Competitive mountain biking is governed by the UCI, which is based in Switzerland. It organizes the international World Cup and World Championships, while national series are organized by the relevant national body, which must be affiliated with the UCI.

SIDELINES

The number of seconds Gregory Duggento (Italy) took to skate 656 ft (200 m) at the World Speed Skating Championships in 2006, breaking the world record.

8.000 The number of participants who competed over 24.8 miles (40 km) in the 2007 World Inline Cup curtain raiser in Seoul, South Korea.

140.000 The approximate number of square feet in the world's biggest skate park, complete with bowls, banks, and rails, that was opened in Shanghai, China, in 2005.

The number of Americans in millions who participated in inline skating in 1999, at the height of the sport's popularity. By 2010, that number had fallen to an estimated 10 million.

OLLER SKATING









SPORT OVERVIEW

From its humble beginnings in the 19th century, roller skating has evolved into a remarkable number of disciplines. These include inline skating, speed skating, guad skating, aggressive skating, roller derbies, roller hockey, freestyle, and artistic skating. Roller skaters practice on city streets or on country roads on indoor or outdoor tracks or trails either recreationally or professionally in races and championships organized on a local, regional, or international level.



Inline roller skaters who want to compete with others as opposed to enjoying the leisurely recreational activities can enter into sprint races to test their speed or into marathons that explore the limits of their stamina and endurance.

Sharp angles

As they skate around a bend on a track, speed skaters will adopt sharper angles to maintain their momentum



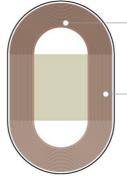
SPEED TRACKS

Speed skaters often race on indoor and outdoor tracks, with two straightaways of the same length and two symmetrical bends of the same diameter. The tracks can be level or have banked bends.

Speed skaters often wear special socks that are durable and comfortable but not bulky

NEED2KNOW

- Quad roller skates, invented by James Plimpton in 1863, had two sets of parallel wheels that enabled skaters to go backward, make turns, and move in a smooth curve.
- After Scott Olson founded Rollerblade Inc. and mass produced skates, the term "rollerblading" has been synonymous with inline skating.



Total length

The minimum length of a track is 410 ft (125 m) and the maximum length is 1,312 ft (400 m)

Streamlined helmet

Close-fitting strip

and shorts

Speed skaters reduce air

resistance by wearing a tight-fitting jersey

Sneed skaters wear streamlined helmets to reduce air resistance.

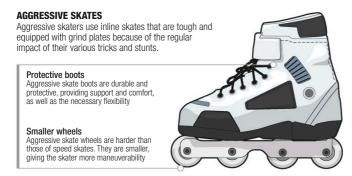
They also offer protection for the head in case of accidents

Track surface Any material can be

used for the track surface as long as it is smooth and not slippery

TYPES OF SKATES

Variations in the boot, frame, and wheels mean that skates are available in many types and can be made to suit the kind of roller skating and the conditions of the surface where they are used. Inline skates have aluminum frames that are usually fitted with a maximum of six wheels. Polyurethane wheels vary in diameter between 3.12 in (78 mm) and 4 in (100 mm). Skates can be fitted with a brake.



SPEED SKATES



WORLD SPEED RACING

The World Championships in inline speed skating are organized by the International Speed Skating Committee (known as Comité International de Course, or CIC). CIC is a technical body of the Fédération International de Roller Sports (FIRS). Inline speed-skating competitions, which are held for men and women in junior and senior categories, include sprints, time trials, elimination races, relays, and marathons. Team races include time trials, pursuits, and relays.

AGGRESSIVE INLINE SKATING

For years, the extreme sport of aggressive inline skating has been an underground culture with groups and communities existing and competing on a local and national level. It is popular in the US, Australia, Brazil, Japan, and various European countries, such as The Netherlands, Spain, and the UK. Inline skating events, such as vert, street, and downhill, used to happen at the X Games—a competition of action sports in the US that is held in winter and summer—but was eventually removed from the competition in 2005. In that year, about 50 aggressive skaters and promoters from nine countries set up the International Inline Stunt Association to develop the sport.

MASS STREETSKATING THROUGH THE CITY

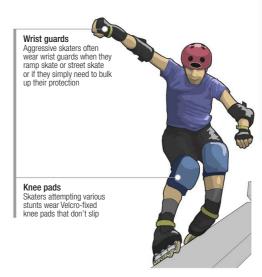
SKATERS IN CITIES REGULARLY MEET FOR MASS PARTICIPATION EVENTS THAT FOLLOW A COURSE THROUGH BUSY METROPOLITAN STREETS. IN THE LONDON STREETSKATE, WHICH BEGAN IN 2000, AS MANY AS A THOUSAND SKATERS ARE LED BY UP TO 50 TRAINED MARSHALS WHO KEEP THE TRAFFIC AT BAY. THE LARGEST STREET SKATE IN THE WORLD IS THE PARI ROLLER, WHICH STARTED IN 1994.

VERT, STREET, AND PARK

There are three kinds of aggressive inline skating. Vert usually involves aerial tricks done on a half-pipe. Street needs obstacles, such as curbs, rails, and steps. Park is performed in skate parks, often beside skateboarders and BMX bikers.

TRICKS AND STUNTS

A feature of aggressive skating, also called freestyle rollerblading, is the wide repertoire of tricks and stunts, many of which are dangerous. These include grinds, which are sliding maneuvers along the top of an obstacle such as a handrail or concrete ledge.



STANDING AND MOVING

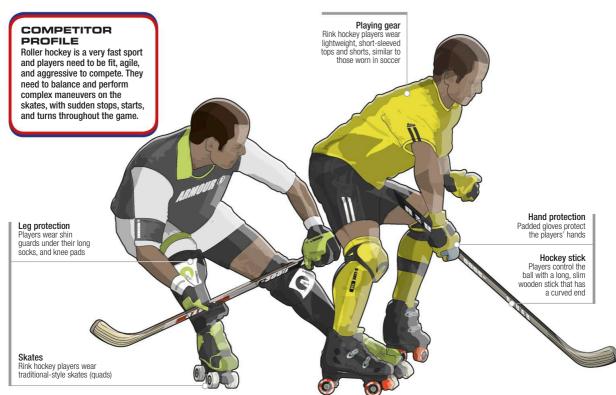
Individual inline skaters develop their own techniques, depending on what they are trying to do and how experienced they are. However, there are a few basic techniques that are universal. These include standing, stopping, turning, striding, and gliding. Many skates have a heel brake at the back, and some are equipped with a leash which is pulled by the skater. Learning to use the brake can help avoid accidents.

SKATING FASTER

Speed skaters in motion rarely have both feet on the ground at the same time. They do not twist or turn their shoulders but move their arms forward or backward to add to their momentum. They have mastered the art of using their legs independently. As they stride forward, they set each skate down in turn on a line that is central to their body and then push their feet out to the side, rather than pushing backward behind them. At the end of the stride, they flick their heel outward and begin the cycle again in a relaxed, effortless motion.

INSIDE STORY

Inline skaters from many teams compete for the annual World Inline Cup, which is organized under the auspices of Fédération International de Roller Sports (FIRS). Competitors accumulate points as they move from one location to another through the year. Whoever has the most points by the end of the year is the champion.



NEED2KNOW

- ⇒ British teams dominated the sport internationally until World War II, when Latin countries, such as Spain and Portugal, took over.
- Rink hockey has a huge following in Spain, Italy, Portugal, Argentina, and Brazil.
- → Inline hockey originated in the United States and gave ice hockey players a means of training during their off-season.

SIDELINES

60 The number of countries where roller hockey is played.

15,000

The number of spectators who watched the roller hockey final when it was a demonstration sport at the 1992 Olympics.

The number of times Spain has won the World Championships in rink hockey.

ROLLER HOCKEY







SPORT OVERVIEW

Roller hockey is a fast, exciting game played on skates. There are two types: rink hockey and inline hockey. They have similar tactics and principles—two teams compete to score goals by hitting a ball or puck into the opposing team's goal—but differences in rinks and equipment. Rink hockey is a popular professional sport in southern Europe while inline hockey is more common in North America.

INLINE HOCKEY EQUIPMENT

There are differences between inline and rink hockey equipment. Inline players wear helmets and skates with wheels in a line. They use longer sticks and a puck or a ball. Inline goalkeepers use a glove for catching rather than a flat glove for rebounding.

INLINE SKATES

Inline hockey skates have a metal chassis usually fitted with four wheels, but may have five. The wheels at the back may be larger than those in the front. Unlike normal inline skates there is no brake.

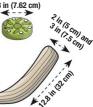
BAUER

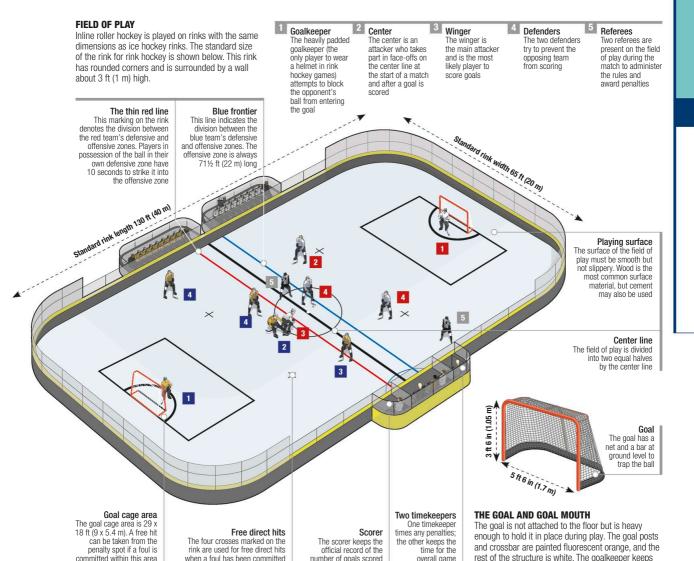


PUCK AND STICK

Players use a hard puck made of plastic or other material or a ball between 2.54 in (6.35 cm) and 2.8 in (7 cm) in diameter. The stick can be made of wood, aluminum, carbon composite, or graphite.

BAUER -





RINK HOCKEY

Rink hockey is played with two teams of five players (one goalkeeper and four skaters—a center, a winger, and two defenders). A team can have a maximum of 10 players, including a back-up goalkeeper, which means that substitutions are frequent. Rink games are played in two halves of 25 minutes each, with a 10-minute half-time break. Offside rules vary from country to country—for example, there is no offside in the US.

INLINE HOCKEY

Inline hockey also has five players per team on the field, with a maximum of 14 players on the team. Matches are played in two 20-minute halves with a five-minute half-time. In the event of a tie, overtime is played, followed by a shoot-out if the match is still undecided. Inline hockey has similar rules to ice hockey but has no offside, resulting in more free-flowing play. As with rink hockey, players can incur penalties for fouls such as intentional body-checking and physical contact.

ROAD HOCKEY

ROAD HOCKEY IS A VARIATION ON ROLLER HOCKEY THAT EVOLVED AS A GAME PLAYED ON THE STREETS OF THE UNITED STATES AND CANADA. ALSO KNOWN AS DEK HOCKEY AND BALL HOCKEY, IT STARTED AROUND 1970 AND HAS BEEN ORGANIZED INTO LEAGUES AND CHAMPIONSHIPS AND CAN BE PLAYED MORE FORMALLY ON INDOOR AND OUTDOOR RINKS.

INSIDE STORY

position in a semicircle with a radius of 5 ft (1.5 m).

The sport of roller hockey dates back to the 1870s and 1880s in Britain. By 1901, teams were playing throughout Europe. Inline roller hockey developed in the 1990s, following the invention of inline skates in the 1980s. The first World Inline Roller Hockey Championship for Men took place in Chicago in 2005, while the first such championship for women took place in Rochester, New York, in 2002. Inline roller hockey was introduced to the World Games in 2005.

FEDERATION INTERNATIONALE DE ROLLER SPORTS (FIRS)

FIRS is the governing body for both rink hockey and inline roller hockey (it also governs speed skating and artistic skating). The World Championship for rink hockey takes place every two years, and that for inline roller hockey annually.

SKATEBOARDING







EVENT OVERVIEW

Millions of people worldwide skateboard as a hobby or even as a means of transportation; an elite few also participate in skateboarding as a competitive sport. Individual athletes in skateboarding competitions are judged on their ingenuity and skill at performing inventive acrobatic tricks and flips or their balance and control at negotiating a field of obstacles. Skateboarding is a media-friendly and well-sponsored sport, and high-profile international competitions attract large audiences both at the venue and on television.

HALF-PIPES & RAILS

There are various types of skateboard competitions, each taking place on a different field of play. Perhaps the most spectacular is the half-pipe. This is a U-shaped trough with steeply sloping walls called verts (short for verticals). Skaters ride back and forth along the half-pipe, propelling themselves off the verts and performing tricks while airborne. Freestyle contests are also a showcase for tricks but take place on a flat surface. Street competitions test skaters' skills on features such as curbs and handrails. There are also slalom contests, in which skaters maneuver around courses set by cones.

NEED2KNOW

- Rudimentary skateboards were improvised in the 1940s and 1950s by fitting roller skate wheels to boards or taking the handlebars off scooters.
- Skateboarding surged in popularity in California in the 1950s and '60s. It had strong ties to surfing culture and was often called "street surfing" or "sidewalk surfing."
- Skateboarding as a sport really took off in the 1970s, when innovations in manufacture gave skaters more mobility and control, leading them to develop more daring and inventive acrobatic stunts.

SIDELINES

18,500,000 number of people who take part in skateboarding worldwide (according to a US report in 2002).

The number of gold medals Tony Hawk has won for vert skating at the X Games, one of the most high-profile competitions. Hawk is probably the world's best-known and most successful skater.

The first 1080° turn was performed by Tom Schaar in 1999, 720° and 540° turns are more common.

THE ZEPHYRS

THE Z-BOYS OF CALIFORNIA. MEMBERS OF THE LEGENDARY ZEPHYR TEAM OF THE 1970S, USED THE WALLS OF EMPTY SWIMMING POOLS TO PRACTICE THEIR TRICKS—AND INTRODUCED VERT SKATING TO THE WORLD.

GRAB 540 BACKSIDE TRICK

The trick illustrated here is the grab 540 backside. The skateboarder performs a 540° turn while airborne, with one hand holding onto the board and the other arm providing the impetus for the rotation. The board is released before the skater comes back into contact with the half-pipe.

Knee pad Knee pads consist of

a flexible foam part

that extends from

below the knee to

above it, with a tough

plastic part to protect the knee itself

Protective helmet

A crash helmet is

essential to prevent

injury. Most consist of a

rigid plastic exterior with

a padded interior to fit

closely to the skull

Vert lip

Some skateboarders perform tricks on the lip of the vert, such as grinds or one-handed handstands

Vert walls

The total height of the vert (short for vertical) section is usually 10-13 ft (3-4 m)

Half-pipe surface

The half-pipe is usually a wooden frame covered with a smooth surface of masonite (fiberboard)

COMPETITOR PROFILE

Skateboarders need a great sense of balance, perfect timing, coordination, and muscle control to perform the technically demanding tricks. They also need creative flair and imagination to come up with original tricks to impress contest judges. Skateboarders are often fairly lightly built rather than muscle-bound, which gives them greater mobility and control, particularly when airborne.



BOARDS & PROTECTION

Developments in competitive skateboarding have evolved as the technology has evolved. The introduction of polyurethane wheels in the early 1970s was a landmark that significantly improved the performance of skateboarders and helped popularize the sport. Apart from the skateboard, protective gear is essential equipment, as injuries are common. A helmet, knee pads and elbow pads, and shoes or sneakers with a good grip are all key items.

SKATEBOARD

Skateboards can be made from fiberglass or polypropylene but are most commonly wooden. Maple is the favored material, and boards are generally made of seven layers of veneer pressed together. Curved deck The deck is the board Decks have a rise at each end; the Axle housing front rise is the nose, and The trucks are attached to the deck the back rise is the tail and house the axle. They are 13–15 in (33–

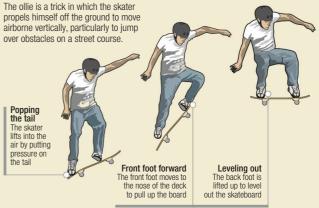
Small wheels

The polyurethane wheels are 2-21/2 in (5-6.5 cm) in diameter 38 cm) apart and 2-21/2 in (50-65 mm) in diameter

TRICKS OF THE TRADE

Street skateboarding techniques appear less spectacular than half-pipe tricks, because they take place on a flat plane, but still require supreme technical ability. The ollie (described below) and grind are core tricks. The grind involves ollieing onto a rail and sliding along it on the trucks of the skateboard.

THE OLLIE



INSIDE STORY

There is no international governing body for skateboarding, and there has been some resistance within the community to having a regulating body for a sport with such strong roots in nonconformist youth culture. However, competitions are vital to the sport. The first official contest was held in California in 1965, and the first European event took place in Germany in 1977. Today, the X Games are one of the most popular events.

X GAMES

The X Games are one of the most high-profile international contests featuring skateboarding along with other "extreme" sports, such as snowboarding. The Games began in 1995 and take place annually.

MOTOR SPORTS



NEED2KNOW

- Each Grand Prix is watched by enormous crowds of enthusiastic spectators and by hundreds of millions of television viewers in nearly every country in the world.
- Formula One was established in 1946, and the first race was in 1947. The first Formula One World Championship was held in 1950.
- The Fédération Internationale de l'Automobile (FIA) is the governing body of Formula One racing.

DRIVER PROFILE

Drivers need to be physically fit and mentally tough to cope with the rigors of competing at high speed in hot, cramped, noisy, and extremely dangerous conditions. Together with supreme driving skills, great courage, and rapid reflexes, drivers need to work closely with their teams and quickly adapt their tactics to the circumstances of a race.

Gripping tires Precision molding of tires increases grip and improves cornering speeds

Rear wing
The aerodynamic
effect of a rear
wing increases the
downward force on
the car

SPORT OVERVIEW

The pinnacle of the motor sport calendar, Formula One is an annual series of thrilling, high-speed Grand Prix races held on circuits around the world. Car constructors and drivers conform to a strictly enforced set of regulations—a formula of specifications that is continually adapted to the changing needs of safety and fairness—as they compete for the technological edge that sees them triumph over their rivals. The drivers and constructors who accumulate the most points throughout the season are crowned Formula One World Champions.

DRIVER SAFETY

Racing regulations make driver safety a top priority. The safety cell, seatbelts, and carbon fiber chassis and body protect drivers from injury in the event of an accident. Drivers have to wear suits and other gear made out of Nomex, a remarkable flameresistant fabric that withstands hydrocarbon fires.

THE FORMULA ONE CAR

The product of brilliant engineering design and cutting-edge technology, Formula One cars rely on a finely tuned balance of aerodynamics, electronics, tires, and suspension.

HANS collar

Reduces load on head and neck and protects them from injury

Under the suit

beneath the suit

provides more

Underwear

fireproof

protection

Air intake

The engine's air intake is just above the driver's head

Safety cell

Built into the chassis, the safety cell contains the cockpit with the fuel tank behind and a protective structure in front

Braking system

Carbon fiber disc brakes enable the driver to stop a car traveling at 70 mph (110 kph) within 60 ft (18 m). Cars are fitted with a failsafe back-up braking system

BOW TIE

FLAMBOYANT BRITISH DRIVER MIKE HAWTHORN, WHO BECAME FORMULA ONE CHAMPION IN 1958, OFTEN COMPETED IN RACES WEARING A BOW TIE TO GO WITH HIS DISTINCTIVE SMILE.

Driving glovesFireproof gloves are thin to give the driver the feel of the wheel

Crash helmet Helmets and visors can withstand an object traveling at 300 mph (480 kph)

Shoulders

Handles on the shoulders enable the driver to be lifted free

Racing boots

Fireproof shoes have a good grip and are thin to give the best control of the pedals



Front suspension
The front suspension supports the front of the car and determines how

the tires contact the road









SIDELINES

The number of seconds it takes a car to accelerate from a standing start to 100 mph (160 kph) and then decelerate to 0 again. A Formula One car traveling at 186 mph (300 kph) can come to a complete stop in less than 3.5 seconds.

The age of the youngest driver-Sebastien Vettel-ever to win the Formula One World Championship. He won it in 2010. his third full Formula One season.

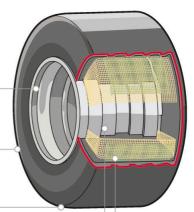
200 The speed, in mph (320 kph), which Formula One cars can reach on a straight track.

The number of Grand Prix races in Formula One's 2019 season. 12 of which-including China, Australia, Japan, Brazil, and Bahrain-were outside Europe.

The record number of times Michael Schumacher has been Formula One World Champion. Statistically, he is the greatest driver the world has ever seen.

POINTS OF CONTACT

Formula One cars are fitted with tires that maximize the points of contact with the track surface while withstanding massive downforce loads. Hard tires are more durable and longer lasting than soft tires, which give more grip. Tires work best at certain temperatures and are designed to last for one race at the most. Restrictions tend to be reviewed regularly and may change from year to year. Treadless, or slick, tires were previously the best for dry conditions, but they have been replaced by tires with grooves. For the 2007 season, the teams had to use a hard and a soft compound during each race.



INTERACTIVE STEERING WHEEL

Inside the cockpit, the interactive steering wheel provides the driver with various details about the car's performance, as well as the ability to fine-tune and control a number of settings and the means to communicate via radio with his team in the pits.

Light sequence

A sequence of lights helps the driver time a gear change to perfection

Left button bank

received from the pits

Main display

Information about gears, temperatures, and brakes appear on a large screen. At the bottom of the screen, the FIA can show the driver the color of a flag (such as yellow, red, or black), which trackside marshals might be waving



Right button bank

The buttons on the right side of the wheel include the pit lane speed limiter LIM) and the radio (RAD), which connects the driver with engineers on the pit wall

Gear change/clutch Drivers can change gear

easily by flicking a paddle behind the steering wheel with their fingers. There are usually eight gears (seven forward and

Traction control

This alters the traction control settings during the race, depending on the grip level required and the changing track conditions

Wheel dimensions

The maximum diameter of wheels with wet tires fitted is 261/2 in (66 cm) and 26% in (67 cm)

Tire dimensions

The maximum width of front tires is 141/4 in (35.5 cm) and of rear tires is 151/4 in (38 cm)

Contact surface The outer surface of the tire is made of a rubber compound

Bracing plies In the middle layer, bracing plies are embedded in rubber

High-tech mesh The inner layer is a high-tech mesh of polyester and nylon

CHOOSING TIRES

Some of the most important decisions a Formula One team must make are focused around knowing which tires to choose and when is the best time to change them. At the start of a race weekend, teams have a supply of ready-to-go sets of tires: seven sets of dry weather tires, four sets of intermediates, and three sets of full wet (monsoon) tires.



Dry-weather tires

These are "slicks," meaning that they have no tread at all. There are two kinds of dry-weather tire: soft rubber and hard rubber.



Wet-weather tires

For wet conditions, teams keep tires with a tread at the at the ready. They keep a close eye on the forecast in case rain is on its way



Extreme-weather tires Tires for very wet conditions have a deep tread, which

improves grip by clearing water from the tire where it meets the track.

STICKS LIKE GLUE

The buttons on the left side of the wheel

the ACK button, which the driver presses

when he is unable to talk but wants to

acknowledge a radio message he has

include the neutral setting (N) for the gearbox, the calibration (CAL) of the clutch, a menu display on the screen, and

Designers of Formula One racing cars aim to create a light car that increases mechanical grip and "sticks like glue" to the track. This is achieved by minimizing wind resistance and aerodynamic drag and maximizing the downward force on the car. Over the years, design innovations included the upswept tail, small wings either side of the nose, flexible skirts, and rear wings. In the 1980s, the whole car became like a wing, creating a "ground effect" that increased speeds dramatically but made cornering dangerous, so it was banned. Almost every surface on a modern Formula One car is designed to produce downforce.

Front aerofoils

Aerofoils at the front of the car create downforce on the front tires and aerodynamically channel the air flow to the rest of the car

Barge boards

On the side of the car, barge boards shape air flow and reduce turbulence

Shaped helmets

Aerodynamically shaped helmets can improve the air flow into the air intake above the driver's head

Rear wing

The downward force from the adjustable vanes on the rear wing increases the grip between the rear tires and track



RACE WEEKEND

Each of the season's Grand Prix races takes place over a weekend. On Friday (Thursday in Monaco), drivers have two free practice sessions. On Saturday, they have another practice, then qualifying sessions to determine where they start Sunday's race. The rules stipulate that there must be a minimum of 20 cars and a maximum of 24 cars in a race.

FREE PRACTICE

The goal of the practice sessions is to give teams experience of the particular circuit. Drivers become familiar with the track's idiosyncrasies, while engineers and directors make critical tire and fuel decisions, and adjust the settings of their cars and adapt them to the local conditions.

QUALIFYING FOR THE RACE

In three 15-minute qualifying sessions, the drivers compete against the clock to complete the fastest lap and establish the order of the starting line-up for Sunday's race. All the drivers race against each other in the first session—the slowest (usually six) occupy the last places on the grid and take no further part in qualifying. In the second session, the slowest (usually six) go on to occupy the next places (usually 11 to 16) on the grid. In the third session, the remaining drivers compete for the top places on the grid, with the fastest taking pole position.

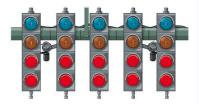
The 2018 season saw 21 races around the world. The illustration below provides an aerial view of the Istanbul circuit in Turkey and highlights some of the more important aspects of the racetrack.

THE RACE BEGINS

Drivers and cars must be on the grid 15 minutes before the start of the parade lap. During this time, refueling is finished, tires are put on the cars, engines are running, and the track is cleared. Two green lights signal the start of the parade lap, which ends with drivers taking up their allotted grid positions. The countdown to the race begins.

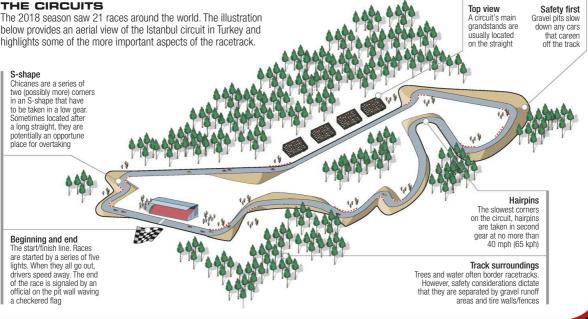
GO! GO! GO!

At one-second intervals, red lights come on from left to right and one at a time. After a few seconds, all five go out simultaneously-and the sprint to the first corner begins.



SCORING

Drivers are awarded points if they finish a Grand Prix race in the top 10 positions. The winner in first place receives 25 points, the runner-up in second place receives 18 points, third place gets 15 points, fourth place 12 points, through to tenth place with one point. Constructors that have two drivers in a race are awarded their points according to how many their drivers score together. A team that comes first and second is awarded 43 points, for example. A point is also awarded to the driver who records the fastest lap during the race.



SIGNAL FLAGS

Marshals are stationed at various points around a track, ready to wave flags to attract the drivers' attention. Flags are colored differently according to the particular signal they are sending, such as danger on the track ahead, an interruption to the race, or all clear.



LET CAR PASS

Blue warns of a faster car behind: driver to let the car pass



TECHNICAL PROBLEM

Black with orange circle and car number warns a driver to return to his pit.



DANGER ON TRACK

Single vellow means danger; drivers slow down and don't overtake.

WARNING

Black and white with

car number warns of

unsportsmanlike behavior.



Yellow with red stripes means a slippery track surface ahead



SLOW CAR

White warns of a slowmoving vehicle on the track; drivers slow down.



ALL CLEAR

Green means all clear and yellow flag warnings have been lifted



DISQUALIFICATION

Black with car number orders a driver to his pit; possible disqualification.



RACE INTERRUPTED

Red means the race, practice, or qualifying session is stopped.



RACE OVER

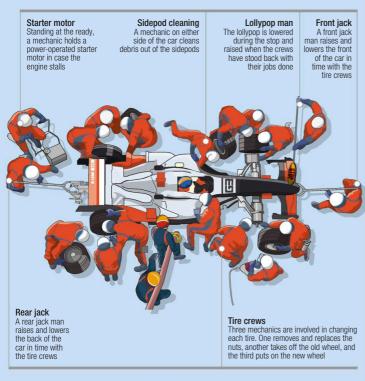
Checkered means the race has ended; shown first to the winner

TEAMWORK

Many people contribute their services and expertise to the smooth running of a Formula One team. The drivers may become the most visible member, but everybody—from senior managers, designers, and engineers to test drivers, logistical support, and pit crew—is crucial to the team's success.

PIT CREW

When a driver brings his car into the pits for a pit stop, a large team of helmeted mechanics swarms around him in a carefully synchronized flurry of activity. Every split second counts. Each mechanic knows exactly what to do, jacking up the front or changing a tire.



THE PIT LANE

The pit lane separates the pit wall from the team garages and is divided into two lanes—the fast lane nearest the pit wall and the inner lane beside the garages. The pit crew emerges from the garages when one of their cars arrives on the inner lane during a pit stop. Teams install their control centers beside the pit wall. These centers become the hub of the team's activity during the race—directors, engineers, and others discuss tactics and strategy, refer to computers, watch monitors and screens, and use the communications equipment that keeps the team in touch with a driver and with analysts back at headquarters.



PIT BOARD

The pit board tells a driver his race position, laps completed, and the time between him and the car in front and the car behind.



TIMING WALL

Each Formula One team is equipped with a timing wall in the pits where computers analyze the performance of their cars. The team monitors lap times, telemetry, and television feeds on a bank of screens. Between test laps, drivers can watch displays of their laps. The brightness of the screen images is unaffected by strong sunlight or the smoky atmosphere of the garages and pit lane.

STAT CENTRAL

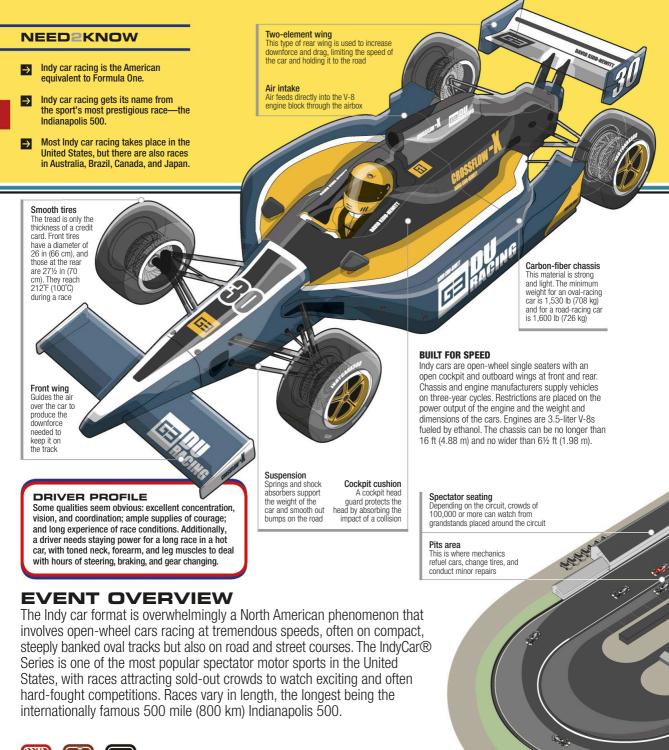
DRIVERS CHAMPIONSHIP		
YEAR	NAME	COUNTRY
2018	LEWIS HAMILTON	(GBR)
2017	LEWIS HAMILTON	(GBR)
2016	NICO ROSBERG	(GER)
2015	LEWIS HAMILTON	(GBR)
2014	LEWIS HAMILTON	(GBR)
2013	SEBASTIAN VETTEL	(GER)
2012	SEBASTIAN VETTEL	(GER)
2011	SEBASTIAN VETTEL	(GER)
2010	SEBASTIAN VETTEL	(GER)
2009	JENSON BUTTON	(GBR)
2008	LEWIS HAMILTON	(GBR)

CONSTRUCTORS CHAMPIONSHIP			
YEAR	NAME	POINTS	
2018	MERCEDES	655	
2017	MERCEDES	668	
2016	MERCEDES	765	
2015	MERCEDES	703	
2014	MERCEDES	701	
2013	RED BULL	596	
2012	RED BULL	460	
2011	RED BULL	650	
2010	RED BULL	498	
2009	BRAWN	172	
2008	FERRARI	172	

ALL-TIME RACE WINS			
WINS	NAME	COUNTRY	
91	MICHAEL SCHUMACHER	(GER)	
81	LEWIS HAMILTON	(GBR)	
52	SEBASTIAN VETTEL	(GER)	
51	ALAIN PROST	(FRA)	
41	AYRTON SENNA	(GBR)	
32	FERNANDO ALONSO	(ESP)	
31	NIGEL MANSEL	(GBR)	
27	JACKIE STEWART	(GBR)	
25	JIM CLARK	(GBR)	
25	NIKI LAUDA	(AUT)	

INSIDE STORY

Retired Formula One drivers started competing against each other in 2005 in a series of races called the Grand Prix Masters. Driving identical openwheel vehicles based on the 1999 Reynard Champ cars and powered by 3.5-liter V-8 engines, all entrants must be medically fit, more than 45 years of age, and veterans of two or more Formula One seasons. Nigel Mansell won the inaugural event at Kyalami, South Africa.





INDY CAR RACING

RACE CIRCUITS

Indy car races are contested on three main types of race track: ovals (speedways), longer superovals (superspeedways), and street circuits. Drivers may cover up to 500 miles (800 km) in the longest races. The most famous of all the Indy car circuits is the Indianapolis Motor Speedway, where drivers battle it out over 200 laps of the 2½ miles (4 km) superoval to become the Indy 500 champion. The streets of St. Petersburg, Florida, provide an urban circuit for another leg of the IndyCar Series calendar. This series has also featured a race in Japan—at the Twin Ring Motegi, which includes both an oval speedway and a road course.

SIDELINES

257,325 The capacity of the stadium at Indianapolis Motor Speedway, the home of the Indianapolis 500.

The number of horsepower generated by the 3.5-liter, ethanol-powered engine of an Indy car.

5,000 The number of pounds of downforce produced by an Indy car traveling at 220 mph (350 kph).

POLE POSITION

Turn two

Drivers slow only marginally as they negotiate this banked corner.

Steel and foam energy reduction

(SAFER) barriers cushion the

impact of cars during crashes

During qualification, drivers race against the clock to earn a spot on the starting grid. The rules for qualification vary from race to race. For oval races, drivers complete up to three qualification laps. The driver who records the fastest lap takes pole, the next fastest takes second spot, and so on until the starting grid is full. After a couple of warm-up laps, the race has a rolling start behind a pace car. For road races, the six fastest drivers in the qualification laps race head to head to determine the first three rows on the starting grid.

Turn three Pit lane entrance The sweeping turns are Drivers leave the track here to make a pit stop angled at 18°, allowing drivers to corner at maximum speed In-track area Within the track are viewing areas, campsites, and parking Home straight Cars accelerate to 230 mph (370 kph) on some circuits. The straight is often banked, but not as much as the turns Start and finish Oval races have a rolling start Service area Service vehicles for the huge crowds use this area. Some spectators view from motorcoaches parked here **RACING AN OVAL**

Many Indy car races are held on banked ovals. One of the regulars on the IRL schedule is Michigan International Speedway in Brooklyn, Michigan.

This 2 mile (3.2 km), D-shaped oval has turns

and 5° banking on the back straight. On some

(320 kph), with faster top speeds on straights.

with 18° banks, a front straight cambered at 12°,

circuits, drivers' speeds never fall below 200 mph

INDY CAR VERSUS FORMULA ONE

There are a number of differences between Indy car racing and Formula One racing. Indy Car races are usually held on oval circuits and begin in a flying start with the cars in position but on the move. Formula One races are held on nonoval circuits and begin from a standing start with all the cars in position on a formal grid. Indy cars are heavier but faster on the straights than Formula One racers, but the latter are more agile and accelerate more quickly. Indy cars can use slick tires that are flat and without grooves, whereas Formula One dry-weather tires must have grooves. Traction control and semiautomatic gearboxes are permitted in Formula One cars but not in Indy cars, which have engines limited to 10,300 rpm. Indy cars have been fueled with methanol or a mixture of methanol and ethanol, but in 2007 switched to 100 percent ethanol. Formula One cars are fueled with unleaded racing gasoline.

STAT CENTRAL

DRIVER WITH MOST IRL VICTORIES			
WINS	DRIVER (COUNTRY)		
45	SCOTT DIXON (NZL)		
33	WILL POWER (AUS)		
24	HELIO CASTRONEVES (BRA)		
21	DARIO FRANCHITTI (GBR)		
19	SAM HORNISH JR. (USA)		
16	DAN WHELDON (GBR)		
16	TONY KANAAN (BRA)		
13	SIMON PAGENAUD (FRA)		
13	JOSEF NEWGARDEN (USA)		
9	SCOTT SHARP (USA)		

INSIDE STORY

Indy car racing has its origins at the Indianapolis Motor Speedway course. For many years, Championship Auto Racing Teams (CART) ran Indy car racing, but after an acrimonious split in 1994, the "Indy" name was taken by the Indy Racing League. CART now runs the Champ Car World Series, an Indy format similar to F1.

GOVERNING BODY

The Indy Racing League (IRL) is the North American organization that sanctions the IndyCar Series. It also runs the developmental Indy Pro Series.









NEED2KNOW

- Televised GP2 races take place in Bahrain; Malaysia; and European countries such as Spain, Italy, France, Hungary, Germany, Beloium. Monaco. and the UK.
- GP2 cars can reach speeds of 200 mph (320 kph). They can travel from 0-62.5 mph (100 kph) in 2.95 seconds and from 0-123 mph (200 kph) in 6.70 seconds.

SPORT OVERVIEW

Introduced to the motor sports calendar in 2005, the GP2 Series—often abbreviated to GP2—is a new form of motor racing that replaces Formula 3000 as a means of preparing drivers and their teams for life in the fast lane of Formula One. The GP2 championship is an annual series of races that accompany Formula One races in certain countries. To ensure the best driver prevails in the series, each participating team shares the same engine, chassis, gearbox, and tires.

HANS device

Every driver wears a HANS device to protect and support the head and neck

DRIVER PROFILE

The young competitors who participate in GP2 races need driving skills and talent above all else because the car they drive has no additional technological advantages to help them with handling.



WEEKEND FORMAT

Drivers compete in races that take place in 11 locations. There are two races on each weekend of the series—these follow the same pattern (except at Monaco, which has no Sunday race). Drivers practice and then qualify for their grid position on the Friday, race for 112 miles (180 km) on Saturday, and then for 75 miles (120 km) on Sunday. The top eight results on Saturday determine the order of Sunday's grid in reverse order—eighth takes pole position and the winner starts in eighth place. In Saturday's race, there is one mandatory pit stop where teams must change at least two tires.

POINT SCORING

In the Saturday race, 2 points are awarded for achieving pole position and then 10 points to the winner, with 8, 6, 5, 4, 3, 2, and 1 point going to the following seven finishers. In the Sunday race, the winner receives 6 points, with 5, 4, 3, 2, and 1 point going to the next 5 finishers. In each race, 1 point is awarded for the fastest lap. When Lewis Hamilton won the series in 2006, he amassed 113 points—12 ahead of Nelson Piquet Jr.

SERIES WINNERS

GERMAN DRIVER NICO ROSBERG WAS THE CHAMPION IN THE INAUGURAL GP2 SERIES IN 2005, AND BRITISH DRIVER LEWIS HAMILTON WON IN 2006. BOTH GRADUATED TO FORMULA ONE AND WENT ON TO BECOME WORLD CHAMPIONS.

INSIDE STORY

Five essential values help shape GP2 racing and the regulations that govern it. These are high performance of the GP2 car, control of competition costs, driver safety, training of every team member, and, finally, putting on an entertaining and exciting show. Controlling costs became vital with the demise of Formula 3000, which became too expensive for teams to enter. The GP2 series is the first motor sport with a fully integrated strategy—for example, centralized purchasing enables teams to buy cheaper parts.

The Deutsche Tourenwagon Masters (DTM) is hugely popular in Germany and features a top-class international grid driving works-backed touring cars with V8 engines generating a maximum of 470 hp. The cars share standardized tires, brakes, transmissions, dimensions, and aerodynamics.

DRIVERLESS CAR

SEAT UNVEILED THE WORLD'S FIRST DRIVERLESS TOURING CAR IN 2007. DRIVEN BY REMOTE CONTROL FROM THE PITS, THE CAR CAN PRODUCE CONSISTENTLY FAST LAPS WHILE ELIMINATING HUMAN ERROR.

BRITISH TOURING CAR CHAMPIONSHIP

Since its inauguration in 1958, the British Touring Car Championship (BTCC) has been attracting large crowds eager to watch their favorite production models speed around race tracks with top drivers at the wheel. Manufacturers were equally eager to showcase their new models, especially with regular television coverage bringing the championship to millions of viewers. Teams using 2-liter saloon cars compete in three races at each of nine tracks in the UK and the Republic of Ireland. In 2007, the touring cars were required to conform to the FIA's Super 2000 regulations as a step toward harmonizing the technical specifications across the sport.

SPORT OVERVIEW

Touring cars are essentially four-door saloon cars or two-door coupés that have been thoroughly modified for competitive racing on road courses and street circuits. The touring cars are different from sports cars, which are often purpose-built. Various types of touring cars compete in a number of major championships and series around the world, especially in Britain, Germany, and Australia.

INSIDE STORY

In 2005, the Fédération
Internationale de l'Automobile
(FIA) replaced the European
Touring Car Championship
with the World Touring Car
Championship. Drivers compete
on 12 tracks in various countries
such as Brazil, Italy, and Russia.
The races are usually for Super
2000, Diesel 2000, and Super
Production cars.

NEED2KNOW

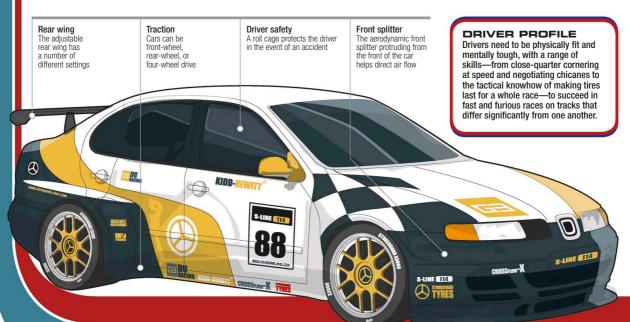
- Some touring car races last for 24 hours and are tests of endurance for crew and driver.
- Drivers coming to touring car racing from Formula One include Mika Häkkinen and Jean Alesi. Drivers who raced in touring cars and graduated to Formula One include Michael Schumacher and Alexander Wurz.

TOURING CAR RACING









NEED2KNOW

- → Drag racing originated in the United States and is still most popular in North America. It also has a big following in many European countries, Brazil, Mexico, Canada, South Africa, and Australia.
- Worldwide, there are more than 300 drag strips.
- The annual US Nationals six-day event organized by the National Hot Rod Association (NHRA) at Indianapolis attracts more than 100,000 spectators and is the richest drag racing competition in the world.

DRAG RACING







EVENT OVERVIEW

Drag racing is about speed, pure and simple. It is the fastest land-based sport. The competition is simple: two motor vehicles race along a relatively short, straight, and level track, and the first to cross the finish line is the winner. Vehicles are classified according to various criteria, including vehicle type, engine size, wheelbase, frame type, and the use or absence of power-enhancing fuels such as nitrous oxide.

Rear wings
Carbon fiber wings exert a massive
downward pressure on the dragster
and keep it from taking off when
the engines fire up

Supercharger
This rams air into

the engine at a

staggering rate to

keep the fuel burning

COMPETITOR PROFILE

Total lack of fear is the number-one requirement. The ability to focus completely is also crucial, since a fraction of a second's delay when the starting lights change will probably mean the difference between winning and losing. Drag racers also have to have the mental strength to psych out their opponents and resist these tactics from their rivals.

Front wings The canard wings help keep the dragster on the track when it is moving Low clearance
The front of the
car must be at
least 3 in (8 cm)
off the ground

TOP FUEL DRAGSTER

Rear tires These are massive: 18 in (46 cm) wide and 37.5 in (95 cm) in diameter

Parachutes

after a race

Twin chutes are

dragster to a halt

needed to bring the

No car in the world can accelerate faster than a top fuel dragster. They are often powered by 426 Chrysler Hemi engines, which have hemispherical combustion chambers with large valves and a more central spark plug to improve ignition and performance and generate 8,000 horsepower. Top fuel dragsters need special fuel, enormous tires, and wings to keep them firmly on the ground.

GLOVE

The gloves offer all-around, fire-resistant protection for the hands and wrists.

LAYERED HELMET

The helmet has three layers to protect the head from trauma and fire: an outer shell, a foam liner, and an inner fire-resistant layer. To help counter the massive G forces, a 360° neck collar provides vital support for the head.



Wrist protection
The glove extends
well up the arm

Foam liner
A thick layer of foam helps absorb any impact to the helmet

Outer shell
Provides trauma protection

SIDELINES

nitromethane per minute

Powerhouse

The fuel pump supplies the powerful engine with 50 gals (227 liters) of

3.58 The time in seconds it took Sammy Miller to complete the Santa Pod strip in England in 1984, when he broke the world record in his car Vanishing Point. His average speed over the ¼ mile (400 m) course was 386.26 mph (621.61 kph).

The number of times American driver John Force has been crowned winner in the NHRA's Funny Car championship. With more than 130 career victories to his name and the record for qualifying in 395 consecutive events, he is one of the sport's most successful competitors.

384

SPEEDWAY

race distance.

The racing speedway strip is straight, level, and short. A special seal applied to the surface of the track increases tire traction. The standard strip lengths are 1/4 mile (400 m) or 1/8 mile (200 m). Electronic beams at the start and finish record the times of contestants. Drivers accelerate across the starting line as soon as they see the green light appear on the "Christmas tree" in front of them. There is a deceleration section at the end of the track equal in length to one-and-a-half times the

Drivers prepare to move when the last of the orange lights comes on. A split second later, the green light shows and the race is underway

Christmas tree

CHRISTMAS TREE

ROCKET RACERS

An array of signal lights—from yellow to orange to green—in front of the starting line let the driver know when the race is going to begin.

THE FASTEST TOP FUEL DRAGSTERS

COVER A 1/4 MILE (400 M) COURSE IN

LITTLE MORE THAN FOUR SECONDS,

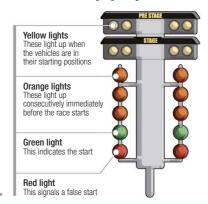
HITTING 330 MPH (530 KPH) OR

MORE. THE 5G DECELERATION

EXPERIENCED BY DRIVERS AS

PARACHUTES SLOW THEM TO A

STOP CAN CAUSE EYE PROBLEMS.



Drivers are not permitted to move from their own lane into that of their opponent. If they do so, they are disqualified

Track surface

A cement surface at the start of the track gives the tires good traction. The rest of the track may be asphalt

Line-up

The vehicles line up side by side in all competitions except handicap races, when vehicles with poorer performance potentials are allowed to compete against faster cars. The slower of the two is given a handicap head start

WHAT THEY DRIVE

There are more than 200 different vehicle classes, each with different requirements in terms of engine size, weight, fuel, and chassis style. The main classes are: top fuel dragsters (see left), pro stock cars, pro stock bikes, top fuel funny cars, top methanol dragsters, and pro modified cars.

the bike from

flipping over

it accelerates

backward when

PRO STOCK CAR

Vehicles must resemble production models but can cover 1/4 mile (400 m) in six seconds. NHRA cars are allowed an engine capacity of up to 500 in³ (8.2 l), and IHRA engines may be up to 820 in3 (13.1 l)

PRO STOCK BIKE

Heavily modified motorcycles race in NHRA competitions. Most pro stock bikes are powered by 1,500cc Suzuki engines that can generate 300 horsepower and rev to 13,500 rpm.



TOP FUEL FUNNY CAR

These vehicles vaguely resemble production cars, but they are nearly as fast as the dragsters. The chassis is light fiberglass and the body is made of aerodynamically enhanced carbon fiber.



THE RACE IS ON

Typically, pairs of drivers race against each other, with winners proceeding to future rounds to battle it out in a knockout. There are few rules, but a driver is disgualified for a false start or for crossing lanes. Once the green light goes on, the tactic is maximum speed as fast as possible until the first car crosses the finish line. Sometimes, an engine blows before the vehicle reaches the end of the track, but it can still coast home before its rival. This is called "heads-up racing" and is relatively common.

JUMPING THE LIGHTS

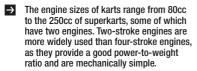
Technically, the car should not move before the green light comes on the Christmas tree. In practice, the driver starts to move his car in the fraction of a second between the last orange light going out and the green flashing on. However, if the car passes the electronic eye in front of the start before the green shows, the driver is said to have "red-lighted" and is disqualified. In the event that both drivers "red-light," then only the first to cross the beam is disqualified.

GOVERNING BODIES

In North America, the sport is governed by the National Hot Rod Association (NHRA) and the International Hot Rod Association (IHRA). Elsewhere, it is governed by the Fédération Internationale de l'Automobile (FIA). These bodies organize championships for various vehicle classes. For example, the NHRA, the world's biggest drag-racing organization, organizes the Mello Yello series of races in the United States.

NEED2KNOW

KARTING









- Karting began in the 1950s, when enthusiasts wanted to make the thrill of motor racing accessible for young people and successfully assembled homemade machines from lawn mower engines, simple steering equipment, and small wheels.
- Formula One champions Fernando Alonso, Michael Schumacher, and Ayrton Senna all began their racing careers in karting.

SPORT OVERVIEW

In karting, which is also called go-karting or kart racing, drivers speed around a track and compete with each other to be the first past the finish line. Often thought of as the simplest form of motor racing yet an important stepping stone for aspiring Formula One drivers, karting is an ideal recreation for both young and old, men and women. Seasoned drivers can take part in junior or senior competitions in which races are organized according to a range of different divisions and classes.



TYPES OF KARTING

The most common type is sprint karting, in which drivers compete on twisty tracks between 0.25 miles (400 m) and 0.82 miles (1.5 km) in length. Road-racing karts reach higher speeds and are used on larger tracks with longer straights. Shifter karts have a sequential gearbox and are usually raced on sprint tracks.

INTERNATIONAL COMPETITIONS

International karting competitions, such as the World Championship and the European Championship, are organized by the Commission Internationale de Karting (CIK). This sanctioning body is associated with the Fédération Internationale de l'Automobile (FIA), which organizes Formula One and many other races.

SIDELINES

The thousands of rpms that some two-stroke engines can reach.

The minimum age for driving a kart in most countries.

The speed, in mph (80 kph), of a kart on a short track. On longer straight tracks, karts may reach twice this speed.

4.5 The number of seconds a 100cc 2-stroke engine, weighing 330 lb (150 kg), takes to go from 0–60 mph.

SPEEDWAY KARTS

SPEEDWAY KARTING RACES ARE HELD ON SHORT OVAL TRACKS WITH A DIRT OR ASPHALT SURFACE. KARTS ARE PURPOSE-BUILT FOR LEFT-TURN ONLY RACING—THE REAR IS NOT ALIGNED WITH THE FRONT AND THE OUTSIDE REAR WHEEL IS LARGER THAN THE INSIDE REAR WHEEL.

INSIDE STORY

Traditionally, karts need to be started by an external starter or a push start. By contrast, touch-and-go (TaG) karts are equipped with a push-button starter, are longlasting, and are used in clubs worldwide. The Rotax Max was the first successful TaG kart, and the Austrian manufacturer organizes national competitions in various countries and a World Final every year.

COMPETITOR PROFILE

Stock car drivers need to be tactically clever during a race so they can judge the most opportune moments to overtake, to fall in line to reduce drag, and to break out of the group to win the race.

Roll cage

The middle section of the car has a roll cage that keeps its integrity to protect the driver in the event of an accident

Rook flaps

If a car spins out of control, a set of flaps at the back of the roof reduces lift and prevents the car from taking to the air

Radial tires

Stock cars have radial tires that are stable at high temperatures and give good traction-many are filled with nitrogen instead of air

Powerful engine Stock car engines have a large 750 brake horsepower, and reach speeds of 200 mph (320 kph)



SPORT OVERVIEW

Stock car racing is a predominantly North American motor sport in which drivers in various vehicle categories compete on oval tracks. Originally, the cars had to be models that were part of the stock that manufacturers sold to the public. Since 1973, the rules changed so that cars could look like production models, but their specifications conform to the standards laid down by NASCAR, the governing body.

STOCK CAR RACING







NEED2KNOW

- → Stock car races organized by NASCAR are extremely popular. In 2002, they were 17 of the best-attended 20 US sporting events.
- → As well being the US's second most watched sport on TV after football, NASCAR races are broadcast to more than 75 countries.

NASCAR RACES

The National Association for Stock Car Racing (NASCAR) was formed in 1948 and regulates the sport in the US. It organizes the two main series of races—the Sprint Cup (which includes the Daytona 500) and the Nationwide series—and sanctions 1.500 races at 100 tracks in the US. Canada, and Mexico.

OVAL TRACKS

Races are usually held on oval tracks between 0.25 miles (400 m) and 2.66 miles (4.26 km) in length. Some are banked and others, known as dirt tracks, are unpaved short tracks. Long tracks, such as the one at Talladega in Alabama, are called superspeedways.

WIN ON SUNDAY, SELL ON MONDAY

THE FIRST MODERN OVERHEAD VALVE ENGINE TO GO ON SALE TO THE GENERAL PUBLIC WAS THE OLDSMOBILE ROCKET V8. ITS SUCCESS IN THE STOCK CAR RACES OF 1949 AND 1950 ENCOURAGED MORE AND MORE PEOPLE TO BUY THE CAR, LEADING TO THE SAYING "WIN ON SUNDAY, SELL ON MONDAY."

IN THE SLIPSTREAM

During a race, drivers tend to make the best use of the aerodynamics of slipstreaming. They bunch together or follow each other closely in a line to reduce the drag on their vehicles and save fuel. Such dangerous maneuvers make the sport exciting and entertaining. Although accidents are common, severe injuries to the drivers are rare.

INSIDE STORY

Stock car racing arrived in Great Britain in 1954, using slightly modified saloon cars. Contact between cars became a part of the sport, so bumpers and roll bars were added. The British Stock Car Association (BriSCA) is the sport's governing body. Formula One stock cars look nothing like the manufacturer's standard production models; they have open wheels, for example, as well as a centrally located driver.

- → The Fédération Internationale de l'Automobile (FIA) sanctions the Cross-Country Rally World Cup, which is made up of a maximum of eight events each season.
- → Early cross-country rally events included the Peking to Paris race of 1907, which involved just five cars covering the 60,000 mile (96,560 km) distance in 60 days.
- Although it is no longer a World Cup event, the Dakar Rally remains the biggest, most dangerous, and most prestigious of all crosscountry rallies. In 2019, 100 cars, 137 motorcycles, and 41 trucks started the race.

ROUGH RIDES

In cross-country rallying, anything goes. From the sands of the Sahara to the rocky terrain of the Atlas Mountains and the savannas of the Pampas, it's a test of endurance and navigation the tougher, the better.



DESERT BIKES

Off-road motorcycles need to have a combination of robustness, power, and light weight. Ground clearance is high to avoid hitting obstacles such as rocks, while the suspension is beefed up to enable riding over rough terrain.



KEEP ON TRUCKIN

For most cross-country endurance rallies, trucks are defined as vehicles with a total weight of 3.5 tons or more. They can carry up to three people and have a fuel capacity in excess of 217 gallons (820 liters).









OFF-ROAD RALLYING

SPORT OVERVIEW

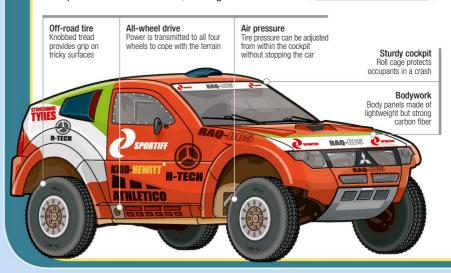
This is the ultimate form of endurance racing. requiring the spirit of an adventurer as much as that of an athlete. Once exclusively a car sport, motorcycles and trucks now also race point-to-point routes that traverse hundreds or thousands of miles of desert, mountain, or other wild terrain. Winning drivers are those with the quickest aggregate times over several legs, sometimes raced daily over a week or more. The most famous event is the Dakar Rally, which traditionally starts in Europe and ends in Dakar, Senegal.

PENALTIES

Drivers do not have to follow precisely the same route, but they must get from the start to the finish of a section by passing one or more checkpoints. A failure to do so results in time penalties.

DRIVER PROFILE

Drivers, co-drivers, and riders in this motor sport all need the attributes of adventurers, as well as athletes.



SIDELINES

The number of competitors who have died in the Dakar Rally since its first running in 1978.

1,000,000 The number of Portuguese spectators who came to watch the 2007 Dakar Rally over its first two days as the race left the capital Lisbon and worked its way across into Spain.

The number of times the Dakar Rally has been held in South America. The race was relocated in 2009 due to fears of terrorist attacks along the route through North Africa.

DAKAR INSPIRATION

FRENCHMAN THIERRY SABINE CAME UP WITH THE IDEA OF THE DAKAR RALLY AFTER GETTING LOST IN THE LIBYAN DESERT DURING THE 1977 ABIDJAN TO NICE RALLY. HE ORGANIZED THE FIRST DAKAR RALLY IN 1978. THERE WERE 170 ENTRIES. THIERRY WAS KILLED IN A HELICOPTER CRASH DURING THE 1986 EVENT.

NEED2KNOW

- → When European truck racing started in the 1980s, road-going, working vehicles were used.
- The Camping World Truck Series first began in 1995.
- A racing truck can accelerate to 100 mph (161 kph) quicker than a Porsche 911 sports car.
- The minimum weight for a truck is 6 tons (5,500 kg).
- For safety reasons, there is a maximum speed limit of 100 mph (160 kph).

RULES OF THE ROAD

The European race series is controlled by the Fédération International de l'Automobile (FIA), and it has limited the top speed of the trucks to 100 mph (161 kph). Rather than the static grid used in other types of motor sports, races commence with a rolling start and last for a predetermined number of laps. Points are given to trucks finishing in the top positions and are accumulated from the two races held at each circuit over one weekend.

DRIVER PROFILE

Driving a 6-ton truck around a racing circuit at high speeds is not for the fainthearted. Lightning-quick reactions and nerves of steel are essential requirements. To race a truck, drivers must be at least 21 years old and hold a race license.

TRUCK TRACKS

In both Europe and the US, truck racing is held at a variety of tracks, from "road courses" that incorporate both left- and right-handed turns to oval circuits that only include left-handed bends. Less than 10 tracks host the European Truck Racing Championship (ETRC) each season, but the Camping World Truck Series visits up to 25 circuits a year.

RULE BOOK

In addition to conventional motor sport penalties such as for speeding in the pit lane, truck racing drivers are disciplined for infringements like emitting excessive exhaust smoke and exceeding the 100 mph (161 kph) speed limit.

WHEEL TO WHEEL











TRUCK RACING

SPORT OVERVIEW

Truck racing may not be the most high-profile of motor sports, but it is certainly one of the most exciting. The European Truck Racing Championship (ETRC) takes place on some of the world's best-known motor-racing circuits, such as the Nürbürgring in Germany and Le Mans in France. In the United States, the Camping World Truck Series draws massive crowds to tracks all over the country to watch modified pick-up trucks go head-to-head in races of up to 250 miles (400 km).

TOP TRACK

THE NÜRBÜRGRING IN GERMANY IS THE LONGEST AND MOST EXCITING TRACK IN EUROPE. IT IS A VENUE FOR THE BRITISH TRUCK RACING CHAMPIONSHIP (BTRC) DURING WHICH OVER 150,000 FANS GATHER TO WATCH THE ACTION.

RALLYING









SPORT OVERVIEW

Rallying is a fast and furious point-to-point motor sport raced on public and private roads, usually against the clock. The World Rally Championship (WRC) is the sport's premier event, featuring races on a wide range of courses all around the world that test the reliability of the cars and the nerves and skills of the driver and co-driver.

Crew protection

Extra-strong roll cage is welded into the frame of the car

Removable panels Body panels are made of pressed steel and can be replaced during a race

DRIVER PROFILE

Controlling a 300 bhp rally car takes more than just technical driving ability. A rally-car driver needs to have quick reactions to adjust to the ever-changing terrain, high concentration levels to cope with testing conditions, and complete trust in the co-driver.



Rallying powerplant All WRC cars incorporate 2-liter, turbocharged engines Braking system Massive ventilated disc brakes provide the stopping power Racing rubber
Tires can be up to
18 in (46 cm) wide
to provide extra grip

TransmissionSix-speed gearbox is operated via a semiautomatic shifter

Hand-built chassis is stiffened to create a rigid car able to withstand the extreme forces of a rally Aerodynamic aid
Rear spoiler creates
downforce that helps
control the car
when cornering at
high speeds

NEED2KNOW

- Until private routes were used in the 1950s, rallying events took place on public roads.
- Swede Björn Waldegard won the first World Rally Championship for Drivers in a Ford Escort in 1979.

CLASSIC RALLY

LAST RUN AS A WRC EVENT IN 2002, THE SAFARI RALLY IS REGARDED AS THE TOUGHEST OF THEM ALL. HELD ON THE OPEN ROADS OF EAST AFRICA, HAZARDS INCLUDED WILD ANIMALS AND SEVERE DUST STORMS.

ALL-TERRAIN DRIVING

From the icefields of Sweden to the high-altitude mountain passes of Argentina and the forest tracks of Wales, WRC races take place over every conceivable type of course. Only by being able to master terrain as varied as ice, mud, gravel, and sand do drivers stand a chance of challenging for the Championship. The rallies are made up of short, timed special stages where the points are won and liaison stages that enable the manufacturer-backed teams to get to the start of the next special stage.

RALLY FORMAT

Each rally has up to 25 special stages, ranging in length from just a few miles up to 37 miles (60 km). Stages have a staggered start, with cars sent off at a time interval of one or two minutes to race over a mixture of (closed) public and private roads. Drivers aim to cover the course as quickly as possible, with the winning car the one that completes all the stages in the least overall time.

TIME PENALTIES

Rallying has a strict system of time penalties. These are imposed on drivers for reasons such as being late for the start of a stage and if team mechanics spend longer than the allotted time allowed to check a car at the end of a stage.

THE CO-DRIVER

The eyes of a rally car team, the co-driver provides his or her driver with all the navigational information needed to complete a stage. Before a stage, the co-driver surveys the course and takes detailed notes on the location of bends, type of road surface, and any potential hazards. These are then read out to the driver during the race.

390

CARS UNDER SCRUTINY

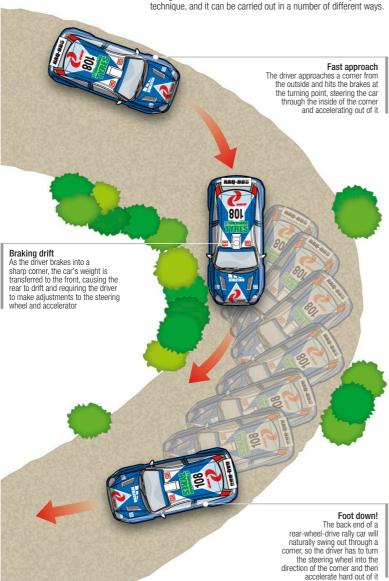
According to the rules laid down by the sport's governing body, the Fédération International de l'Automobile (FIA), World Rally cars must be based on their passenger car equivalents and be available—albeit in limited numbers—to the public. But that's where similarities end, as teams then modify the cars within the limits set by the FIA. At WRC events, a team of official scrutineers checks the cars for legality before, during, and after the race, with drivers sometimes disqualified from a rally for contravening technical regulations.

SPEED FREAKS

Maintaining momentum is the key to fast times out on the course. Accelerating into jumps and water troughs keeps the car "nose up," which is vital if the driver is to execute a safe landing. Drivers take advantage of the extra traction in dips and troughs to use heavier braking and steering to maintain a smooth line through the course. Most rally cars incorporate four-wheel drive, where power is transmitted to each wheel, and this provides extra traction for the tires to grip to the surface.

CORNERING TECHNIQUES

Cornering is a fine balance of play between the brakes, throttle, accelerator, and clutch. The art of drifting—setting a car sideways through a corner to enable a faster exit—is a crucial rally technique, and it can be carried out in a number of different ways.



STAT CENTRAL

MOST WRC WINS—DRIVER		
WINS	DRIVER	
79	SEBASTIEN LOEB	
46	SEBASTIEN OGIER	
30	MARCUS GRONHOLM	
26	CARLOS SAINZ	
25	COLIN MCRAE	
24	TOMMI MAKINEN	
23	JUHA KANKKUNEN	
20	DIDIER AURIOL	
19	MARKKU ALEN	
18	HANNU MIKKOLA	

MOST WRC WINS—MANUFACTURER		
WINS	MANUFACTURER	
101	CITROËN	
91	FORD	
73	LANCIA	
53	TOYOTA	
48	PEUGEOT	
47	SUBARU	
44	VOLKSWAGEN	
34	MITSUBISHI	
24	AUDI	
21	FIAT	

BEHIND THE SCENES

PROFESSIONAL TEAMS ENTER UP TO THREE CARS IN A RACE, AND THEY ARE ALL BACKED UP BY A TECHNICAL SUPPORT CREW THAT KEEPS THEM AT PEAK PERFORMANCE DURING THE RALLY. BETWEEN STAGES, EACH CAR IS INSPECTED BY THE SUPPORT CREW.

INSIDE STORY

The concept of rallying dates back to competitions between the first "horseless carriages" in the 19th century. Early motorized rallies included the Monte Carlo Rally, which was first held in 1911 and is still raced today. Longer events then sprang up, such as the 10,000-mile (16,000-km) Méditeranée-le Capheld in Africa in the 1950s. It is a far cry from professional modern rallying and its highly tuned cars racing over short distances.

GOVERNING BODY

Rallying comes under the auspices of the FIA World Motor Sport Council that governs all motor sports. The Council organizes the WRC that takes place annually over 13 courses worldwide.

RACER PROFILE

With races running for roughly an hour, endurance is a necessity, along with strength and low bodyweight. Riders also need the courage to take their bikes to speeds up to 200 mph (320 kph)

Engine power Engine size varies according to the race specs. For MotoGP races, they are state-of-the-art 800cc four-stroke engines

One-piece suit A padded, abrasion-resistant, one-piece body suit and gloves are necessary

Safety helmet These are designed to absorb one incident only

THE CIRCUIT

Circuits are usually specially built tracks, and while each one has its own layout and special character, they all have common features. These include gentle and hairpin bends, straights, ascents and descents (sometimes), a run-off area, and gravel beds for safety. The track must be sufficiently wide for bikes to corner and pass each other, and barriers and off-track emergency zones are placed appropriately. Spectators watch races from grandstands, and safety marshals are positioned around the track.

OTHER COURSES

Road races are not always held on specially built circuits. Races sometimes take place on public roads, airfields, or a combination of

DRAG RACING Two contestants race each other along a straight, paved strip of road, such as a dragster track, that is commonly

HILL CLIMB Single riders race the clock

ROAD RALLY Competitors drive along open public roads between a fixed start and finish, visiting checkpoints along the route. The riders must obey speed restrictions and

public roads and off-road tracks.

1/4 mile (400 m) long.

along uphill stretches of road.

other rules of the road.

Broad tires Rear tires are wider than the front for extra grip, since all

the power goes through this wheel

Aerodynamic design A powerful engine and aerodynamic design allow MotoGP bikes to hit speeds of 215 mph (350 kph)

PUSHING TOO HARD

ON MARCH 7, 2007, SHINYA NAKANO CRASHED DURING A PRACTICE SESSION AT THE SPANISH GRAND PRIX. TRAVELING OVER 200 MPH (320 KPH), HE LOST CONTROL OF HIS BIKE GOING INTO A TURN. FORTUNATELY, HE SURVIVED.

NEED2KNOW

- → Track motorcycle racing is a massively popular spectator sport around the world, particularly on television. An estimated 300 million people worldwide watch each Moto Grand Prix.
- → The most prestigious races are those of the MotoGP world championship, which is contested every year.
- → In 2001, Valentino Rossiconqueror of the 125, 250, and 500 World Championships in his second season in each class—became only the second rider in history (after Phil Read) to achieve this feat.

ROAD RACING

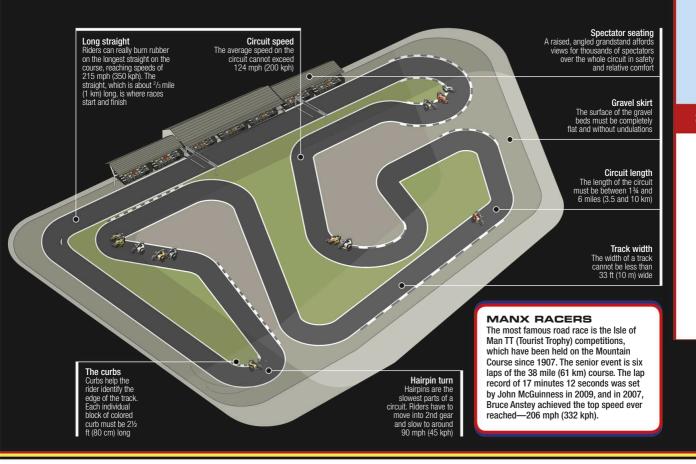






EVENT OVERVIEW

The most popular road racing events involve competitors riding motorcycles on tarmac circuits or closed public roads. The most illustrious circuit races are the 125cc, 250cc, 800cc GP World Championships, the World Championships for Superbike. and Supersport, Endurance, and Sidecar categories, but Motocross and Supercross events have increased in popularity, especially in the US.



EQUIPMENT

Protective clothing is not optional. All racing motorcyclists crash, and most suffer injuries from time to time. Wearing the proper gear can make the difference between some bad bruising and broken bones, or worse. A full-face helmet, one-piece racing leathers, gloves, knee-sliders, and boots are all mandatory, and all racers must wear a metal identification tag with blood type details. Riders must be in peak physical condition to race with all the required safety equipment.

GLOVES

The outer leather skin is reinforced, and a foam lining gives extra protection and comfort. There can be sticky-grip material on the palms.



HELMET

In addition to absorbing impacts and shielding the face, the helmet is designed to draw in fresh air and allow exhaled air and humidity out.



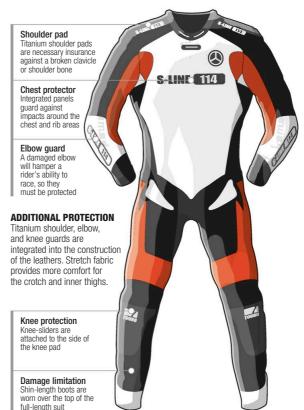
BOOTS AND KNEE-SLIDERS

Made up of a number of independent plates that offer special protection for the Achilles heel, ankles, toes, and lower shins. These give extra protection for the vulnerable knees and shins.



Give extra protection to one of the most damaged parts of the body Tough panels Carbon fiber sole

inlays provide additional safety



RULES OF THE ROAD

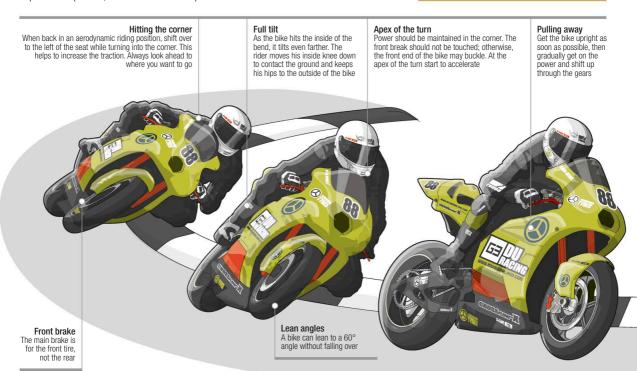
World championship 125cc, 250cc, and MotoGP races, run by the Fédération Internationale de Motocyclisme (FIM), are between 59 and 81 miles (95 and 130 km) long. The number of laps to be raced will depend on the length of the track. Positions on the starting grid are decided by the fastest lap time recorded during qualifying, and to qualify for the race, a rider must achieve a time at least equal to 107 percent of the time recorded by the fastest rider of his class. Before the start, race officials declare a race "dry" or "wet" so riders can decide which tires to use. Tires can be changed on the grid before the start of the race. After one warm-up lap, the race is started by lights. A red light will be displayed for between 2 and 5 seconds and, when it goes out, the race will start. If two riders cannot be separated at the finish, the one who achieved the fastest lap time during the race wins.

TAKING A CORNER

While overtaking is the skill that marks out a championship winner from an also-ran, cornering hard and fast will enable a rider to achieve top lap times. The more time the bike spends upright, the quicker it will go, so being able to get in and out of corners quickly will allow the rider to improve on lap times, and therefore be competitive in a race.

STAT CENTRAL

GRAND PRIX WINNERS			
RIDER (NATIONALITY)	TITLES	WINS	
GIACOMO AGOSTINI (ITALY)	15	122	
ANGEL NIETO (SPAIN)	13	90	
VALENTINO ROSSI (ITALY)	9	115	
MIKE HAILWOOD (UK)	9	76	
CARLO UBBIALI (ITALY)	9	39	
JOHN SURTEES (UK)	7	38	
PHIL READ (UK)	7	52	
GEOFF DUKE (UK)	6	33	
JIM REDMAN (RHODESIA)	6	45	
MICK DOOHAN (AUSTRALIA)	5	54	
ANTON MANG (GERMANY)	5	42	



VALENTINO, NUMERO UNO

ITALIAN RIDER VALENTINO ROSSI IS ONE OF THE ALL-TIME GREAT MOTORCYCLING SUPERSTARS. NICKNAMED "THE DOCTOR" FOR HIS CLINICAL DISMANTLING OF OPPONENTS, ROSSI HOLDS THE RECORD FOR THE MOST CONSECUTIVE PODIUM APPEARANCES. FROM SEPTEMBER 8, 2002, TO APRIL 18, 2004, HE WENT TO THE PODIUM ON 23 OCCASIONS. HIS SUCCESS ON THE TRACK HAS BROUGHT HIM FORTUNE, AS WELL AS FAME, AND BY 2009, HIS ANNUAL EARNINGS AMOUNTED TO A MONUMENTAL \$35 MILLION. THAT'S AN AWFUL LOT OF MONEY.

INSIDE STORY

The origins of road racing go back to 1894 and the Paris—Rouen race, which saw motorcycles and cars racing side by side, and the first Isle of Man TT that took place in 1907. Circuit racing did not start until 1949, when the FIM launched the Road Racing World Championship Grand Prix for 125cc, 250cc, 350cc (now discontinued), and 500cc bikes and sidecars. The early years were monopolized by Italian and British riders, but Australians, Americans, and Spanish riders now dominate the sport. The Superbikes (1000cc) championship began in 1988, and MotoGP, which replaced the 500cc class, was launched in 2002.

GOVERNING BODY

The FIM was founded in 1904 by representatives of motorcycle clubs from Austria, Belgium, Denmark, France, Germany, and Great Britain. Today, it represents 103 national motorcycle federations, divided into six regional groups: Africa, Asia, Europe, South America, North America, and Oceania. The FIM is recognized by the IOC.

EVENT OVERVIEW

Off-road motorcycle racing includes any competition that is not raced on tarmac circuits or roads. The most popular events are motocross (MX), supercross (SX), speedway, enduro, cross-country, and trials. In recent vears, variants such as beachcross have developed a large following. Aside from the race surface, the big difference from track racing is the style of the bikes.

OFF-ROAD MOTORCYCLE RACING







NEED2KNOW

- Speedway took Britain by storm when it was introduced in the 1920s. In its heyday, crowds of 80,000 or more attended races. Today, a popular GP series takes place throughout Europe.
- In North America, indoor supercross is more popular than motocross, attracting massive crowds at indoor arenas on man-made courses. More than 70,000 spectators have packed the Georgia Dome for a World Supercross Series event.
- In the early years of motocross, the 500cc class was considered the premier division. However, as technology progressed, the 250cc bikes became faster and more manageable and eventually superseded the 500cc bikes to become the premier class event.



Body protection The body armor that is worn Head gear Goggles RIDER PROFILE outside of the jersey is commonly Must be removable Riders cannot Off-road racing requires skill, strength, compete without since they are likely made from a hard plastic stamina, and concentration. Riders must an approved to get muddy helmet Lever setup be prepared to take hits and get muddy. The clutch lever and brake lever should be angled down slightly so that the forearms are in a Trials riders must be especially skillful and have tremendous balance, throttle control, and vision to negotiate the straight line with the levers when demanding obstacles, steep slopes, attacking the course and sharp turns. Controlling suspension Rebound dampening controls how fast the suspension returns to its full length after it's been compressed by hitting an obstacle or bump. If your rebound dampening is set too fast, the bike may have a tendency to kick up when accelerating out of corners

Deep blocks

Tire patterns differ depending on the terrain. For deep mud, tall blocks give good grip and resist slippage when the bike is cornering. On front tires, the blocks are sometimes turned 45° to evacuate mud guickly

Engine power

Motocross bikes are usually powered by single-cylinder, twoor four-stroke engines

Quick change

Wheelbase is the measure of the distance between the front wheel and back wheel. Bringing the rear wheel forward will decrease the bike's wheelbase and will make the bike corner more quickly

POSTWAR COMPETITION

A TEAM MOTOCROSS COMPETITION
TOOK PLACE IN HOLLAND IN 1947.
THE RACE COMPRISED TWO HEATS
OF EIGHT LAPS EACH OVER A 2-MILE
COURSE, WITH TEAM SCORES BASED
ON THE TIMES OF THE THREE FASTEST
RIDERS. THE BRITISH TEAM WON BY
JUST NINE SECONDS OVER BELGIUM.

WHAT THEY RIDE

Off-road bikes come in many different shapes and sizes, but all need super-responsive engines for quick acceleration, tires that can grip difficult terrain, and suspension that is able to cope with the bumps and jolts. Race classes generally divide on the basis of engine size.

ENDURO

The biggest difference between an enduro bike and MX and SX machines is that enduros have to be street-legal. Engine size ranges from 100cc to 650cc, and races are classified accordingly.



TRIAL BIKES

Trial motorcycles are extremely lightweight, are designed to be ridden standing up, and have suspension travel that is short relative to a motocross or enduro motorcycle.

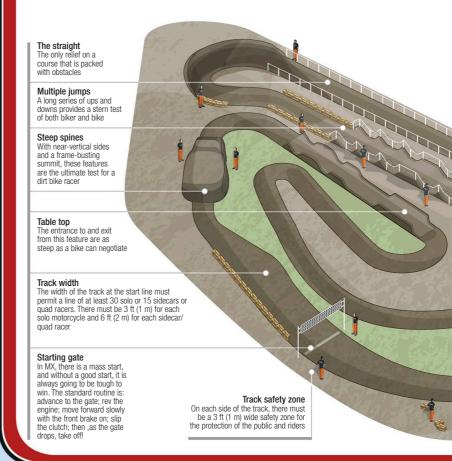
ALL-TERRAIN VEHICLES

Riders of all-terrain vehicles (ATVs) have their own motocross competition. Engines used in sanctioned competition must be production-model ATV engines available to the general public.



MX CIRCUIT

Races are held on a marked and fenced circuit, often 1–1¼ miles (1½–2 km) long, that combine steep drops and climbs with fast straights, artificial jumps, and steep turns to create a varied and exciting racing environment. In accordance with FIM rules, the track materials should be natural and must be capable of retaining water, easily maintained, and give traction. Races run for a fixed period, usually 30 minutes plus two extra laps, with a maximum of 30 competitors riding in each race.



MAYHEM ON FOUR WHEELS

All-terrain vehicle (ATV) racing is especially popular in North America, with engine size starting at 50cc. Four-wheeled ATVs are raced in a similar format to their two-wheeled equivalents: MX, MS, enduro, and hare and hounds. Additionally, ATV tourist trophy scrambles are held on prepared dirt tracks with right and left turns and jumps and on a short track. The racing is similar to speedway, with competitors battling it out on oval tracks roughly ¼ mile (400 m) long. For the really brave, there is ATV racing on ice!

KEY SKILLS

The skills required to be a off-road racer are numerous, but a must-have is the ability to corner at speed on a surface with little traction. Particularly hard to negotiate are turns without a camber, such as those of a speedway circuit or an MX course. For MX, SX, and any cross-country discipline, the ability to negotiate the jumps skillfully is especially crucial.

TAKING OFF

To be an effective jumper, the rider has to be able to generate enough lift to get over an obstacle. They also need to land without breaking the momentum of the bike. Skilled riders can alter their direction in midair, making the jump look even more spectacular.

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OTHER COURSES

A number of new motor sports developed from speedway and arguably from the exploits of Evel Knievel. What they have in common is that the races (usually) take place on dirt courses with various obstacles in the form of jumps. Different courses require different bikes.

SUPERCROSS SX is indoor MX and has all the features of the latter—climbs, jumps, hairpin turns, and fierce racing competition—packed into a tight stadium circuit. This derivative of MX provides spectacular viewing. Qualifying rounds are followed by semifinals and the "main event."

ENDURO Riders are timed over a rough course of up to 100 miles (160 km) long. Racers set off at intervals along boulder-strewn riverbeds, along forest tracks, and up steep muddy banks, checking in at time stations along the route. Penalties are awarded for slow times.

TRIALS Each course is different and is designed to challenge riders' bike control to the limit. Competitors have to negotiate a circuit of large boulders, ledges, water, logs, and pallets without touching their feet on the ground. If they do touch, the "dab" or "prod" is penalized.

SPEEDWAY Four riders, two from each team, keep turning left over four laps of an oval track, and each race is over in less than a minute. They race 500cc single-geared machines with no brakes.

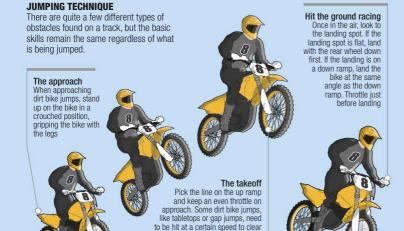


DIRT BIKE RULES

Each discipline has its own rulebook, which is administered by the governing body (the FIM), but foul, unfair, or dangerous riding always results in disqualification. Exacting regulations control the machines ridden, the equipment worn by the racer, and the fuel used. In six-day enduro events, the bikes are in the possession of the race organizers; this is called parc fermé, or closed control, and prevents work being carried out on vehicles between different days of a race. Starts vary between disciplines, so MX and speedway have mass starts, but solo racers start at timed intervals in enduro.

STAT CENTRAL

WORLD	MOTOCROSS CHAN	IPIONS	
TITLES	RIDER	(COUNTRY)	
FIM MX1 WORLD MOTOCROSS (250cc)			
7	STEFAN EVERTS	(BEL)	
6	JOEL ROBERT	(BEL)	
4	TORSTEN HALLMAN	(SWE)	
FIM MX2 WORLD MOTOCROSS (125cc)			
3	ALESSION CHIODI	(ITA)	
3	HARRY EVERTS	(BEL)	
FIM MX3 WORLD MOTOCROSS (500cc)			
5	ROGER DE COSTER	(BEL)	
4	JOEL SMETS (BEL)		
3	GEORGES JOBE	(BEL)	
AMA USA MOTOCROSS (125cc)			
3	RICKY CARMICHAEL	(US)	
3	BROC GLOVER	(US)	
AMA USA MOTOCROSS (250cc)			
7	RICKY CARMICHAEL	(US)	
4	GARY JONES	(US)	



them, so speed should be up

before the approach

INSIDE STORY

Motocross was first known as a British off-road event called scrambles, which were themselves an evolution of trials events popular in northern Britain. During the 1930s, the sport grew in popularity, especially in Britain. In 1952, the FIM created an individual European 500cc Championship and in 1962, a 250cc World Championship was created. It was in the smaller 250cc category that came into its own. The sport has evolved with subdisciplines such as stadium events known as Supercross and Arenacross. Freestyle (FMX) events where riders are judged on their aerial acrobatic skills have gained popularity, as has Supermoto (Motocrossstyle racing on both tarmac and off road).

- > Powerboat racing is an expensive sport-the cost of equipment, fuel, and maintenance can reach seven-figure sums.
- Formula One powerboat races attract live audiences of up to 70,000 spectators, who all get to watch for free
- Some powerboats can accelerate to 100 mph (160 kph) in 4 seconds.
- Crews all need a license to thrill. Part of the exam requires them to escape from a cockpit that has been submerged in water, and they must also undergo a rigorous medical examination.

CREW PROFILE

Formula One and Class 1 powerboats have two-person crews of a driver and a throttle operator. Although life jackets are required, the crew should be strong swimmers and have fast reactions to maneuver the craft safely at high speeds. The ability to "read" the water is essential, as is having a constant awareness of the boat's position on the course.









EVENT OVERVIEW

With vessels able to reach speeds up to 140 mph (225 kph), powerboat racing is the fastest, most dangerous, and most glamorous of all watersports. Boats race in various classes depending on their engine size and travel around a defined course, either circular or point-to-point. Other races focus on endurance and are designed to test the resilience of vessels and crews. Crashes are rare but can be fatal.

WATER COURSE

Powerboat races can be held on any suitable expanse of water, such as a bay, fiord, lake, river, or sometimes the open ocean. The course may be around natural landmarks, such as rocks and islands, or marked out with buoys.

Boats usually go around a course counterclockwise, but the direction may be reversed if tide or weather conditions dictate. At inshore races, the starting jetty must be no less than 246 ft (75 m) long and should be positioned at least 984 ft (300 m) from the first turn for safety reasons. No straight should be longer than 2,789 ft (850 m).

On a straightforward race course, the winner is the boat that crosses the finish line first after completing a certain number of laps. Slalom courses have a much larger number of buoys that mark out all the necessary turns.

Propeller Various types are

used depending on the condition of the

Design values

The two main construction

Adjustable wings The crew can adjust the angle of the wings

Cockpit

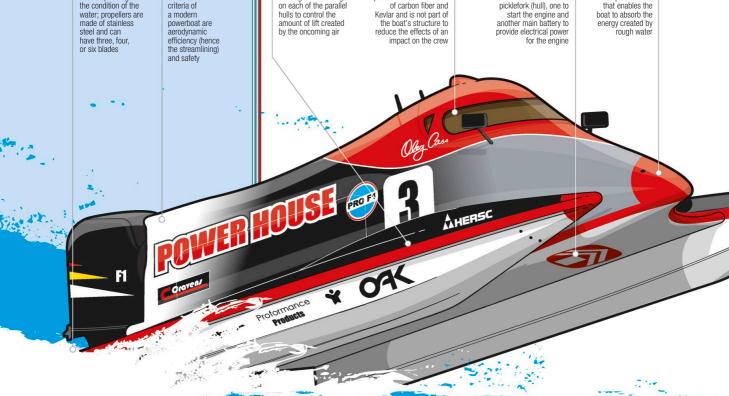
This self-contained protective "cell" is made of carbon fiber and

Auxiliary power

Two batteries are located in the left

Nose

The nose is filled with plastic foam that enables the



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FORMULA ONE POWERBOAT RACING

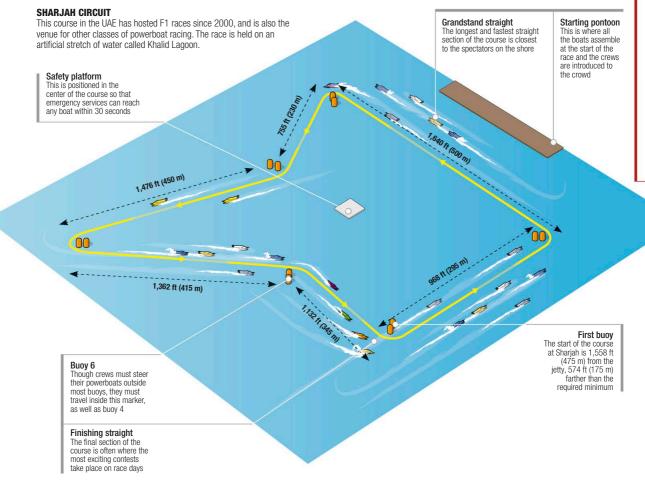
Formula One (F1) is the most prestigious competition in powerboat racing, with events taking place in countries around the world that include Brazil, Ukraine, China, and the United Arab Emirates (UAE). It attracts thousands of spectators to each event.

COURSE LAYOUTS

Although F1 courses vary in type, they are all about 6,560 ft (2,000 m) long. Each circuit incorporates at least one long straight where the boats reach their top speeds, with Doha in Qatar even having two 2,133 ft (650 m) straights. Other circuits include hairpin turns that test the ability of drivers to steer their boats around buoys without the assistance of brakes or gears.

RACE QUALIFICATION

Each F1 event runs over two days, with the first day set aside for teams to post the fastest time possible during time trials. This generally determines the grid positions in the main race on day two, though an extra race (a "shootout") is held at the end of the first day between the top six boats to see which one starts on pole.



F1 BOATS

The catamarans that compete in F1 races are 20 ft (6 m) long and 7 ft (2.1 m) wide. Their design allows the hulls to lift out of the water at high speeds, with just a small section of the boat actually remaining in the water. This enables the powerful 350 bhp engines to propel the boat to exceptionally high speeds and has led some people to say that the sport has almost as much in common with flying as it does with boating. In addition, the structure of the boat—as well as the crew—has to be strong enough to cope with the large G-forces that it will encounter in the turns.

SAFETY FEATURES

As well as operating the boat from inside a strengthened cockpit "capsule," the crew is protected by seatbelts, head and neck harnesses, and an airbag system that inflates if the vessel crashes. As recently as the 1980s, F1 boats were made of fragile plywood and the unharnessed crew sat in open cockpits.

STAT CENTRAL

FORMULA 1 WORLD CHAMPIONS			
YEAR	WINNER (COUNTRY)		
2018	ALEX CARELLA (ITA)		
2017	ALEX CARELLA (ITA)		
2016	SAMI SELIO (FIN)		
2015	GUIDO CAPPELLINI (ITA)		
2014	JAY PRICE (USA)		
2013	SAMI SELIO (FIN)		
2012	SCOTT GILLMAN (USA)		
2011	GUIDO CAPPELLINI (ITA)		
2010	SCOTT GILLMAN (USA)		
2009	GUIDO CAPPELLINI (ITA)		
2008	GUIDO CAPPELLINI (ITA)		



EQUIPMENT

Although the various types of boats have different technical and safety specifications, all use a global positioning system (GPS) as the standard method for navigation. Timing equipment is installed into the cockpits, as is a system of lights that are activated by race coordinators in the event of all boats having to slow down—or even stop completely—after an incident or rule violation. The crew members themselves must wear clothing that is both waterproof and fireproof, as well as protective helmets and life jackets.

TALK ON WATER

The roar of the engines and the slap of the water make it hard for the crew to hear each other, so they usually communicate by radio even when sitting side-by-side in the cockpit. This method is also used to pass tactical and other messages between the boat and the team engineers and directors located on the shore.

BOAT TYPES

Powerboats come in various designs, with the smallest vessels found in Formula One (F1). Offshore racing uses the largest boats with the most powerful engines, some of which are made by the Italian supercar manufacturer, Lamborghini. For speed, nothing can beat unlimited hydros, which can reach 187 mph (300 kph).

Bodyshell Wi Made of carbon fiber and other composite that

Windshield Material is the same as that used in military aircraft windshields Picklefork
The two forks
are designed to
crumple in the
event of contact
with another hoat

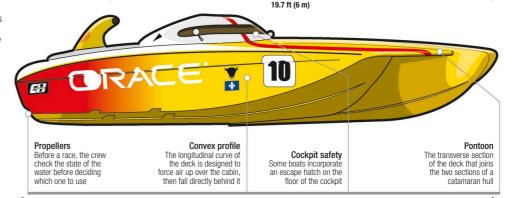
FORMULA ONE OUTBOARD

At the heart of the catamarans used in F1 are 2-liter gas-powered engines that can generate up to 425 bhp. The boats have a crew of two, weigh 860 lb (390 kg), and are able to carry 26 gallons (120 liters) of fuel.



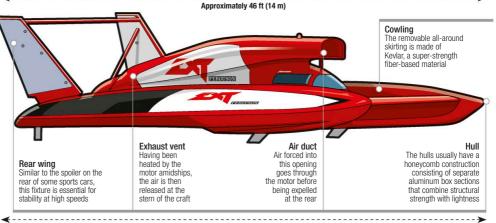
OFFSHORE CLASS 1

Boats racing in this class can be monohulls or catamarans. Powered by two or three 8-liter gas engines or 10-liter diesel units, they are able to average 125 mph (200 kph) over a race and hit maximum speeds of 156 mph (250 kph). The crew is made up of a driver and a throttle controller.



UNLIMITED HYDRO

These boats are propelled by inboard turbine or piston engines similar to those used in aircraft. The adjective refers to their top speed of 187 mph (300 kph), which makes them the fastest of all powerboats. What is not unlimited, however, is the size of their propellers, which may be no more than 16 in (40 cm) in diameter.



28-32 ft (8.5-9.75 m)

SIDELINES

317.6 The highest speed, in miles per hour (511.11 kph), ever achieved in a powerboat. The record, set in 1978, belongs to Ken Warby of Australia.

The distance, in nautical miles (46 miles/74 km), over which motorboats raced at the 1908 Olympics, the last time the sport was included in the Games. There were three events—under 60 ft (18 m), 26 ft (8 m), and open—and in each, there was only one finisher.

The number of victories achieved by American Lee Edward "Chip" Hanauer since 1982 in the Gold Challenge Cup. This prestigious American Power Boat Association (APBA) event is held annually in the United States, often on the Detroit River.

BIRTH OF INTERNATIONAL POWERBOATING

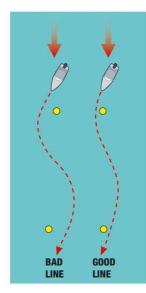
THE FIRST ANNUAL INTERNATIONAL POWERBOAT COMPETITION, THE HARMSWORTH CUP, WAS SET UP IN 1903 BY THE OWNER OF THE BRITISH *DAILY MAIL* NEWSPAPER, ALFRED HARMSWORTH, DURING THE 1920s. THE ANNUAL RACE WAS WON NINE TIMES BY GAR (SHORT FOR GARFIELD) WOOD, AN AMERICAN INVENTOR WHO AT HIS DEATH IN 1971 HELD MORE PATENTS THAN ANYONE ELSE IN HISTORY. WOOD LOOKED OLDER THAN HIS YEARS, AND SPORTS JOURNALISTS DUBBED HIM "THE GRAY FOX."

AQUA TACTICS

While in Formula One motor racing, it is advantageous to tuck in close behind a rival and overtake as late in the race as possible; the wake of a speeding launch makes powerboat racing a sport in which it is desirable to lead from the front.

BUOY-WATCHING

Drivers must not give buoys or markers too wide a berth for fear of losing precious time (see the Bad Line in the illustration on the right), but equally they should not touch them. If they go inside a course marker that should have been rounded, they are given a penalty that can range from a one-lap deduction to disqualification from the race. As in motor racing, there is an art to cornering efficiently, with drivers attempting to travel in as straight a line as possible around the buoys while at the same time maintaining a high speed.



FULL THROTTLE

There is a lot more to powerboat racing than merely steering the vessel in the right direction and flooring the throttle in order for the boats to work effectively and go as quickly as they can. Crews must constantly balance the power generated by the extremely powerful engine against the angle of the bow or bows and the propeller, adjusting the former to maximize the benefits of the latter. The revs generated by the motor count for nothing if the bow is hitting, rather than cutting through, the air and water ahead. Energy will also be wasted if the propeller is not cutting as deep as possible below the surface of the water.

MONEY MATTERS

Although there are some similarities between powerboat racing and motor sports, especially in the way they are marketed, there is one major difference—fans of the water-based sport don't have to pay to spectate. For most events, they can just show up on the shoreline to watch the time trials and main races for free.

At the top level of the sport, vast sums of money are generated by television deals secured with broadcasters around the world and through the sponsorship of teams by some of the world's most high-profile companies. The globalization of Formula One really began in the early 1990s, when Nicolo di San Germano took over as head of marketing for the discipline. He oversaw the expansion of the sport into new, untapped areas of the world, such as Asia.

RULING THE WAVES

Competitions are held in various categories, often according to engine size. What is common to all events is that races begin on a jetty away from the circuit and engines must remain switched off until officials give a green light for the start.

FORMULA ONE

Formula One events are for boats with 2000cc engines. There are up to 10 Grand Prix a year, each with 24 participating boats. The top 10 boats that post the most amount of laps after 45 minutes get points on a sliding scale, from 20 points for a win to 1 point for coming in tenth.

CLASS 1

The Class 1 World Offshore Championship is contested over 10 events spread throughout the year. Each race is over approximately 100 nautical miles (115 miles/182 km) around a circuit measuring 5 nautical miles (5¾ miles/9 km) or for a period of no more than one hour. The points system is the same as in Formula One.

HARMSWORTH CUP

Among the many regional races held around the world is the Harmsworth Cup, which is held over point-to-point courses such as Cowes—Torquay—Cowes along the south coast of England. There is no limitation on engine size, and the most successful boats in the modern era have been powered by units based on helicopter engines.

OTHER RACING TYPES

Hydroplane racing takes place on relatively short courses in the United States and Australia, while P1 is a Europe-based endurance series made up of races that cover 80 nautical miles (92 miles/148 km).

KING OF THE WATER

GUIDO CAPPELLINI IS REGARDED AS ONE OF THE ALL-TIME GREAT DRIVERS IN F1 POWERBOAT RACING. THE FORMER SHIPBUILDER FROM COMO IN ITALY BEGAN HIS RACING CAREER IN LAND-BASED GO-KARTS AND HAS WON MORE INDIVIDUAL F1 GRAND PRIX RACES AND MORE WORLD CHAMPIONSHIPS THAN ANY OTHER COMPETITOR. HE SECURED HIS FIRST WORLD TITLE IN 1993 AND HAS SO FAR WON ANOTHER NINE WORLD CHAMPIONSHIPS.

INSIDE STORY

Powerboat racing changed radically in 1981, when the International Powerboating Union recognized the Formula One class. What had previously been a minority sport was quickly transformed into a major attraction for spectators and sponsors alike. Races that had formerly been held on any suitable body of water now had to take place in sight of a shore that housed the full range of service industries—such as hotels, restaurants, and marine engineering works—and which had good transportation links.

AMERICAN POWER BOAT ASSOCIATION (APBA)

The first official powerboat race took place in 1903 on New York's Hudson River under the auspices of the American Power Boat Association (APBA). The APBA held sway in the United States, but it had very little influence in the rest of the world, and this schism was probably the reason for the slow growth of the sport in the international arena.

UNION INTERNATIONALE MOTONAUTIQUE (UIM)

The Union Internationale Motonautique (UIM) was the rest of the world's response to the APBA. Formed in 1927, its founding members were Argentina, Belgium, France, Germany, United Kingdom, Holland, Ireland, Monaco, Norway, Poland, and Sweden. The United States finally joined on the eve of World War II.







AIR RACING

NEED2KNOW

- The first event in air-racing history was held in 1909—the Reims Air Race from Reims, France, to England.
- The competitors use high-end aerobatics planes, all of which are equipped with Lycoming engines.
- If a pylon gets hit, the crew can set up another one to replace it in less than three minutes.

COMPETITION OVERVIEW

Air racing features a dynamic new discipline of flying, where the objective is to navigate a challenging race course in the sky in the fastest possible time. Flying individually against the clock, the pilots have to execute tight turns through a slalom course consisting of specially designed pylons called "Air Gates." But the Air Race is not just about speed—precision flying is crucial to success because any mistakes made by a pilot incur penalty points, which are then added to the pilot's time.

SPEED RACING

In closed-circuit air racing, the course is marked out by six 30 ft high (9 m) pylons. There are two parallel straights with a semicircle at each end. There are five classes of racing: Formula V, Sports Biplane, T6 Harvard, Formula One, and Unlimited. The Formula One course is usually 3 miles long, and each straight is 1 mile long. The number of race planes is limited to eight, and the race distance in Formula One is usually 24 miles (39 km).

Wing span The wings are 100% carbon-fiber and have a span of 26 ft (8 m)

The driving force Three-blade propellers are most widely used. The

maximum rotation is 2,700 rpm (revolutions per minute)

Engine power

Planes are commonly powered by fuel-injected, six-cylinder 8.8 liter engines, which are capable of producing 260-310 hp

Changing lanes

Ailerons are used to change direction. They are mounted on the trailing edge of each wing

The main body The fuselage should be strong and lightweight. It can be made of carbon fiber, steel tube, or a mixture of the two

Pilot seats This Extra 300L is built with a two-seat bubble canopy but is available with just

one seat

SIDELINES

The average length, in miles, over which the pilots race during each air-racing session. This translates to approximately 13 km.

The average speed, in miles per hour, that the planes reach during the qualifying sessions and during the race.

Race competitors perform challenging maneuvers and fly close to the ground. During some turns, pilots have to withstand forces of almost 10G-10 times their own bodyweight. All this must be endured without the help of a G-suit.

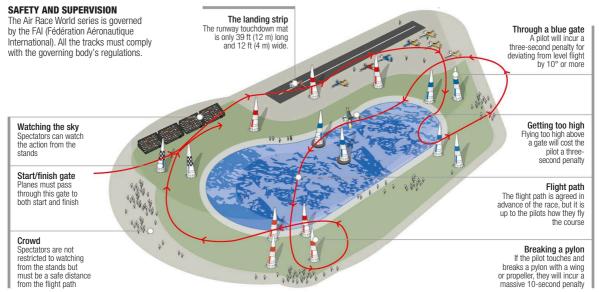
The year that the first Red Bull air race took place. There were only two races in that first year, but the number of races has increased over the years.

RULES AND REGS

The qualifying consists of two sessions, with the pilot's fastest result being used. The fastest 12 pilots take part in the elimination session, from which eight pilots will take part in the finals. Penalty seconds are added for an incorrect passing of a gate. A three-second penalty is incurred when a pilot passes a gate too high, performs the wrong type of crossing, or fails to perform a turning maneuver correctly. A 10-second penalty is incurred when a pilot touches a pylon or if the course is flown incorrectly.

Standing at 66 ft (20 m) high, an air gate consists of two pylons (only the Quadro, a special air gate, has four), which are made of a light spinnaker material that rips if it is touched by an aircraft. Colliding with the gates is not dangerous to the pilot or the plane, but it does produce a bang, because the pylons are filled with compressed air. The air gates are resilient and can withstand wind speeds of up to 34 mph (54 kph)—at their base, they measure 16 ft (5 m) across, and at their tip measure 29½ in (75 cm).





AIR GATE

THE COURSE

The race track is approximately 1 mile (1.4 km) long and consists of a series of inflatable gates (air gates). Pilots complete one of three predetermined flight plans in each session. They must pass between the gates, making either a horizontal crossing (through gates marked in blue) or a vertical crossing (through gates marked in red). Pilots must fly through the slalom gates that consist of three single air gates. The courses will differ slightly from event to event as each round will have new challenges and varying environmental factors.

A WORLDWIDE EVENT

From its humble beginnings in 2003, the Red Bull Air Race World Series grew into a global phenomenon. This development was halted by a hiatus in championships between 2011–2013, although the series recommenced in 2014. The locations used for the 2007 series are shown below. In the US, closed-circuit racing is still the most popular form of the sport (see opposite page).



ESSENTIAL FLYING TECHNIQUES

The Air Race is not just about speed; it is as much about precision. The pilots have to execute specific "turning maneuvers," such as the knife-edge maneuver, the horizontal crossing, and the half Cuban eight in order to navigate the track. The slightest mistake in the execution of the maneuver can result in penalty points being incurred. Other maneuvers include tailslides, vertical roll, horizontal round, and the Loop.

BLUE COLORED PYLONS

When positioned parallel to each other, the blue-colored pylons which stand approximately 46 ft (14 m) apart, form an Air Gate. The pilots must fly through the blue gates horizontally. This is called a horizontal crossing.



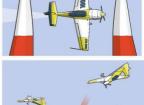
THE KNIFE EDGE MANEUVER

The red-colored pylons that stand just 33 ft (10 m) apart, form an even tighter air gate that pilots must pass in a "knife edge" (or vertical) position—with one wing pointed toward the sky and the other toward the earth.

THE HALF CUBAN EIGHT

This maneuver is used to reverse the direction of the plane. To execute the maneuver, the pilot performs a pullup and five-eighths inside loop to 45°, followed by a half roll, and a one-eighths inside loop to level flight.













SPORT OVERVIEW

In the snowbelt communities of the Northern Hemisphere, particularly the United States and Canada, snowmobiling is a popular motor sport with exciting—and fiercely competitive—winter races held on ice ovals and over cross-country trails. Snowmobiles grew in popularity when the invention of the Ski-doo in the late 1950s brought smaller and lighter engines to the rear-track, front-ski system of the earlier and larger snow vehicles that had been used by the military, postal services, ambulances, and the forestry industry.

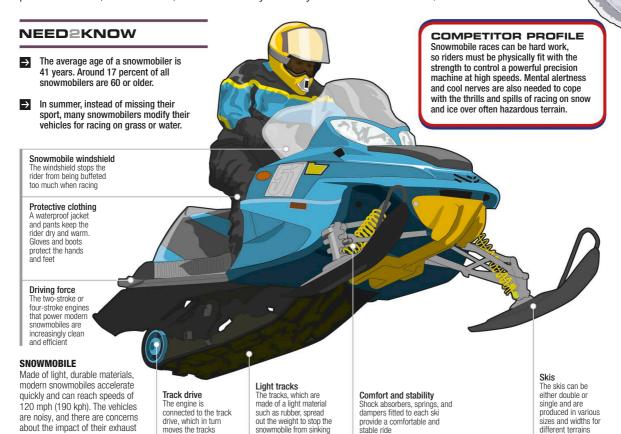
Banked corners

At each end of the ice oval, heavily cambered corners keep the snowmobiles

ICE OVAL

At many venues, including the famous Eagle River in Wisconsin, snowmobilers compete in races around oval ice tracks.

different terrains



SIDELINES

fumes on the environment.

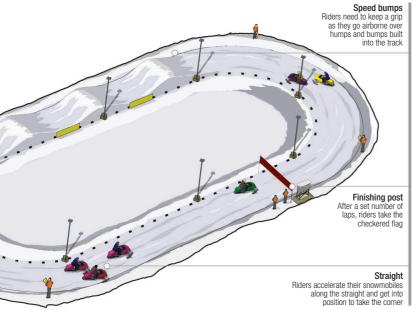
129,087 The number of snowmobiles sold throughout the world in 2012: 48,689 of them in the United The number of snowmobiles sold States and 40,165 in Canada.

The approximate number of miles (1.481 kph) per year an average snowmobiler rides. In the same period, he or she spends \$4,000 on the sport.

The percentage of snowmobilers who use their snowmobile for trail riding or touring on the many trails that have been specially groomed and marked. Around 20 percent use their snowmobile for transportation, fishing, or work.

The billions of US dollars that snowmobilers in the United States and Canada spend annually on their sport. In Europe and Russia, the corresponding figure is \$4 billion.

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EAGLE RIVER

The Derby Track at Eagle River in northern Wisconsin plays host to the annual World Snowmobiling Championships. Snowmobile racing started here in 1964, with events such as hill climbing, cross-country races, and sprint races on a track laid out on a lake and drawing a crowd of around 3,000. As the years went by, new courses and facilities attracted prize money, television coverage, professional riders, and crowds of 50,000 or more. In the 40th Eagle River World Championship, which was held over seven days, riders competed for the World Championship Oval, the World Championship Snocross, and the Vintage World Championship. In 2007, Eagle River held the 44th World Championship Derby, the Loadmaster Classic Vintage weekend, and a World Power Sports Association National Snocross event.

SNOCROSS

The thrilling sight of snowmobiles negotiating a snocross course (a track resembling a motocross course with snow) attracts large numbers of spectators. The short track, which is composed of various bumps, banked corners, and tight turns, encourages the riders to catch "big air" and perform breathtaking aerial maneuvers. Snocross classes may vary from region to region. In some championships, the classes cater to a whole range of abilities, from Mini, designed for children up to the age of 11; to Pro, for entrants who already have experience competing at an expert level (see stat table below).

TYPES OF SNOWMOBILE

There are five main types of snowmobiles, starting with the light, easy-to-handle, entry-level machines (also called trail models). Performance machines are heavier, have a little more horsepower (85+hp), and are more responsive. Touring snowmobiles are even larger and heavier, have longer tracks, and can carry two people in comfort over long distances. Mountain snowmobiles are longer, narrower, more powerful, and have special tracks that enable various maneuvers in deep powder snow. Utility machines, which are heavier, longer, and a little wider than other types, are good for trails and working in heavy snow.

TREK OVER THE TOP

Each February, snowmobilers can trek along 200 miles (322 km) of groomed trails from Tok in Alaska to Dawson City in Yukon. Also called the Tok to Dawson Poker Run, the trek allows touring snowmobilers to travel along the Top of the World Highway, with steep hills, howling winds, twisting turns, and breathtaking views.

IRON DOG CLASSIC

RENOWNED AS THE LONGEST AND TOUGHEST SNOWMOBILE RACE IN THE WORLD, THE IRON DOG GOLDRUSH CLASSIC IS CLOSE TO 2,000 MILES (3,220 KM) LONG AND LINKS WASILLA WITH NOME AND FAIRBANKS IN ALASKA. COMPETITORS RIDING SNOWMOBILES USING SPECIAL FUEL TRAVEL AT SPEEDS OF UP TO 100 MPH (160 KPH) ACROSS EXTREMELY RUGGED TERRAIN IN TEMPERATURES FAR BELOW ZERO.

GROOMING THE TRAILS

Throughout the snowbelt of North America, an army of volunteers from snowmobiling clubs and other organizations work with provincial, state, or local governments, and private landowners to design, map, construct, and groom marked trails. It has been estimated that more than 225,000 miles (362,000 km) of groomed and maintained trails are accessible to the 4 million or more snowmobilers in Canada and the United States.

STAT CENTRAL

SNOCROSS CLASSES		
CLASS	AGE RANGE	
MINI	5-11 YEARS	
YOUTH 1	9-13 YEARS	
YOUTH 2	13-17 YEARS	
SPORT	13 + YEARS	
PLUS 30	29 + YEARS	
MASTERS	39 + YEARS	
SEMI PRO	13 + YEARS	
PR0	13 + YEARS	

SNOWMOBILE ENGINE		
CYLINDER VOLUME		
125CC (MAX SPEED OF 10 MPH/15 KPH)		
500CC MAX (INC. LIQUID COOLED)		
500CC MAX (PRO UP TO 800CC)		
600CC MAX (NOT LIQUID COOLED)		
800CC MAX		

INSIDE STORY

The United States Snowmobiling Association (USSA) is the sport's oldest sanctioning body. Founded in 1965, it took on the organization of a chaotic sport—there were nearly 120 brands of snowmobile with more than 25 different engines, and races were held everywhere at the same time. The USSA established uniformity of rules, specifications, and track safety and ordered the events calendar.

WORLD POWER SPORTS ASSOCIATION (WPSA)

The WPSA is a governing body that organizes, regulates, and promotes various snowmobiling competitions.

ANIMAL SPORTS











HORSE RACING

SPORT OVERVIEW

Race competitions usually comprise six races run over various distances. In summer, all the meetings are flat; in winter, there are also jump competitions in some countries. Horses are trained to race according to their age and experience; younger horses usually run shorter distances and carry less weight. Jockeys are small, light, and highly competitive, and injuries are not uncommon particularly for jump jockeys. As a spectator sport, racing is extremely popular—classic races are watched by millions, many of whom gamble on the outcome.

LEGENDARY SECRETARIAT

THE AMERICAN RACEHORSE
SECRETARIAT IS A LEGEND IN THE
HISTORY OF THOROUGHBRED RACING.
IN 1973, HE SET RECORDS IN THE
TRIPLE CROWN EVENTS—THE
KENTUCKY DERBY, THE PREAKNESS
STAKES, AND THE BELMONT STAKES—
THAT HAVE YET TO BE BETTERED.

NEED2KNOW

- Most horse races are run over special courses either on the flat, over hurdles, or over jumps. The Palio horse race in Sienna is held in the town square twice a year.
- Bred for its speed, the Thoroughbred horse descended from three stallions—the Byerley Turk (1689), the Darley Arabian (1704), and the Godolphin Arabian (1730).
- The most famous steeplechase is the 4½ mile (7.2 km) Grand National at Aintree, England, in April each year.

FLAT RACECOURSES

There are two types of flat racecourses. Grass tracks are situated on undulating natural terrain and vary considerably in shape and size. Some operate in a clockwise direction and others in a counterclockwise direction, and many have straight sections that are long enough to accommodate shorter five-furlong races. All weather dirt tracks are handmade, flat, and in many countries operate only in a counterclockwise direction. The starting stalls are mobile and can be set up at the appropriate distances on race days. The finishing post is permanent and usually found in front of the grandstands. Most have a camera that photographs the first horse past the post. In a close finish, the picture is used to decide the winner.

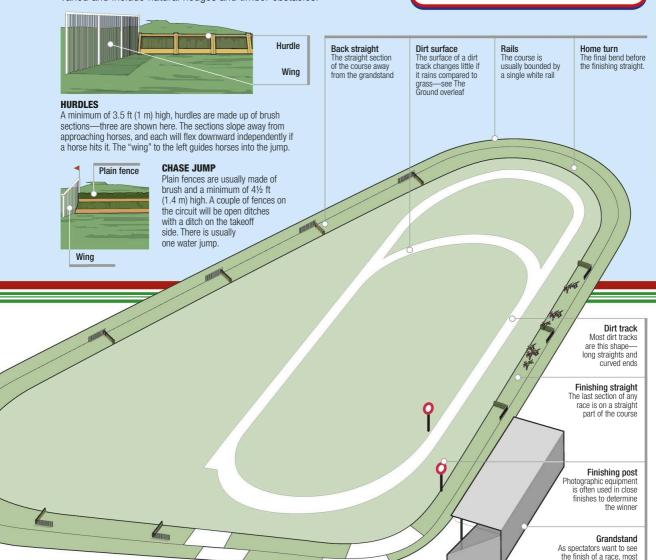
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STEEPLECHASE COURSES

National hunt racing is centered mainly in the UK, Ireland, and France. Racing is on grass over either brush fences or hurdles, which are flexible and lower in height. The two courses are usually side by side. Racing can be either clockwise or counterclockwise depending on the course, and some racecourses have both jumping and flat facilities. The amateur equivalent of the steeplechase is called a point-to-point; these courses are usually on farms and only used once or twice a year. Other countries, such as the US, do have jump races, but often the fences are more varied and include natural hedges and timber obstacles.

AMERICAN QUARTER HORSE

Most racehorses are Thoroughbreds, but Quarter Horse, Arab, and pony racing is also very popular. The Quarter Horse, named for its speed over a quarter mile, is the dragster of the horse world. It can cover 440 yards (400 m) in less than 21 seconds from a standing start, making it faster than a Thoroughbred over short distances. Quarter Horses race on the flat over one eighth to a half a mile (200 to 800 m). In contrast, Thoroughbred races range from one eighth to about 2½ miles (200 m to 4 km).

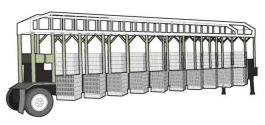


HANDICAP RACES

Horses sometimes run in handicap races, which aim to give all horses entered a fair chance of winning. Essentially, more successful horses carry more weight, 1 lb ($\frac{1}{2}$ kg) being equivalent to about one length in distance. If necessary, lead weight is carried in a weight cloth under the saddle. Jockeys are "weighed in" with their saddles and weight cloths before and after the race to confirm the correct weight is carried.

START GATE

Used in flat racing, horses are loaded into the back of the stalls and then released together from the front when the race starts. In the US, the opening of the gates coincides with the ringing of a bell.



grandstands are placed there

JOCKEY GEAR

All jockeys carry a whip, and most wear goggles to protect their eyes. They wear the same basic clothing (shown here) but change their "colors" depending on the owner of the horse they are riding.

HEAD GEAR

The crash cap is designed to cushion the skull during a fall and to protect the head from being kicked by other horses, both of which are more likely to happen in jump racing.







Boot tops

White breeches tuck into the soft tops of the boots

are mandatory for all jockeys.

LONG BOOTS

Soft leather hunting boots protect the lower leg and are often custom-made for extra comfort.



RULES OF RACING

Because large amounts of money can be won or lost on a single race, there are many rules and regulations in place to reduce the likelihood of fraud. For example, no race can start before the time stated, and winning horses, like athletes, are tested for drugs. Horses that are expected to do well but run badly are also tested to check they have not been "drugged," and sometimes the trainer and jockey are interviewed by the racecourse stewards to explain the poor running of a horse. Whipping is always a contentious issue, and so, in the UK, excessive use of the whip carries a penalty—jockeys found guilty of this are suspended for several days.

AGES AND RACES

Thoroughbreds are all aged from January 1 of each year regardless of the month in which they are born. Flat horses can race as early as 2 over a distance of 5 furlongs (1 km), but those destined for hurdling and chasing careers cannot start racing until they are at least 4 years old. Some flat races are restricted to fillies only and others to colts. Maiden races are restricted to horses that have never won a race.

BREEDING

Thoroughbred bloodlines are very important in the breeding of racehorses. The matching of a mare with a stallion depends on the sort of racehorse required. For example, fast racehorses are more likely to be produced from horses that were themselves successful in sprint races. Many Thoroughbreds are sold at sales as yearlings; purchases are made on the basis of their bloodlines and conformation.

RACE TECHNIQUES

The key to racing a horse is settling it at the start of the race so it doesn't waste energy and knowing how they run best. Some are front runners, others like to make a late challenge, and saving a horse can produce a good enough finish to win the race ahead of all its rivals.

GALLOP

All races are run at a gallop. At first, the pace may be quite steady, particularly if the race is a long one. The pace picks up markedly in the last mile (1.6 km), and by the final 220 yd, the horses in contention will be running flat out, encouraged by the hands, heels, and whips of their jockeys.

JOCKEY AND HORSE IN UNISON

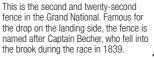
During a race, the jockey crouches low over the horse, keeping his legs still, but moving his arms slightly to accommodate movements of the horse's head as it gallops.

Sitting quietly Jockey crouched low and in perfect balance with the galloping horse

JUMPING

Besides running quickly, jump horses also have to clear a number of fences or hurdles at high speed without falling. Even if they negotiate the fence successfully, there is also the risk that they will be brought down by another horse falling in their path.

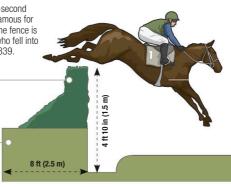
BECHER'S BROOK



The fence Unlike any other UK race fences, Grand National fences are built of spruce branches

The ditch

It contains a brook and is on the landing side of the fence



WINNING WAYS

Top racehorses are the product of good teamwork. On the day of a race, a horse must be produced in peak condition, and this is the responsibility of the trainer. He or she must get the horse fit and ready to race without it succumbing to any injuries. It will be ridden almost every day on the home gallops by a stable hand, and its progress is carefully monitored. The amount and type of work a racehorse does depends on the distance of the races it is going to run in and when in the racing season the races take place. Each horse has a stable boy or girl who is responsible for its care. They groom the horse to tone its muscles and keep it relaxed and happy. If the slightest thing is wrong, such as a horse not eating its food, it is their job to make the trainer aware of it. If everything goes to plan, the horse will be ready to race.

THE GOING

Some horses run better on hard ground than on soft, so the "going" is an important consideration when deciding to run a horse. Trainers will often enter horses for races at different courses or on different days of the same meeting so they can run the horse where the going suits it best. It also allows the trainer flexibility if a race meeting is abandoned.

THE JOCKEYS

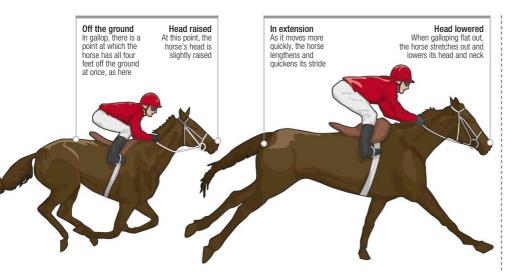
The jockey is an experienced rider who guides the horse through the race and ensures it has the best chance of winning when the time comes. "Stable jockeys" are retained by a particular stable to ride all their horses; other jockeys have agents and are booked to ride for a variety of owners and trainers. The jockey who rides the most winners in a single season becomes the champion jockey of that year.

THE WEIGHTS

In some flat races, all horses carry the minimum 110 lb (50 kg), but in handicaps, the weight carried ranges from 116 lb (53 kg) to 140 lb (64 kg). Jump horses carry a minimum weight of 117 lb (53 kg), while the top weighted horse may carry 176 lb (80 kg). Most professional jockeys are men, but there are a few women who hold licenses.

CHAMPION JOCKEY LESTER PIGGOT

CHAMPION JOCKEY ON 11 OCCASIONS, LESTER PIGGOT IS ONE OF THE GREATEST FLAT-RACING JOCKEYS OF ALL TIME. HE RODE HIS FIRST WINNER WHEN JUST 12 YEARS OLD AND RETIRED ON A TOTAL OF 4,493 WINNERS, WHICH INCLUDED NINE DERBYS.



RACE TACTICS

Race riding is very tactical, but success also depends on finding an opening between tiring horses when making the final challenge. Tactics are more extreme in valuable races where a trainer may enter a horse purely to make the pace for another more favored runner. Sometimes jockeys are given precise instructions by a trainer on how to ride a race, but others are left to decide for themselves as the race develops.

SETTING THE PACE

The leading horse in a race sets the pace. Jockeys on following horses must make sure that their horses are not tempted to run faster than they would like or get left too far behind and lose their chance of winning.

A GOOD START

A good start is essential particularly in shorter races that include bends. Getting away swiftly allows a jockey time to cross to the inside rails and take the shortest track without impeding other runners in the race.

USING WHIPS

The use of whips in horse racing, like racing itself, varies from country to country, and there are strict regulations regarding its length and weight. Whether hitting a horse makes it go faster or not is much debated. However, "showing" the whip to a horse in the final stages of a race and moving it back and forth without actually making any contact can help to keep a tiring horse running straight.

INSIDE STORY

People have raced horses since they were first domesticated over 4,000 years ago. Flat racing started in the UK, when knights brought small, swift Arab horses back from the Crusades. It became more popular in the 1700s, possibly due to royal interest in the sport—a tradition that has continued to the present day. Early European settlers took flat racing to the US, the first race track being built on Long Island in 1665. Today, it is the second most popular spectator sport.

Steeplechasing has its roots in the Irish hunting community when racing between landmarks, such as church steeples, gave the sport its name. Racing now has a worldwide following with tracks as far away as Australia and New Zealand, Hong Kong, Dubai, and South Africa.

THE WORLD'S RICHEST RACE

The Dubai World Cup is held in late March and is the world's richest race. It is a flat race run over a 10 furlong (2 km), dirt track at Nad Al Sheba racecourse in Dubai City, United Arab Emirates. First run in 1996, The Dubai World Cup was created by Sheikh Mohammed bin Rashid Al Maktoum and attracts the best 3- and 4-year-old Thoroughbreds in the world.

NEED2KNOW

→ The International Equestrian Federation (FEI) is the governing body for Olympic equestrian sports. Dressage has been an Olympic sport since 1912.

Dressage grew out of the training methods used to prepare horses for the battlefield.

SPORT OVERVIEW

Dressage has been called "horse ballet." It is the ultimate exhibition of horsemanship. In this centuries-old sport, horse and rider are tested on a series of precise movements, with the horse responding to the rider's slightest commands or "aids." Horse and rider are also expected to be dressed well. Dressage has a long military tradition, and riders from the armed forces may compete in uniform.



Dressage requires concentration, patience, and supreme horsemanship. The rider must exhibit complete control over the horse using the most subtle commands. The horse must be obedient, but the rider should not force it against its will. This can only be achieved over years of intensive training.

Formal attire

Military riders may compete in uniform; otherwise, riders wear formal attire as stipulated by the FEI and may consist of a top hat and tail coat with white or cream jodhpurs and long leather boots. Gloves are required

Good grooming

The horse should be immaculately groomed with the mane braided

Double bridle

Dressage riders use a double

bridle, which has two bits

that attach to two sets of reins





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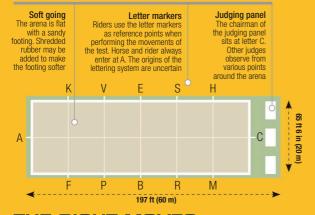




DRESSAGE

THE ARENA

The standard dressage arena is a flat rectangle, usually of sand. Letters mark the points in the arena at which particular movements are made. Those around the edge of the arena are visibly marked. The letters that run down the center line of the arena are not visibly marked but are used in the same way.



THE RIGHT MOVES

Each dressage test consists of up to 35 movements. A test is ridden from memory in a set order around points in the arena, which are marked by the letters. The test ends with a halt and salute to the head judge. Up to 20 tests are recognized in FEI international competitions.

ROUNDS AND TESTS

adjustable strips of leather

In advanced dressage tests, horse and rider perform a series of movements in an arena like that illustrated (see left). The horse has to show three paces—walk, trot, and canter—as well as smooth transitions within and between these paces. Five judges assess each of the movements from different angles and award a score from one to 10. Once added, these scores produce a percentage, and the rider or team with the highest marks is the winner. Olympic and World Championship competitions include Grand Prix, Grand Prix Special, and Grand Prix Freestyle (Kür) tests.

THE SPANISH RIDING SCHOOL

THE STALLIONS AND RIDERS OF THE SPANISH RIDING SCHOOL IN VIENNA ARE FAMOUS FOR THEIR PERFORMANCES OF CLASSICAL HORSEMANSHIP. THE HORSES ARE SAID TO DANCE TO THE MUSIC THAT ACCOMPANIES THEIR QUADRILLE RIDES DURING WHICH A GROUP OF HORSES PERFORMS A NUMBER OF DRESSAGE MOVEMENTS IN FORMATION. ONLY OLDER STALLIONS ARE TRAINED TO PERFORM THE COMPLEX MOVEMENTS OF HAUTE ÉCOLE OR "AIRS ABOVE THE GROUND." THE HORSES ARE CHARACTERIZED BY THEIR GOOD NATURE, STAMINA, PERFECT PHYSIQUE. GRACE. AND INTELLIGENCE.

EVENTING











SPORT OVERVIEW

Eventing is the triathlon of equestrian sports. Often taking place over three days, it combines the horsemanship of dressage with the endurance of cross-country and the skill of show jumping—all ridden on the same horse. As with many equestrian sports, eventing has a strong military tradition. In recent times, a shorter event has evolved, which has a reduced cross-country section and can be completed in a single day.

NEED2KNOW

- Before the 1952 Olympics, eventing was only for military athletes. Today, men and women compete against each other on an equal footing.
- → The cross-country tests the courage of both horse and rider over 30 to 40 jumps.
- The most accomplished riders come from Australasia, Europe, and North America.
- Eventing can take place over one, two, or three days.

PENALTY POINTS

Since 1971, the overall winner of an eventing competition has been decided using a system of penalty points. Penalty points accumulated during the dressage are added to jumping and time faults accrued in the cross-country and show-jumping tests. A rider receives time faults for each second by which he or she exceeds the time limit in each test, while jumping faults are given for knocking down or refusing to jump an obstacle. Depending on the ground—wet or dry—the cross-country test can be very influential when it comes to scoring the competition. The winner is the rider with the least number of penalty points in all three tests.

THREE-DAY EVENTING

Eventing is a complete test of horse and rider over three days of competition. Dressage takes place on the first day, followed by cross-country on day two, with the jumping test on the third and final day.

CROSS-COUNTRY

Natural

obstacles

Drystone walls

cross-country test

Leg protection

The horse's legs are covered with grease to protect them

against injury if they collide

with obstacles on the course

This is the most demanding test in the competition during which the fitness of horse and rider are tested. Competitors gallop over a set distance jumping a variety of solid obstacles, including water hazards and drop fences.

Each rider guides his or her horse through a course that includes up to 16 jumps. The course tests the jumping skills of the horse and rider, as well as the fitness and stamina of the horse, which will be recovering from the exertions of the previous day.



Show iump The poles used in show jumping fall when knocked by the horse

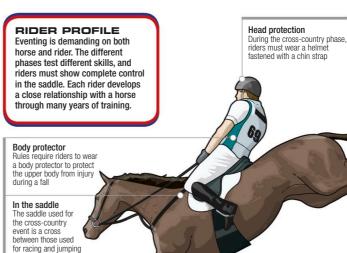


ELITE COMPETITION

The numerous competitions in FEI's international eventing calendar are categorized by their star rating, four stars being the highest level of competition and one star the lowest. The most advanced and greatly contested are the four-star Concour Complet International (CCI) events. There are only six four-star events in the world: Adelaide in Australia; Badminton and Burghley in Britain; Kentucky in the United States; Luhmülen in Germany; and Pau in France. The Olympics and World Equestrian Games are equivalent to four-star CCI events.

A SPORT OF PRINCESSES

IN GREAT BRITAIN, EVENTING HAS A NOBLE PEDIGREE. BOTH THE PRINCESS ROYAL AND HER **DAUGHTER ZARA PHILLIPS** HAVE WON MAJOR EVENTING COMPETITIONS, INCLUDING THE WORLD CHAMPIONSHIPS.



SHOW JUMPING









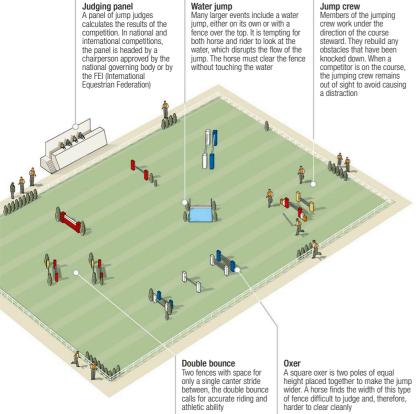
SPORT OVERVIEW

Show jumping involves horse-and-rider partnerships jumping over a course of obstacles in an arena. The rider has to present the horse at the jump (or fence) at a suitable speed and in balance, while the horse has to jump and land cleanly. There are usually two rounds. The second one, the jump-off, involves only those who cleared all the fences the first time and is held against the clock. Competitions range from small local events to the Grand Prix, World Cup, and Nations Cup.

THE ARENA

There is no standard arena size, and courses can be indoors or outside on sand, earth, or grass. Grand Prix are contested over courses of up to 15 obstacles and a distance of up to 3,330 ft (1,000 m). The course design includes a variety of set fences. For example, there will usually be a solid-looking wall, which is intimidating for both horse and rider. The prescribed route involves tight cornering and taxing takeoff points. Time penalties increase the pressure.





JUMPING RULES

STROLLER (1950-1986) IS ONE OF THE MOST

14.2 HANDS (434 FT/1.47 M) HIGH, HE COMPETED

HIS RIDER MARION COAKES WON THE HICKSTEAD

FAMOUS SHOW JUMPERS. A PONY OF ONLY

SUCCESSFULLY AGAINST HORSES OVER 16.2

DERBY, AND IN THE 1968 MEXICO OLYMPICS, THEY WON A SILVER MEDAL. THEY WON 61 INTERNATIONAL COMPETITIONS IN ALL.

HANDS (5½ FT/1.68 M) HIGH. IN 1967, HE AND

A TINY HERO

The basic rules of show jumping are quite simple: to clear the obstacles in the order dictated by the course builder. This must be done without the horse knocking down any poles or putting its feet into the water jump, stopping in front of a jump (a refusal), or running to one side of the jump (a run out); any of these earn four penalty points (faults). A second refusal results in elimination, as does following the wrong route or the rider falling off. The course must be completed within a set time. Those riders with the fewest faults at the end of the first round go on to the jump-off, which is held over fewer jumps. If two or more horses jump clear, the winner is the one with the best time.

SPECTATOR SPORT

With its straightforward rules and fast, furious pace, show jumping makes a good spectator sport. Individual rounds last a matter of seconds, and the variety of horses and personalities of the riders add to the interest.

SADDLE WORK

Competitive jumping is done at a canter—a fast, bouncy pace that the rider can adjust to achieve a longer or shorter stride. The comparatively short stirrup leathers allow the rider to move fluidly in the saddle. Leaning forward over the jump has the dual effect of taking the rider's weight off the horse's back and loosening the reins very slightly, both of which allow the horse to bascule (arc over the jump) more easily.

HORSE PROFILE

Although any horse can jump, not all make good competition jumpers. Key traits in a show jumper are boldness—to jump the fences—and carefulness—not to knock them down. It must also be responsive to the rider's requests and be highly athletic and fit.

MAKING A GOOD JUMP

A jump can be broken down into five elements: approach, takeoff, jump, landing, and getaway. Each one plays a key part in whether the horse iumps successfully or not.

Controlled approach

Impulsion (power in the horse's legs) is crucial in the approach. The rider may also alter the horse's stride length to arrive at the best takeoff point

Taking off and jumping

At takeoff, the horse tucks its front legs up and powers off with its hind legs. The jump is an extended canter stride

Landing and getaway On landing, the horse and rider move on to the next jump as smoothly and efficiently as possible



SIDELINES

The Olympic record for show-jumping golds, held by German Hans Gunther Winkler.

The FEI high jump record, in feet (2.47 m), set by Alberto Morales of Chile in 1949.

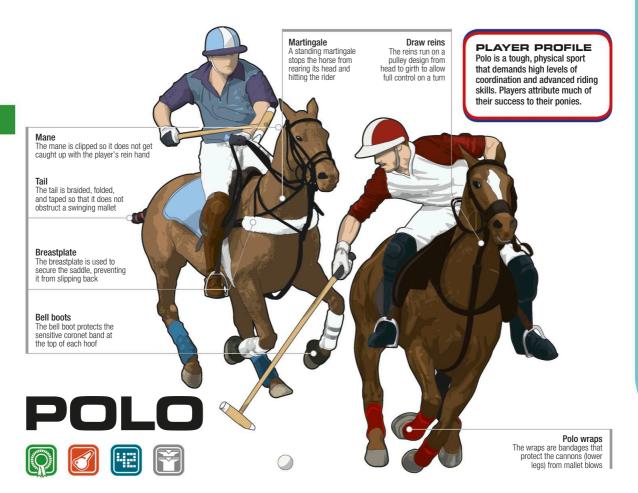
The longest jump over water, in feet (8.4 m), set by Andre Ferreira of South Africa in 1975.

50,000 The capacity of the equestrian center built for the 2000 Olympics in Sydney.

INSIDE STORY

The origins of show jumping can be traced to 19th-century Britain, when riders regularly negotiated obstacles such as fences and walls during mounted hunts. The riding style then was to have long stirrups and stay upright over the jump. Early competitions were dominated by military riders, and it was Italian Captain Fiederico Caprilli (d.1907) of the Pinerolo Calvalry School who developed the forward-iumping seat used today.





EVENT OVERVIEW

Outdoor polo is an equestrian sport played between two teams of four players. The game is played in time periods called chukkas. There are six chukkas in most matches, and each one lasts for seven minutes of nonstop play. During play, the goal is to score more goals than the opposing team. A player scores using a long wooden mallet to drive the ball through the opposition's goal posts. Polo is played at a breathtaking pace and is an exhilarating sport for spectators and players alike. An indoor variation, called arena polo, is also played.

ARENA POLO

Arena polo is an indoor version of the sport played according to the same basic rules. Each team has three players, and the game is played over four chukkas of seven and a half minutes each. Because the size of the playing area is smaller, arena polo is generally much slower than its outdoor counterpart, but it more than makes up for this with its physical nature.

SIDELINES

The number of times polo has been included in the Olympics (Paris 1900, London 1908, Antwerp 1920, Paris 1924, and Berlin 1936).

The age of Argentine polo player Facundo Pieres when he reached his 10-goal handicap—the youngest player ever to do so.

1875 The year in which the Hurlingham Polo Committee was established. It continues to govern the game in the United Kingdom under the name of the Hurlingham Polo Association.

14,130 The elevation, in feet (4,307 m), of the reputed highest polo ground in the world. It is situated on the Deosai Plateau in Pakistan.

NEED2KNOW

- Polo is one of the oldest team sports in the world. It is thought to have originated in Persia around 600 BCE.
- The Federation of International Polo (FIP) is the governing body for the sport and organizes the Polo World Championships.
- Argentina dominates the world of professional polo. Most of the world's 10-goal handicap players (the highest ranking) hail from Argentina.

ESSENTIAL EQUIPMENT

Polo is a tough contact sport, and the saddle and tack must be able to withstand the twists and turns and high-speed chases. Players use a long-handled mallet to hit the ball. The longer sides of the mallet, not the tips, are used to make impact.

18-54 in (120-135



SPECIALIZED BALL

In outdoor polo, the ball is made of solid high-density plastic. In arena polo, it is inflated and made of leather (above).



POLO SADDLE

Players use an English saddle similar to a jumping saddle but without the extra padding.

Rubber grip A rubber grip helps the player grip the mallet, and a webbed thumb sling wraps around the hand to prevent the player from dropping it

Bamboo shaft

The shaft is made from bamboo cane and may he rigid or flexible. The length depends on the height of the mount

Mallet head

The head is about 10 in (25 cm) long and tapered at one end to allow for a full swing flush to the ground

MALLET CONTROL

The mallet head is weighted to give a player greater control of the pendulumlike swing. The weight of the head is called the "cigar."

WHAT THEY WEAR

Every player wears a helmet, a polo shirt in team colors bearing the number of the player's position, and traditional white polo breeches. Riding boots may include spurs. Knee pads are mandatory in some clubs, and gloves are optional.



Team colors Players display colors on their helmets

HEAD PROTECTION

A flying ball could seriously injure a player, so it is necessary that all players wear a helmet.



GLOVES FOR GRIP

Most players wear at least one glove (on the right hand) to improve their grip on the mallet.



KNEE PADS

Pads protect the knees from hits and flying balls without causing injury to the horse.



COLLARED SHIRT

The collared polo shirt displays the team's colors and is as popular off the polo field as it is on it.



Polo shirt

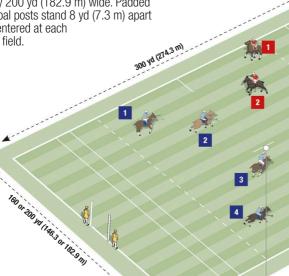
The shirt

RIDING BOOTS

Well-fitting boots cut just below the knees protect the lower leas from injury during play.

THE FIELD OF PLAY Outdoor polo is played on a flat, grass playing field with an area equivalent to nine soccer fields. The length of the field is

always 300 yd (274.3 m), but the width can vary. Fields that are enclosed by an upright board are 160 yd (146.3 m) wide, while unboarded fields, bounded by a white line, are usually 200 yd (182.9 m) wide. Padded wooden goal posts stand 8 yd (7.3 m) apart and are centered at each end of the field.



Number 1 Number 1 is the main attacker but the least experienced player. He/she uses the speed of his/her mount to race upfield and score goals

Number 2 The number 2 is the secondary attacker. He/she drives into the opposition's half, breaks up defensive plays, and sets up the scoring chances

Number 3 The most experienced player of the team, the number 3 is the playmaker and the pivot between attack and defense. He/she hits all the penalty shots

Number 4 The number 4, or back, plays defense. He/she uses the speed and strength of his/her mount to break up attacking plays and guard the goal

Goal area Two goal judges stand beside the goal posts to confirm whether or not a goal is scored

> 40 yd line Following certain fouls, a free hit may be taken from the 40 vd line

Side lines

Some polo fields are enclosed by a 12 in (30 cm) upright board, which stops the ball from rolling out of play

60 yd line Center T

At the start of each chukka, the players line up in two rows on either side of the center T

As well as penalties taken from the 30 and 40 yd lines, a free hit can also be taken farther away from the goal

PLAY THE GAME

Polo is played at an electrifying pace. A full match may last for 8 chukkas, but most games are now played over 6 chukkas. Play is continuous. Stoppages occur only when there is an injury to a horse or player or if broken tack prevents a player from continuing. The intervals between chukkas usually last four minutes, which allows the riders to change their mounts (although they may do so at any point in the game). There is a longer 10-minute interval at half-time.

POLO SPORTS

Many different sports go by the name of polo. One version is played using camels instead of horses, another uses elephants, and there is even a game involving yaks. Other polo sports include canoe polo and cycle polo, but these are generally played for fun. Water polo is a competitive team sport and is played at the Olympic level.

HANDICAPS

Polo has adopted a handicap system so that two teams fielding players of differing abilities have an equal chance of winning the game. The handicap is based on a standard 6-chukka match and runs on a scale of -2 to +10 goals, with -2 being the lowest and +10 the top end of the scale. A player with a handicap of 4 is good enough to play in international matches. Before the start of the game, the handicap of each player in the team is added to give the overall team handicap. The difference in the total between the two teams is given as a goal advantage to the team with the lowest handicap. So a team with an overall handicap of 30 playing a team with a handicap of 35 starts the match with a 5-goal advantage.

LEFT OUT

ALTHOUGH THERE ARE A FEW LEFT-HANDED POLO PLAYERS ON THE INTERNATIONAL CIRCUIT, THE MALLET MUST ALWAYS BE HELD IN THE RIGHT HAND—LEFT-HANDED PLAY WAS OUTLAWED IN 1975, AS IT WAS DEEMED TOO DANGEROUS.

PENALTIES

If one member of a team commits a foul, one of the umpires may call for a free hit or a penalty hit. Minor fouls are usually penalized by a free hit from the 40 yd line or the 60 yd line, depending on the level of the offense. If the foul prevents a player from scoring a goal, the umpire will call for a penalty hit from the 30 yd line. Penalties are usually taken by the most experienced player at number 3, who gallops up to the ball on the line and drives it between the goal posts. The opposing team cannot interfere with play during a penalty hit.

RULES OF THE GAME

The rules of polo are complex and govern everything from the size of the goal to the team colors. Various field rules cover playing situations. The main goal is to ensure the safety of the players and their ponies. The most common rules cover riding violations and dangerous use of the mallet. Three officials enforce the rules. Two mounted umpires follow the game on each side of the field. A referee presides off the field and settles any disputes between the umpires by watching a video replay of the game.

STARTING PLAY

At the start of each chukka, and after each goal is scored, the teams line up in two rows on either side of the center T. One of the mounted umpires then rolls the ball in between the two teams to start the game. When the ball goes out of play at the side line, the two teams line up 5 yd (4.6 m) from the spot where it went out, and the umpire restarts the game in the same way. If an attacking player knocks the ball out past the end line, a defending player hits the ball back into play from the spot where it went out of play.

ATTACKING SHOTS

A professional polo player can hit the ball the full length of the field in just two powerful strokes. Standing in the stirrups increases the power of the shot. A player may hit the ball in any direction. Some shots are much more difficult than others, so polo players of all levels practice their technique on a wooden horse. The hardest shot to play is known as the "millionaire's hit," which is taken under the horse's belly and involves considerable risk of injury if the mallet gets caught in the pony's legs.

Offside

FOREHAND

A forehand shot is played with the ball on the offside (right-hand side) of the polo pony. The ball is struck in the direction of travel.



The offside forehand is the most powerful and widely used shot in polo

Nearside backhand This is the basic backhand stroke and is the second most powerful shot in the game

BACKHAND Backhand shots are played with the ball on the nearside (left-hand side) of the polo pony. The ball is struck backward, opposite to the direction of travel.

DEFENSIVE PLAY

their strike

A variety of defensive techniques are used to contest for the ball in open play. The number 4, or back, is the key defensive player. He or she maintains a solid defense with support from the number 3. Most

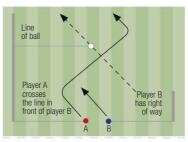


FOULS AND PENALTIES

Polo is a tough, physical sport and, with ponies traveling at full gallop, the safety of both rider and horse is always paramount. For this reason, the use of excessive force is considered to be unsportsmanlike conduct. A player may not use his or her elbows, for example, when riding another player off the ball. This will generally result in a free hit from the spot where the foul took place.

CROSSING THE LINE

The most important principle in polo is the "line of the ball." This imaginary line represents the path of the ball each time it is hit by a player, and it establishes the right of way for all the players on the field. When a player has the line of the ball, he or she has the right of way—which usually belongs to the player who last struck the ball. If another player crosses the line of the ball in front of the player with the right of way, the umpire will call a foul and award a penalty.



DANGEROUS RIDING

Dangerous riding is a catch-all for any riding behavior that is likely to put another player or pony in serious danger. Any exhibition of dangerous riding is strictly prohibited and heavily penalized by the umpires. Examples of dangerous riding include crossing in front of a player riding at a gallop, riding off at an angle greater than 45°, pulling across another player's pony, crossing the hind legs of an opponent's pony, or riding in a generally intimidating manner.

TACTICS AND TECHNIQUES

Polo is as much a game of tactics and strategy as it is an exhibition of strength and stamina. A team rarely works out an advanced game plan, but the players do take time to learn about the opposition's strengths and weaknesses in the hope of exploiting them during the match. Players save their best polo ponies for the 4th or 6th chukkas, which are generally the most crucial in deciding the outcome of the game.

TAILING THE BALL

Tailing, or backing, the ball is a backward pass to a teammate. The player who receives the pass can turn into the ball and then drive it into an attacking position. Tailing the ball is an easier option than turning the ball and may also be used when a player steals the ball from an opponent. After the steal, the player may tail the ball to turn it back in the direction of his or her opponent's goal.

TURNING THE BALL

Turning the ball allows a defending player who is chasing a ball in the direction of his or her own goal to turn and get into an attacking position. A player may also turn the ball to allow teammates to get into better positions. The turn involves cutting the ball back upfield and then turning the horse back onto the new line. This takes time, so it is best avoided if opposing players are close to the play.

RIDING OFF

In some circumstances, a player may decide to ride another player off the ball rather than try to hit or chase it themselves. This tactic is often used if a teammate is in a better field position to take the shot. Riding off is allowed as long as the angle of attack is less than 45°. Although the polo ponies do most of the hard work, each player may also use his or her body to shove the opponent off the ball.

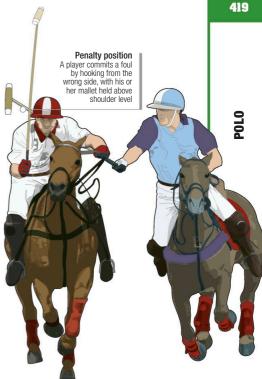


RIDING A PLAYER OFF THE BALL

The player in blue is attempting to ride his opponent off the ball. A player may use his or her mount to physically push an opponent off the ball. Riding off is a defensive move that can be used to prevent an opponent from striking the ball or to allow a teammate a clear shot.

FOUL HOOK

If a player tries to hook by reaching over his opponent's mount, the umpire will call a "cross-hook" foul. The hook must be attempted from the same side of the opponent's pony as the ball. Hooking above shoulder level or in front of the horse's legs will result in a penalty call.



INSIDE STORY

Known as the "sport of kings" thanks to its association with royalty, polo is a sport with a long history. The exact origins of polo are unknown, but it is certainly true that a version of the sport was being played in the Middle East as early as 600 bce. Over the centuries, polo spread throughout Asia and eventually reached Britain through India. The sport was included as an Olympic event from 1900 to 1939 but has since enjoyed limited growth due to the cost of competing at a serious level.

WORLD BODY

Founded in Argentina in 1982, the Federation of International Polo (FIP) is the world governing body for the polo-playing countries of the world. One of the FIP's main goals is to restore the sport's Olympic status.

BRITISH BODY

The Hurlingham Polo Association (HPA) is the ruling body for polo in Britain, Ireland, and 32 overseas associations. The HPA is the oldest polo organization in Britain and has 92 club members in the UK and Ireland.

GREYHOUND RACING



NEED2KNOW

Greyhound racing is popular in many countries but is a major betting sport in Britain, Australia, Ireland, New Zealand, and the United States.

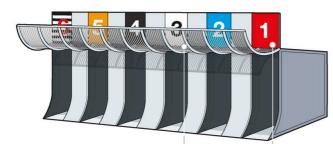
(210 m) and 3,624 ft (1,105 m). A rubber track surface is covered with a mixture of sand and a binding material, such as polyurethane, that prevents the grains from blowing away.

- An evening at "the dogs" is a popular social activity, with up to a dozen races and abundant food and drink.
- Other racing dogs include whippets and, mainly in the United States, dachshunds.

SIDELINES

29.36 The number of seconds taken by the legendary Mick the Miller to complete the 525 yd (480 m) Greyhound Derby course at London's White City Stadium in 1929. The half-minute barrier had previously been regarded as unbreakable.

The maximum number of characters permitted in the name of a racing greyhound; that includes spaces between the words. "Mick the Miller" was only one letter under the limit.



IN THE TRAP

The dogs are loaded into the starting gate according to a draw or current form. When they are in safely, the starter gives the order to start the hare.

Gates

Open automatically to release the dogs after the lure has passed

Numerical significance The trap and the dog closest to the inside rail always have

the number one



Every dog wears the appropriate jacket for his or her starting trap. Most races have six competitors, but in a seven- or eight-dog race, No.7 wears a leaf green jacket,

COLOR CODING

Outside rail The greyhound with the highest number starts from the trap closest to this perimeter fence

Speeding lure
Runs on a rail that encircles the
outer perimeter of the track; when it
reaches a certain point beyond
the starting gates, it goes over a
tripswitch that opens the gates
and lets the dogs out

Paddock

Between the weigh-in and the start, all runners must remain in plain view of spectators and officials so that the former can pick the likely winner and the latter can ensure that there are no attempts to tamper with the dogs

Finish line

Cameras are mounted on the line to help judges call close decisions

Starting traps

These are removed from the track once the race has started and the dogs are clear

Grandstand

The site of most of the amenities—bars, restaurants, and bathrooms. There are betting kiosks here, too, as well as stalls all around the stadium

THE HARE

Starter's rostrum It is from here that the main course official gives a plainly visible signal to start the hare The lure is electrically powered and runs on a rail around the edge of the course. Although they are known as hares, lures may come in any shape, within reason



34,000,000 The number of spectators who paid to attend greyhound races in Britain in 1946, an all-time high.

75–80 The weight, in pounds (34–36 kg), of a racing greyhound at the peak of its career, between 2 and 3 years of age.

The number of US states with greyhound racing tracks. There are now only 25 tracks in the US, 13 of which are located in the state of Florida.

DOG TAGS

Every greyhound must have an identity book that gives its sex, color, and markings (including earmarks) to prove that it really is the dog its owner says it is. This ID system is employed to prevent "ringing" (unauthorized substitutions).

RACE REGULATIONS

Every greyhound must be a registered weight, which is notified by the owner and agreed in advance by the race organizers. If the dog is more than 2.2 lb (1 kg) over or under at the weigh-in, two hours before the start, it will be withdrawn from the race.

Some events are open; others are graded. In graded races, the best dogs are seeded and given the starting trap that most suits their racing style. Those in the outside lane have a "W" (for "wide runner") marked on their trap or beside their name on the race card. Seeded greyhounds with a known preference for the middle of the course are denoted by the letter "M."

No dog may run in more than one race per meeting. In the event of a dead heat, the winner may be decided by drawing lots.

OBSTACLE COURSE

Some dog races are held over a variable number of hurdles, usually between five and seven. Each jump is 2 ft 6 in (75.8 cm) high and slants forward perpendicularly at 20–25°. Like horses, greyhounds tend to be suited to one form of racing or the other, and rarely excel in both. In most dog-racing nations, the premier hurdle event is the Greyhound Grand National; flat-track equivalents are known as Greyhound Derbys.

INSIDE STORY

Greyhound racing has its roots in hare coursing, but it had detached itself from bloodsports by the late 19th century. In Britain, attendances at meetings peaked after World War II but declined dramatically when off-course betting was legalized in 1961. (The sport still has a huge following among gamblers.) Dog racing is also big business in Australia and, increasingly, South Africa. In several European countries, races are popular but less commercial; greyhounds that compete in Belgium, France, Germany, and the Netherlands are still principally pets rather than investments.

NEED2KNOW Almost all harness races are run over 1 mile (1.6 km). In Australia, race distances are sometimes a little longer. Most harness races begin with a running start behind a mobile start gate mounted on the back of a motor vehicle. Major international races include the Hambletonian Stakes in the US, the Maple Leaf Trot in Canada, and the Prix d'Amérique in France. Sulky carriage The sulky is a lightweight, two-wheeled cart with ar aluminum frame Wheel discs



protector and helmet

the horse using leather or synthetic driving lines, which attach to the bit in the horse's mouth

COMPETITOR **PROFILE**

Most harness racing drivers train their own horses. They focus on getting the horse to master its gait, lengthening the stride to increase its speed across the ground.

Overcheck

The overcheck attaches to the bit and lifts the head to keep the horse balanced in the trot

Martingale

The martingale is an attachment that stops the horse from throwing its head upward

Horse's harness

The harness is all the gear worn by the horse when racing. It comprises the saddle, girth, crupper, bridle, and driving lines

Leg protection

Brace bandages stick to and protect the legs. Quarterboots protect the top of the hooves. Knee boots are worn to protect the insides of the knees

The wheels are a standard size. They are covered with plastic discs to reduce drag around the spokes







RNESS RACING

SPORT OVERVIEW

Harness racing is a popular form of horse racing in Europe and the United States. Each horse pulls the driver in a cart called a sulky. Races take place at a trot or pace. and the horse must not change its gait. The winner is the first horse past the finish post.

DUST TRACKS

In the United States, almost all harness races take place on flat dust tracks. The track must form a circuit, but otherwise there are no rules about its shape or dimensions—straights can be long or short, and curves can be tight or sweeping. The mile is widely regarded as the classic distance. In Europe, racetracks are usually covered with grass and can be up to 1½ miles (2.2 km) long.

SPECTACULAR STARTS

In the United States, some races have spectacular running starts behind a mobile starting gate. The drivers get their horses up to speed as the gate approaches the starting line. Then, as the gate passes over the starting line, the two wings of the gate fold forward, leaving the horses free to battle it out over the racetrack.

BREAKING THE GAIT

The most important rules govern the horse's gait during the race. Assisted by the race stewards, the gait judge is responsible for checking gait. He or she follows the race in a car and may use video footage to see if any horse breaks gait. In European races, breaking gait results in immediate disqualification. In the United States, the horse must move to the outside of the track and resume the required gait before continuing to race. The horse then drops one place overall.

HORSE'S GAIT

Harness racing takes place in one of two different gaits, or stride patterns. European races are exclusively trotting. In North America and elsewhere, the faster pacing gait is much more common than trotting.

THE TROT

In the trot, the left front and right hind legs touch the ground at the same time, then the right front and left hind legs.



THE PACE

In the pace, the left front and left hind legs touch the ground at the same time, then the right front and right hind legs. Unlike the trot, in which diagonal pairs of legs move together, the pace involves coordination of the limbs on each side of the horse in turn. This is not a natural pace for most horses and so it has to be taught or bred to move in this way. To help maintain the pace during races, many horses wear an additional piece of tack called a hobble hanger, which fits loosely around the upper leg.

RODEO







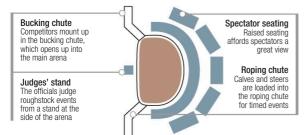


SPORT **OVERVIEW**

Modern rodeo is an American creation with Mexican origins. There are seven standard events in most professional rodeos. The roughstock events are judged. and the competitor with the most points wins. The timed events are races against the clock, and the fastest competitor wins.

THE ARENA

A rodeo takes place inside a fenced dirt arena. There is no standard size for the arena, which may be indoors or outdoors. At one end is a bucking chute, where competitors mount for the ride. A gate opens up into the arena when the competitor is ready. The roping chute is a three-sided pen at the opposite end of the arena. It is used to load the animals used for the timed roping events.



COMPETITOR PROFILE

Different rodeo events require different skills. Roughstock events are the most physically demanding and require great strength and agility-and an equal measure of courage! Roping events rely on agility, speed, strength, and timing.

→ The Professional Rodeo Cowboys Association (PRCA) is the largest governing body for the sport.

> Held in Las Vegas, the National Finals Rodeo is the most prestigious event of its kind in the United States.

> > Horse control

Riders use a thick hack rein secured to a halter

on the horse's head

NEED2KNOW

Saddle The Western saddle used for saddle bronc is extremely light and has no horr

> Leather chaps Chaps are leather pants that protect the legs and the front portion of the pelvic area

RODEO RULES

RODEO STYLE

There are three roughstock events: bareback, saddle bronc. and bull riding. Competitors may use only one hand to ride: any use of the free hand results in disqualification. There are four timed events: steer wrestling, barrel racing, tie-down, and team roping. In all but the barrel-racing event, a barrier across the bucking chute stops riders from getting a head start on the livestock. Breaking the barrier incurs a time penalty.

ROUGHSTOCK SCORING

Scoring for roughstock events is based on a ride of at least eight seconds without disqualification. There may be two or four judges, each of whom awards up to 25 points to the competitor and the animal. The score for a perfect ride is 100 points.

RODEO TECHNIQUES

While good riding skills are key to all the rodeo events, the tie-down and team roping events require the additional mastery of various roping techniques from the saddle (see below).

BARREL RACING

Traditionally a women's event, a barrel race is a timed race where riders complete a circuit around three barrels placed in a triangle.



TIE-DOWN

Tie-down involves roping a calf and tying its legs together. The calf must remain tied for six seconds or the competitor will be disqualified.

BULL RIDING

Style is an important part of the modern rodeo. Riders wear a

traditional cowboy hat made of either tan straw or black felt.

A true cowboy would never lose his hat during an event.

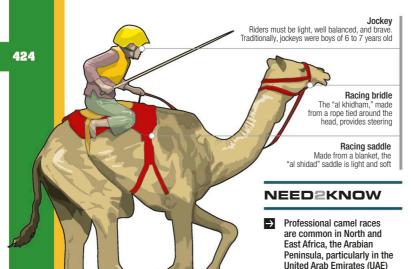
Bull riding is a bareback form of riding using only a thick bullrope to stay on the bull. The event requires coordination and courage.







CAMEL RACING









SPORT OVERVIEW

This popular spectator sport, which originated centuries ago among the Bedouin tribes, attracts large prizes. Female camels are preferred for racing. When trained, they can sprint at up to 40 mph (64 kph) and maintain speeds of 18 mph (28 kph) for an hour.

RACE TRACK

In the United Arab Emirates, races are held over 21/2-61/4 miles (4-10 km) on specially built, circular sand tracks. Australian races are typically "quarter-milers" over 440 yds (400 m), but longer races are increasingly common as the sport's popularity grows. Tracks can be grass or sand.

ROBOTS AND CAMELS

A racing camel is long-legged and slender. Its hump is much reduced due to the animal's extreme fitness. Camels begin training at about 13 months old and start racing at 3 years old. Controversy over the use of child riders has led to the development of tiny robotic jockeys, complete with whip, which are controlled from vehicles following behind.

DGSLEDDING





dogs to begin pulling

and aluminum fittings



SPORT OVERVIEW

and Qatar, and in Australia.

The King's Cup Camel

Race, held annually in

Saudi Arabia, has 2,000

competitors. Most races have 25-30 entrants.

Sprint or endurance dogsledding races are held worldwide (on wheeled carts if there is no snow). The sled is pulled by teams of up to 24 dogs, usually hitched in tandem. The driver rides behind and directs the dogs.



IDITAROD RACE

THIS ALASKAN RACE IS 1,150 MILES (1,852 KM) LONG. MITCH SEAVEY HOLDS THE RECORD OF 8 DAYS, 3 HOURS, 40 MINUTES, SET IN 2017.

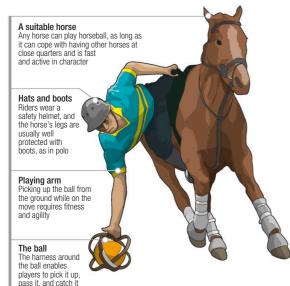
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HORSEBALL









SPORT OVERVIEW

This comparatively new equestrian sport has been likened to a combination of polo, rugby, and basketball. It is played by two sides of four mounted players who can be of any sex and any age over 8 years old. The winner is the team that scores the most goals.

FIELD OF PLAY

The arena is 65×200 ft (20×60 m). The two goals are 3 ft (1 m) circles, fixed vertically, the base $11\frac{1}{2}$ ft (3.5 m) high. The game has two 10-minute halves; players pass the ball with the goal of scoring—three passes must be made between three team members before scoring.

HORSE AND RIDER

Originally developed to inject new life into riding schools, horseball's fast pace requires good balance and excellent communication between horse and rider. Riders have to be able to control the horse with their legs and without using the reins. The horse must be responsive and fit. Some dressage training is ideal as this increases its agility and suppleness.

NEED2KNOW

- Horseball was first played in the 1970s in France.
- Two important events are the World Championship, the European Horseball Championships, and the Champions League.
- The International Horseball Federation has 16 members.

HORSE DRIVING









NEED2KNOW

Harness racing, an ancient sport dating to Roman chariot races and before, involves racing around a sand or dirt track. Speed is key.

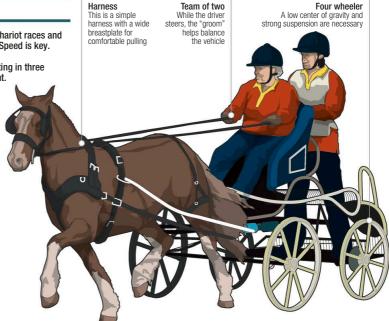
Trial driving is newer and consists of teams competing in three events—speed, agility, and obedience are important.

SPORT OVERVIEW

There is a wide variety of driving activities, ranging from trotting races, where horse and driver teams race each other, to trial driving, where teams of four horses complete various tests, including dressage.

HORSE AND DRIVER

Because of its diversity, there is a type of driving to suit any horse, from pony to heavy horse. Pacing races are fast and use ultralight buggies, while a full-size coach drawn by a team of four horses is slower but requires just as much care and coordination on the part of the driver. Britain's Prince Philip was a competitive driver for many years.











SEA MATCH FISHING

SPORT OVERVIEW

Competition fishing from the shore is the logical progression for many pleasure fishermen looking for a competitive side to the sport. Shore-based competitions tend to be split into two distinct types: pegged/fixed venue, and roving, defined boundary/area events, depending very much on the area in which they are held. More so nowadays, these competitions are fished in the most conservation-minded way possible, in which fish are caught, quickly measured, and then returned alive to the sea (especially the pegged, fixed venue matches). Various fish are assigned certain numbers of points according to species and length.

NEED2KNOW

- Modern sea match fishing grew out of the "birth" of technically advanced shore fishing in the 1960s. Modern rod building methods came from the use of fiberglass, and this gave rise to pioneering long range shorefishing techniques to fish more successfully certain coastal areas.
- Due to the need to catch all kinds of fish in front of you, sea match fishing tends to be a very technically advanced arm of the sport. These highly specialized fishing methods in turn filter down to certain parts of the pleasure fishing market (rig, rod, transport, and shelter developments, for example).

COMPETITOR PROFILE

Sea fishing is a sport where often lengthy periods of inactivity (waiting for fish to bite) are punctuated by short bursts of frenetic activity (when fish are caught, reeled in, weighed, and released in a matter of a few seconds), so anglers need excellent concentration, patience, and quick reflexes. Good upper-body strength and balance is important, especially when reeling in (some fish are extremely heavy), as is a willingness to experiment with different equipment, types of bait, and locations to get the best catches.

Keeping warm

A snug fleece is usually preferred on cold days when the wind blows in from the sea

Hold tight

Fishermen keep a firm grip on the base of the rod, with the other hand supporting

Sturdy clothes

Anglers are likely to get dirty fishing from slippery rocks and other terrain so jeans are common

SIDELINES

3,000 The number of competitors who took part in the sea match fishing World Games in Portugal in 2006. The World Games is the flagship event of the sport, held every five years at different venues around the world.

The total number of world championship medals won by England's Chris Clark. Chris retired from competitive fishing in 2006 and is now a member of the international board and a leading referee.

Strong legs

The leg muscles of a fisherman will be strong from many hours spent on their feet

Solid base

Boots with good grip are important, especially when reeling in

TECHNIQUES AND TACTICS

There are a number of fundamentals that are of great importance for successful competition fishing, two of which are described below.

CASTING

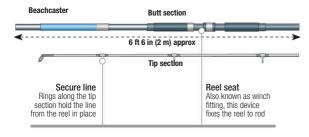
Casting is the art of using the rod and reel to cast the baited rigs out to sea, sometimes at very long range. The ability to be able to cast farther, often into deeper water, can be an advantage. A safe, reliable, and efficient casting technique will pay dividends.

PLAYING THE FISH

Often when a fish is snared, the angler will not reel it in right away. He will allow it to take the line against the reel's drag until it runs out and then recover line when the fish tires. This allows for heavy fish to be successfully landed.

EQUIPMENT

The majority of shore fishing is carried out using a 12–14 ft (3.66–4.27 m) fishing rod, most commonly known as a beachcaster. They are designed to cast around 4–6 oz (113–170 g) of lead weight plus bait; the fisherman then watches the rod tip for any sign of a bite. Many open beach and estuary style match fishermen will also carry a slightly lighter rod (rated 2–4 oz/56–113 g) and reel, principally for fishing at close to medium range for smaller species (called "scratching").



TRIPOD

A large part of shore fishing, both match and pleasure, is about casting out and waiting for the fish to come to the bait—hence the need for placing fishing rods in a purpose-built tripod and watching the tips for signs of a bite.

FISH TO THE CLOCK

Once the baited rig is cast out, the rod tends to be placed in the tripod. In areas where there are plenty of small fish, many fishermen will "fish to the clock," whereby they reel in at their own set time intervals. This serves both to bring the fish in for measuring and also for a continual changing and renewal of the baits (to keep the freshest, most inviting scent trail out there as possible). But often the fisherman will wait for the rod tip to signal a bite (when the fish picks up a baited hook, the movement "rattles" the rod tip) before reeling in the fish.

RIGS

There are countless varieties of rigs for match fishing, mainly working on the principal of baiting up the hooks, casting out the baited rig, and letting the weight (grip or plain) settle on the bottom. Fish home in on the scent from the bait.

BAIT

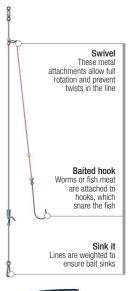
The successful match fisherman will access the best quality bait, often carrying many varieties and with plenty of research into local preferences and recent trends. Baits might include various worm species (lugworm, ragworm, white ragworm, etc.), crab, fresh and blast-frozen fish (mackerel, sandeel), and squid.

REELS

The reel is a device used for the deployment and retrieval of fishing line, using a spool mounted on an axle. In sea match fishing, small multipliers or medium- to large-sized fixed-spool reels are used, depending on preference.

Bail arm

This is flicked back to allow line to flow off the spool when casting; it flips forward when handle is wound on





RULES

There are two different types of sea match fishing—one based on the sizes (length) of the fish caught, the other on the total weight of all fish caught by the individual fisherman.

ROVING, DEFINED-AREA MATCHES

These style of matches tend to be fished in areas where suitable venues for large-scale, fixed-venue matches do not exist, generally along areas of the coastline made up of rocks, small bays, cliffs, and headlands. The competition is again run to specific times, but due to the roving nature of them, more often than not, the fish will be brought back to a central weighing station at the end. The winner tends to be the person with the heaviest "bag" of fish; note that once again the competition will be run on strict size limits of fish.

PEGGED, FIXED-VENUE MATCH

A suitable venue is chosen by the committee, often an open beach with sufficient space to be split up into zones and pegs (specific location for the fisherman to fish from). Fishermen tend to gather beforehand at a designated location to pay their subs and pick their peg numbers on a

random basis. From here, they will spread out to their pegs and await the start time. Once underway, on a measure and release competition, the fisherman will measure any fish with a fellow competitor or steward as a witness and then return the fish alive before casting out again. Points are awarded on lengths, bearing in mind that species of fish have to attain certain minimum lengths to count. The winner is the fisherman who records the greatest length total at the designated finishing time. There are often cash prizes for zone winners as well as the overall winner.

INSIDE STORY

Match angling is governed by the International Sport Fishing Confederation (CIPS), formed in 1952. A subdivision of CIPS, the International Sea Sport Fishing Federation (FIPS-M) organizes a variety of annual World Championships (shore, boat, big game, long-casting, etc.) for men, women, and junior competitors. Each competing nation submits a five-man team. There are also prizes for individuals.





SPORT OVERVIEW

Street luge is an extreme version of the Olympic winter sport luge. Riders hurtle down a concrete track or road on a glorified skateboard at speeds of up to 70 mph (110 kph), lying just inches above the ground. Street luges do not have brakes; riders must use their feet to slow down. The objective is simple: to get to the end of the course first. Every course is different, but most are ½–3 miles (1–5 km) long. There are several types of competition, all equally hair-raising. In dual competition, two racers compete for the right to progress to the next round, and there are also competitions where four or six lugers race each other, with frequent crashes.

SPEEDING TICKETS

IN THE EARLY DAYS OF STREET LUGE, RACERS OFTEN COMPETED ON PUBLIC HIGHWAYS IN CALIFORNIA. THERE WERE NUMEROUS CRASHES INVOLVING SPECTATORS AS WELL AS COMPETITORS, AND THE CALIFORNIA HIGHWAY PATROL EVEN HANDED OUT SPEEDING TICKETS. EVENTUALLY, LOS ANGELES AND OTHER CITIES BANNED RACING ON STREETS WITH A GRADIENT STEEPER THAN 3 PERCENT.

RULES OF THE ROAD

There is no single governing body and no one set of rules, although competitors are never allowed to push or kick each other out of the way. Luges must have bumpers at the front and rear, but regulations governing the weight, length, and width of the luge vary between sanctioning bodies. For example, Gravity Sports International disallows luges heavier than 55 lb (25 kg).

STREET LUGE







NEED2KNOW

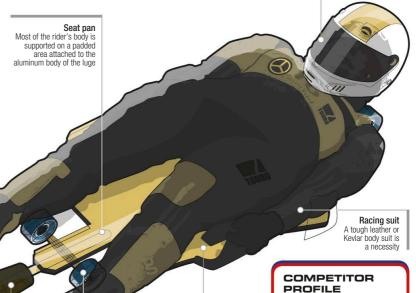
- Street luge is most popular in the United States, Canada, and some European countries, including Austria, France, Switzerland, and Britain.
- The sport originated in southern California in the 1970s.
 Skateboarders discovered that they could go downhill faster if they lay down on their boards.
- The first competitive race was in Signal Hill, California, in 1978.
- The major street luge sanctioning body is the International Gravity Sports Association.

GEAR AND WHEELS

Riders often come off their luges and need to be well-protected. Helmets, full leather suits, gloves, and boots are standard. The luge design varies greatly. Some are made of wood, but most are aluminum. They have between four and six wheels, front and rear bumpers, lean-activated trucks (which connect the wheels and axles to the seat pan), and handrails. Luges are up to 8 ft 6 in (2.6 m) long and 16 in (40 cm) wide.

Racers wear a hard shell helmet with a face shield and chin strap

Head shell



PUSH-OFF APRON

A good start is essential if a competitor is going to win a race. Racers use their hands to gain momentum in a zone between the starting line and the beginning of the road course called the push-off apron. Once speeding downhill, experienced racers take advantage of the slipstreams behind other racers to maintain speed.

Safety bumpers Luges have a bumper at the front and rear

Small wheels

There are four front wheels attached to the truck. The wheels are about 4 in (10 cm) in diameter

Street luge is potentially a very dangerous sport, and

Steering truck

The trucks have lean-activated

leaning the body

one way or the

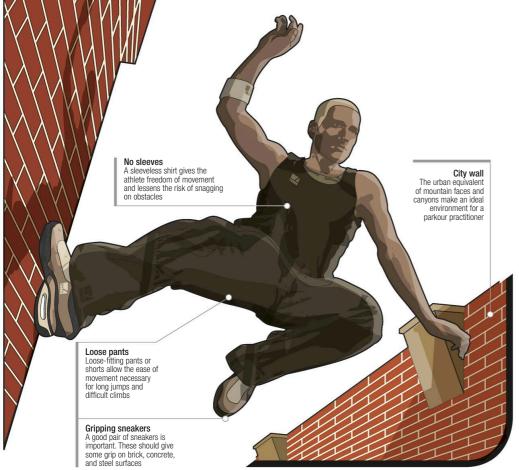
other, the rider

can change the

luge's direction

steering. By

very dangerous sport, and competitors need nerves of steel as they corner at great speed. Racers must be totally focused on the course ahead and their fellow racers, since any lack of concentration can result in a costly crash.



NEED2KNOW

- The word parkour comes from the French parcours du combattant, the obstacle courses used by French soldiers in training in the early 20th century.
- Parkour movements have featured in many films, including Casino Royale and Breaking and Entering, and in the BBC TV trailer Rush Hour.
- Organizations such as Urban Freeflow offer advice and training to aspiring traceurs.

COMPETITOR PROFILE

Before an aspiring traceur attempts a difficult route, he or she must train for months, if not years. Physically, the sport requires strength throughout the body, balance, and agility. But parkour is just as much about mental strength—the ability to be totally aware of the surrounding environment and the judgment to decide in a split second whether or not a move is feasible.

PARKOUR



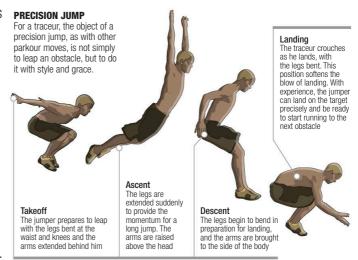


SPORT OVERVIEW

Demanding the agility of an acrobat and the spirit of a warrior, parkour has attributes of martial arts and of dance. It involves uninterrupted motion around, under, over, and through physical obstacles—usually the city environment. The practitioners of parkour are called traceurs. There are no fixed courses, but experienced traceurs stretch themselves by climbing walls, jumping obstacles, and running along the tops of rails. Each new obstacle presents a new challenge. Parkour demands more than simply strength, stamina, and agility. Its adherents also believe it should involve grace and beauty. Most do not compete against each other but against themselves in a constant struggle for self-improvement.

LEAP OF FAITH

Each route presents a different set of difficulties, and an experienced traceur must know hundreds of moves. However, the core skills—jumping, landing, and rolling to absorb impact—are just as important. Precision jump, or *saut de precision*, is a jumping move that combines power, grace, and accuracy (see below).











SPORT OVERVIEW

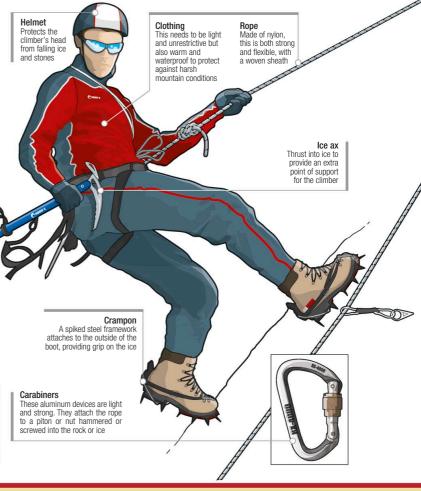
Extreme climbers tackle rock and ice faces that look impossible even to regular climbers. Climbs are divided into aid and free. Aid climbing uses artificial devices for support whereas free climbing uses only natural features. Both free and aid climbers use ropes, although in free solo climbing, often only climbing shoes and hand chalk are used. The main challenge for most extreme climbers is tackling new and more difficult routes, or completing a route in a faster time.

NEED2KNOW

- Ice climbing is especially popular in North America, with 220,000 enthusiasts in the US alone. Ice Climbing World Cup events are held in North America and Europe.
- A survey in the United States showed that climbing is one of the most popular extreme sports. The average age of climbers was found to be 23 years.

ATHLETE PROFILE

Climbers need great leg and arm strength, muscle coordination, endurance, flexibility, and excellent balance. The ability to remain relaxed and confident on vertical faces and overhangs is equally vital.



WHERE THEY CLIMB

Anything goes, especially uncharted territory. Vertical faces, crumbling rock, overhangs, and harsh weather all represent new challenges to be overcome. Climbs are graded for difficulty. For example, an A6-graded climb on the "new wave" system is so treacherous that if one member of the team falls, the mistake may kill the whole team.

INSIDE STORY

People have climbed mountains for thousands of years, but the first recorded climb of a major peak was of Mont Blanc, France, in 1786. Competition climbing first developed in Russia in the 1970s.

GOVERNING BODIES

Competitive ice climbing is governed by the International Mountaineering and Climbing Federation (UIAA). Indoor sport climbing is governed by the International Federation of Sport Climbing (IFSC), formed in 2007.

EQUIPMENT

Equipment varies according to the type of climb. A free climber may use only climbing shoes, gymnastic chalk to dry sweat from his or her hands, and lightweight, nonrestrictive clothing. Aid climbers use ropes, carabiners, pitons, and more. Ice climbers wear crampons over their climbing shoes and carry ice screws and ice axes. If a climber is planning to camp overnight on a mountain, he or she will need a sleeping bag or down jacket; a bivy bag is also useful.

CLIMBING SHOE

The tongue of a climbing shoe is made of supple leather or synthetic material with a sticky rubber sole and toes and heel liners made of rubber. They should fit snugly around the foot.



ICE SCREW

These are tubular and can be screwed in and out of the ice for the secure attachment of carabiners through which a rope can pass.



432

the neck

Shoes

footwear

and muscles. Carrying weights also helps build strength. Acquiring the

mental stamina to be able to run for hours or days is not so easy. But without it, even the fittest individual

will fail an ultra-distance challenge.

NEED2KNOW

- More than 70,000 men and women participate in ultramarathons, races defined as longer than the standard 26 mile (42 km) marathon.
- → The International Association of Ultrarunners (IAU) organizes annual World Championships for a variety of races, including 30 miles (50 km), 60 miles (100 km), 24 hour, and 48 hour.
- It is unquestionably one of the world's most demanding sports. both physically and mentally.

RUNNING BY THE RULES

Rules vary from event to event, but given the high risk of fatigue, it is usual for each runner to have his or her own support crew to administer to them during breaks. Runners must progress entirely under their own power and are prohibited from wearing artificial cooling systems but can and should wear lightweight running gear, a hat and sunglasses, and carry ample water—for obvious reasons. In some races, participants are allowed to have a fellow runner to set a pace for them. On cross-country courses, where it is impossible to monitor the progress of competitors continually, runners are required to check in at regular time stations along the route.

SIDELINES

23,961 The number of competitors in the 75th Comrades Marathon—the world's oldest and largest ultramarathon held in Cape Town.

3,100 The length in miles (5,022 km) of the world's longest certified ultramarathon, the Self-Transcendence in New York. The record for completing the course is 41 days.

9.000 The total ascent, in feet (2,744 m), of Cumbria's Wasdale Fell Race.

AROUND-THE-WORLD RUN

DANISH ULTRA LONG-DISTANCE RUNNER JESPER OLSEN RAN AROUND THE WORLD IN 22 MONTHS IN 2004-2005, ON A ROUTE COVERING 16,250 MILES (26,000 KM). FOR MOST OF THE RUN, HE PUSHED A BABY-JOGGER STROLLER THAT CONTAINED FOOD, BEVERAGES, A TENT, AND OTHER EQUIPMENT.

WHERE THEY RUN

Ultramarathons are run on athletic tracks, roads, dirt tracks, or open terrain. Some are simply tests of distance endurance while others offer additional challenges. The 135-mile (215 km) Badwater Ultramarathon, held in searing temperatures, starts in Death Valley, California, and climbs more than 8,600 ft (2,600 m). Participants in the Four Deserts series must complete 156 mile (250 km) races across the Sahara, Gobi, and Atacama deserts before being eligible for the last race—in Antarctica!

EVENT OVERVIEW

Ultra running takes many forms. The most popular races are ultramarathons. extraordinary feats of endurance over distances longer than the traditional 26 mile (42 km) marathon, and sometimes over extreme terrain. Events are either run over a fixed distance, for example, 31 miles (50 km), or a fixed time period, such as 24 hours, three days, or six days.



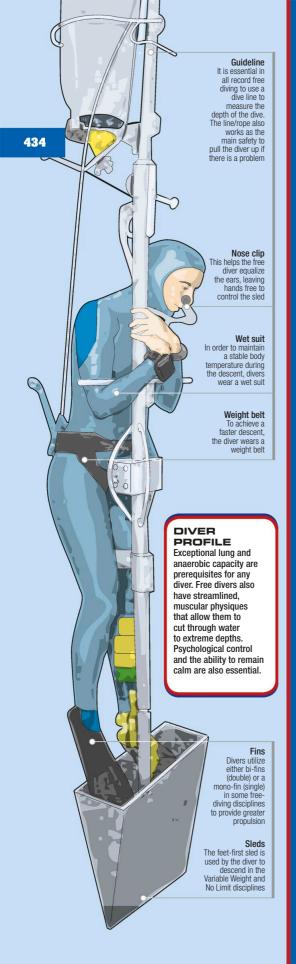








LTRA RUNNING



SPORT OVERVIEW

Free diving is a dangerous sport in which competitors attempt to attain great depths, times, or distances on a single breath, either in open water or a swimming pool. Free divers expose themselves to numerous dangers, like deep-water blackout and drowning, in pursuit of new records and greater extremes. Free diving is a sport based on individual achievement, with disciplines conducted as either record attempts or competitions where the best individual performances determine the winners.







FREE DIVING

DIVING DISCIPLINES

There are five depth disciplines recognized by the International Association for the Development of Apnea (AIDA), the official governing body of free diving. Constant Weight with fins is the most common free-diving event and involves the diver descending to depth with the aid of fins and a set weight. Constant Weight without fins is the most difficult depth discipline and operates under the same rules as Constant Weight with fins, but without the use of swimming apparatus. In the Free Immersion discipline, divers use a guideline to pull themselves to depth and back to the surface. The Variable Weight discipline involves the diver using a weighted sled to descend and their own strength to resurface, either by swimming or pulling on the guideline. No Limit is the absolute depth discipline, where the diver descends using a weighted sled and ascends using a method of their choice.

POOL DISCIPLINES

There are three recognized pool disciplines, and two of these must be conducted in a pool at least 82 ft (25 m) in length. Dynamic Apnea is swimming underwater to attain the greatest distance; this discipline is divided into two categories: with and without fins. The third discipline, Static Apnea, is timed underwater breath-holding.

NEED2KNOW

- The first Free Diving World Championship in 1996 involved teams from Germany, Belgium, Colombia, Spain, France, and the inaugural winner Italy.
- The current world record for the No Limit discipline stands at a staggering 702 ft (214 m). It was set by Austrian Herbert Nitsch.

TRAINING

Free divers undertake underwater and out-of-water training. One out-of-water exercise is the "Apnea walk." The athlete executes a short breath hold (typically 1 minute) taken at rest, followed by a walk while maintaining the hold. This exercise accustoms their muscles to anaerobic (meaning "without air") conditions.

THE BIG BLUE

THE SPORT OF FREE DIVING WAS IMMORTALIZED IN THE 1988 FILM THE BIG BLUE. THE FILM DEPICTS A FICTIONALIZED ACCOUNT OF THE REAL-LIFE RIVALRY BETWEEN TWO FAMOUS FREE DIVERS: FRENCHMAN JACQUES MAYOL AND ITALIAN ENZO MAIORCA.

INSIDE STORY

Jacques Mayol and Enzo Maiorca were the inspiration for organized competitive free diving. The two athletes frequently broke each other's record attempts and increased public interest in the sport during the 1960s and 1970s. In 1976, Mayol became the first to descend to 328 ft (100 m). Maiorca held as many as 13 world records between 1960 and 1974. In 1983, at the age of 56, Mayol dove to 345 ft (105 m).









SPORT OVERVIEW

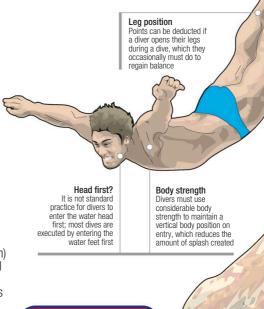
Described by the World High Diving Federation (WHDF) as "the acrobatic perfection of diving into water," cliff diving is a high-risk sport that involves athletes leaping from a steep cliff and performing difficult combinations of twists and somersaults as they plummet to the water below. Competitors aim to execute dives according to a strict criterion that is assessed by a panel of judges who award points after the successful execution of each dive.

COMPETITION LOCATIONS

Cliff-diving events are held at locations that have a sheer vertical cliff face and water with a minimum depth of 16 ft (5 m). The standard height regulations are 75-92 ft (23-28 m) for men and 59–75 ft (18–23 m) for women. For international events, the takeoff platform usually stands 3 ft (1 m) out from the cliff face, although it is common at noninternational events for divers to launch directly from the cliff face.

DIFFICULT COMBINATIONS

To gain maximum points, a diver must execute difficult combinations of somersaults and twists while performing a dive. Important elements in a successful dive are the height, angle, and position of the takeoff; the clear demonstration of announced positions during the dive. such as the "pike," "tuck," or "split"; and the limited amount of splash created on water entry.



DIVER PROFILE

Cliff divers are courageous athletes that have extraordinary physical control. Competitors have lean, muscular bodies that allow them to complete complex midair maneuvers in an average of three seconds.

NEED2KNOW

- The inaugural WHDF World Championship was held in Switzerland in 1997. Dustin Webster from the US emerged the victor with a total score of 248.04.
- The water entry speed of a cliff diver ranges from 46 to 62 mph (75 to 100 kph) and has an impact nine times greater than that caused by diving from a standard 33 ft (10 m) platform.
- The highest score ever received for a single dive is 168.00, recorded by Russian Artem Silchenko at a WHDF International Event in 2006. Silchenko performed a back three somersaults pike with two twists, which has a 5.6 degree of difficulty.

A PERFECT DAY

Colombian Orlando Duque, considered to be one of the most elegant cliff divers ever, performed what has been labeled "the perfect dive" on his way to victory at the 2000 WHDF World Championship in Kaunolu, Hawaii. Duque performed a double back somersault with four twists to receive a perfect "10" from all five judges. Duque's victory was the first of three consecutive world titles from 2000 to 2002, making him the only athlete to accomplish this feat to date.

RULES AND REGULATIONS

A standard event contains three rounds, with each diver allowed one dive per round. A dive is awarded a score out of 10 by a panel of five judges. The highest and lowest marks are eliminated, and the sum of the three remaining scores is multiplied by the degree of difficulty ascribed to the dive attempted. The degree of difficulty for a dive is determined by adding preset scores attributed to five different categories: takeoff; somersaults; twists; number of midair positions; and water entry. At the end of the three rounds, the diver with the highest combined total is declared the winner.

INSIDE STORY

King Kahekili (1710–1794), the last independent king of Maui, was renowned for lele kawa, which in English means: "leaping off high cliffs and entering the water feet first without a splash." A generation later, Hawaiians began practicing lele kawa as a sport, with judgment passed on the style of the jump and the amount of splash on entry.

WHDF

The World High Diving Federation (WHDF) was founded in 1996 and has its headquarters in Avegno, Switzerland. The WHDF is the current, official governing body of international cliff divina.

FREERIDE MOUNTAIN BIKING









NEED2KNOW

- The Red Bull Rampage is the gold standard event for the sport and has been contested at Virgin, Utah, on 13 occasions between 2001 and 2018.
- More than 6,000 spectators gathered to watch the Monster Park Slopestyle freeride competition in Dana Park, California, in 2004.

SPORT OVERVIEW

Just like freeride snowboarding and freeskiing, freeride mountain biking encompasses a range of riding styles that are all linked by a single theme—riding without boundaries. Bikes with more and better suspension enable longer and faster descents, ever-larger jumps, and more extreme lines to be taken.

FREERIDE BIKES

Full-suspension bikes allow massive shock absorption at high speeds and are capable of traversing obstacles large and small.

Body armor

Riders wear full-finger gloves and padded protection on the body, especially on the knees and elbows. This will limit injury but not necessarily prevent it

Aluminum frame

Freeride bikes are not the lightest, typically weighing 30–45 lb (14–20 kg)

Flat pedals

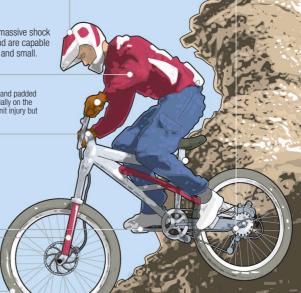
Lightweight, strong alloy pedals provide a stable riding platform

Long-travel suspension

Most designs feature around 9 in (23 cm) of frontand rear-wheel travel

Tough tires

Designed to withstand extreme pressure, the tires have tread that allows great lean angles



Total protection A full-face helmet is

essential to protect

case of a crash

the head and face in

Gear control Most freeride bikes have

just nine gears; normal

mountain bikes have 27

GRABBING BIG AIR

Freeriding is about riders spontaneously pulling jumps and tricks over natural terrain or on urban courses, so it does not lend itself easily to organized contests. The flagship events are invite-only contests where top freeriders compete for cash, and judges award marks for difficulty, speed, fluidity, tricks, and style. One such event is the Red Bull Rampage, which is contested on a predominantly natural course augmented with wooden features. Urban events over man-made courses are also increasingly popular.

NORTH SHORE NIRVANA

An offshoot of freeriding that has grown rapidly is the North Shore style, named after the area of Vancouver where it first emerged. The style involves riding over man-made wooden boardwalks, originally built to convey walkers over densely vegetated areas of the forest floor, and has evolved into riding narrow planks called "skinnies," tree trunks, jumps, and drops, and even massive seesaws. The influence of North Shore riding can be seen in mainstream freeriding, with many wooden features evident in freeride contests.

RIDER PROFILE

Riders need upper- and lower-body strength, a large lung capacity, and technical bike-riding skills-namely balance, jumping technique, the ability to pick a line, and timing. Competitors also need lots of confidence and to be in total control of their bike at all times-one mistake could result in broken bones.

360° DOWNHILL JUMP

Not content to race over the edge of near-vertical rocks up to 30 ft (9 m) high, top freeriders manage to perform aerial stunts at the same time-and come back down to earth with both bike and body intact.



Rear landing

The rider must keep his weight over the bike's rear to ensure the rear wheel touches down first. Front and rear shocks help absorb the impact

NEED2KNOW

- Competitive land yachting is most popular in Europe and North America. France dominated the medal ceremonies at the 2010 world championships—held at De Panne, Belgium—winning three of the six racing categories.
- The International Land and Sandyachting Federation (FISLY), the sport's governing body, organizes world championships every two years.

RULES OF THE BEACH

Pilots must not let their yachts obstruct or touch other craft. If two racers are approaching each other from different angles, the one on the right has priority, and the other must slow down or move aside. An overtaking yacht must not force the slower vehicle to move aside, but the yacht being overtaken is not allowed to maneuver into the path of the faster craft.



STARTING FLAG

The race starts when the red flag is lowered near the starting line. Pilots then battle for position.



TURNING MARKER

The layout of the course for a land yacht race is marked by flags, which indicate where pilots have to turn.



FINISH FLAG

The race finishes when the checkered flag is raised as the first competitor crosses the line.

LIE OF THE LAND

Good competition requires two things—a large, relatively flat, open space, and wind—so anywhere that fits this description could host land-yacht racing. Beaches, salt flats, frozen lakes (with skates used instead of wheels), and airfields are all suitable. The beaches at De Panne (Belgium), Le Touquet (France), and Terschelling (Netherlands), and the dry lake at Ivanpah, Nevada (United States), are popular competition venues. Races are usually contested on closed circuits, with turning markers (a flag with red and white diagonals) used to indicate the extremities of the course. The distance between markers must be at least 1¼ miles (2 km), and obstacles are coned off.

SPORT OVERVIEW

Pilots race three-wheeled, wind-propelled vehicles across large expanses of flat ground. The pilot steers from a prone position, with the use of pedals or levers. By controlling the angle of the sail, a skilled pilot can attain speeds several times faster than the prevailing wind. With no brakes, pilots must use the wind to stop. Land yachts often turn over, so the sport is potentially dangerous.



AS FAST AS A SPEEDING ... DUCK?

AMERICAN PILOT BOB SCHUMACHER STEERED HIS UNLIKELY SOUNDING CRAFT "IRON DUCK" TO A TOP SPEED OF 116.7 MPH (187.7 KPH) ON MARCH 20, 1999, ON A DRY LAKE IN THE UNITED STATES. THIS STOOD AS THE WORLD SPEED RECORD FOR A WIND-POWERED CRAFT ON LAND UNTIL RICHARD JENKINS PILOTED "GREENBIRD" TO A SPEED OF 126.1 MPH (202.9 KPH) ON MARCH 26, 2009.

LAND YACHT CLASSES

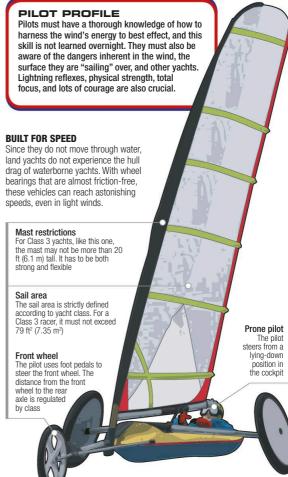
Several different classes of land yachts are recognized for competitions, including:

CLASS 2 The largest and most powerful class, with a fiberglass hull, a wing-shaped mast up to 25 ft (8 m) high, and a wooden rear axle. Not always the fastest craft, they are sailed mostly in Europe.

CLASS 3 Similar in appearance to Class 2 but smaller, this class of yacht is the most popular craft and is capable of reaching speeds of 70 mph (110 kph) or more.

CLASS 5 A smaller class of craft than Classes 2 and 3, the pilot lies in a fiberglass seat suspended from a tubular steel or aluminum chassis, rather than inside the hull.

STANDART Standart yachts are similar to Class 5 craft, with one crucial difference—every yacht is identical. Designed so that pilots cannot rely on technological advantage, Standart yachts allow racers to compare their own performance rather than that of their craft.



WHITEWATER RAFTING

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SPORT OVERVIEW

Whitewater rafting is an exciting and potentially dangerous recreational and competitive sport in which a small crew uses paddles or oars to control an inflatable raft along a stretch of a turbulent river. Clubs or commercial operators offer adventurous types of all ages the unique opportunity to tackle fast-flowing currents safely and to shoot the rapids on out-of-the way rivers all over the world. More experienced rafters can compete in national, continental, or international events, including the World Rafting Championships.

TYPES OF RAFTS

Paddle boats are the most common type of raft for those who want to participate in directing the craft through the foaming waters of the river. Oar boats use oars to navigate rapids and are generally larger, heavier, and more stable than paddle boats. Another type is the cataraft, which is composed of two parallel pontoons connected by a metal frame and is paddled by a crew of two people.

WORLD CHAMPIONSHIP

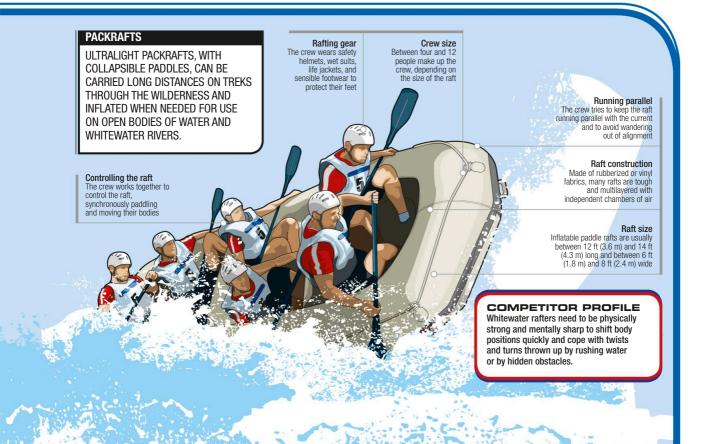
Every two years, the International Rafting Federation organizes the World Rafting Championship for men and women. Teams of six rafters compete for points across three disciplines—sprint, slalom, and downriver—to decide the overall winner. They sprint down powerful rapids, slalom through 12 upriver and downriver gates, and finally race downriver for almost an hour.

NEED2KNOW

- Whitewater rafting grew in popularity during the 1970s after slalom canoeing was included in the 1972 Munich Olympic Games.
- In the 2011 World Rafting Championship, Japan was the men's overall team winner and the Czech Republic was the women's overall team winner.

CLASSES OF WHITEWATER

Whitewater is graded according to an International Grading System, from the smooth flowing water of Class One to the extreme water of Class Six, which can be tackled only by teams of experts. Class Two is rougher than Class One, Class Three has some whitewater, and Class Four has plenty of whitewater. Class Five is only for advanced rafters because it has hidden obstacles and hazards.



439

NEED2KNOW

- The triathlon features an open water race of 1 mile (1.5 km).
- The 10 km (61/4 mile) open water race was included in the 2008 Beijing Olympics for the first time.
- In the women's 10 km at London 2012, less than 1 second separated Éva Risztov in first from second-placed Haley Anderson.

SIDELINES

The number of oceans (Atlantic, Arctic, Indian, Pacific, and Southern) in which the pioneering British swimmer Lewis Gordon Pugh has completed a long-distance swim. He is the first person to achieve this feat.

The number of days Slovenian Martin Strel spent swimming down the Amazon River—from Atalaya in Peru to the Brazilian city of Belem-in 2007, setting a new long-distance record of 3,273 miles (5,268 km).

832 The number of solo swimmers to have crossed the English Channel as of August 2019. The average solo crossing time is approximately 13 hours. Measuring 21% miles (35 km) at its narrowest, it is said to be "the **Everest of open water swimming" because of** tides, winds, and shipping.

The number of swimmers from 25 countries who took part in the women's 10 km (61/4 mile) race at the 12th FINA World Championships in Melbourne in 2007.

ENDURANCE RACES

Endurance swimmers compete in races of various distances, usually 3 miles (5 km), 61/4 miles (10 km), and 151/2 miles (25 km). Other events involve swimmers competing for a set time, usually an hour or more. The Fédération Internationale de Natation (FINA) organizes men's and women's events at the World Championships, the Open Water World Championships, and the Marathon World Cup, which is a series of races of 61/4 miles (10 km). In open water races, each swimmer is accompanied by an escort safety craft, which contains a judge and a member of the swimmer's team who can give advice and monitor the swimmer's well-being.

SPORT OVERVIEW

Endurance swimmers take part in long-distance freestyle events in open water, such as rivers, lakes, or oceans, or in pools or other man-made bodies of water. They compete with each other in various events at local, national, or international championships, such as the biannual World Championships. Swimmers often challenge themselves to conguer a stretch of open water, such as the English Channel, the North American Great Lakes, or a Norwegian fjord.

OPEN WATER CHALLENGES

Many endurance swimmers compete in open water races such as the 12½ mile (20 km) Rottnest Channel Swim in Perth, Australia, or in the long lane swimming events in the waterways of The Netherlands. Others successfully take on some remarkable open water challenges. For example, American Lynne Cox became the first to swim the Bering Strait between Alaska and Russia. She also braved the icy waters of Antarctica to swim 1 mile (1.6 km).

ESCAPE FROM ALCATRAZ

SWIMMING FROM THE ISLAND OF ALCATRAZ TO THE SHORES OF SAN FRANCISCO IS A COMMON OPEN WATER EVENT THAT SOME DETERMINED SWIMMERS HAVE COMPLETED MORE THAN 100 TIMES.

COMPETITOR PROFILE Endurance swimmers need to develop a

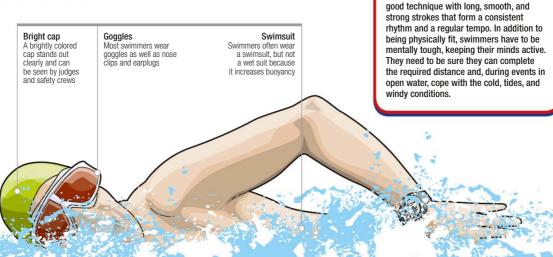
ENDURANCE SWIMMING











NEED2KNOW

→ In the 1890s, Otto Lilienthal made and flew pioneering hang gliders in Germany.

440

In 1963, Australian electrical engineer John Dickenson constructed a portable and controllable glider. Later that vear. Rod Fuller flew it in public while being towed by

a motorboat, ushering in the

popular era of hang gliding.

The Fédération Aéronautique International organizes a World Pilot Ranking System (WPRS) so that pilots can score points in the type of hang gliding competition they enter-Aerobatic, Class 1. Class 2, and Class 5.

HANG GLIDING









SPORT OVERVIEW

Powered only by movements of the air. hang gliders and their pilots soar like eagles above the landscape. Either for sheer pleasure or in cross-country and aerobatic competitions, pilots fly their increasingly sophisticated gliders for long distances and to great heights.

A SINGLE WING

Hang gliders have one triangle-shaped wing composed of a fabric sail mounted on an aluminum frame, which may be strengthened with carbon fiber. An enclosed fabric harness hangs from the wing's center of gravity and fully supports the pilot's weight. The pilot is free to shift his or her weight and so direct the glider through the air.

Nonrip sail A hang glider's sail is made of a nonrip fabric such as Mylar

The airfoil shape of the wing creates lift as it moves through the air-just like an airplane wing

S-LINE STAR

SIDELINES

5-20 The speed (in miles per hour) of the wind needed for ideal launching and landing maneuvers.

16-90 The age range for pilots learning to fly hang gliders. Women make up about 10-15 percent of hang glider pilots in the US.

The number of active national members registered with hang gliding's governing body, the Fédération Aéronautique International.

Wing frame The aluminum frame of the wing is both strong and light

Control bar

The pilot steers the hang glider via the control bar, which is attached to the wing

Lying prone

The harness suspends the pilot in a prone position—by moving forward and back, and from one side to the other, the pilot can alter the glider's direction

INSIDE STORY

National and international competitions regularly take place in countries around the world. Events are organized for different hang gliding classes—flexibles (Class 1) and rigids (Class 2 and 5)—in different categories for both individuals and teams. The world straight distance record is held by Dustin B. Martin who flew 47434 miles (764 km) in 2012.

TAKING OFF AND LANDING

Usually, pilots take to the air by foot launching. Carrying the glider on their shoulders, they run down a hill or mountain until they reach a sufficient speed for takeoff. They can also be towed by a boat, truck, or ultralight aircraft, or pulled into the air by a stationary winch. Once airborne, they steer the glider by moving their weight, navigating through changing air masses such as thermals, where warm air rises, or ridge lifts, where air masses encounter a cliff, hill, or mountain. To land, the pilot steers the glider earthward, then stalls the wing by rotating it upward and coming to ground on his or her feet.

SENSITIVE TO WIND

An essential instrument for many pilots is the variometer, which is very sensitive to vertical wind speeds. It may "beep" audibly, have a visual display, and be able to assess height. It measures the

rate of climb or fall, enabling a pilot to judge a thermal or ridge lift accurately. A built-in global positioning system (GPS) helps pilotsand judges-keep track of their course in competitions.



SELF-INFLATING CANOPY

NEED2KNOW

In 1985, paragliding was born

when a number of enthusiasts

launched themselves into the

air off an Alpine mountainside.

The canopy of a paraglider is designed to fill with air and inflate itself. When the wind is light, the pilot runs forward with the canopy behind so that air enters vents in a row of long "cells" that are open at the front and closed at the back. When the wind is stronger, the pilot faces the canopy as if it were a kite, controlling it so that it fills with air.

SPORT OVERVIEW

As a sport, paragliding is similar to hang gliding—pilots remain airborne for hours and compete fiercely for cross-country and aerobatic awards. The sports differ in several ways. Paraglider pilots are usually suspended in a sitting position under a canopy, which is inflated by air pressure and controlled by lines. Paragliders are lighter, more portable, and easier to assemble than hang gliders—but fly more slowly and have lower performance.











PARAHAWKING

PARAGLIDERS IN NEPAL HAVE DEVISED A UNIQUE DOUBLE ACT KNOWN AS PARAHAWKING, WHICH OFFERS A REMARKABLE AEROBATIC ADVENTURE OF SOARING WITH KITES, EAGLES. AND VULTURES.

DESIGNED FOR SOARING

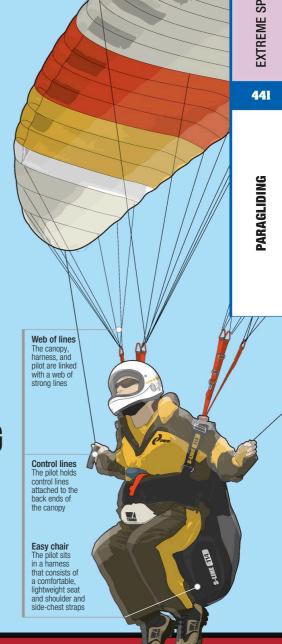
Paragliders are perfect for effortlessly soaring on air currents, whether they are thermals or ridge lifts. Experienced pilots often stay airborne for three hours on average and may reach altitudes of more than 9,842 ft (3,000 m). The duration record for staying aloft is 11 hours and the longest distance recorded by a paraglider is 352 miles (564 km).

In 2006, the first true World

Championships in paragliding

held at Villeneuve, Switzerland.

and hang gliding aerobatics were

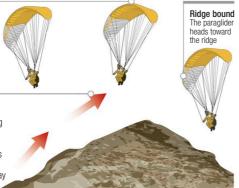


Held aloft The paraglider rides upward on the air currents

Rising air Air rises as it approaches high ground

RIDGE LIFT

Lift is created when prevailing winds come up against hills or sloping ground and are deflected upward. Paragliders and hang gliders ride this narrow band of rising air to stay airborne for long periods.



INSIDE STORY

Like hang gliding, there are both national and international paragliding competitions throughout the world. There are individual and team events for cross-country paragliding, paragliding accuracy, and paragliding aerobatics, each with a World Pilot Ranking System (WPRS) organized by the Fédération Aéronautique International (FAI). The 11th FAI World Championships were held in 2009 in El Peñon, Mexico. Switzerland's Andi Aebi won the overall cross-country event, and Elisa Houdry of France won the cross-country women's event. The inaugural FAI Asian Paragliding Championship was held in Hadong, Korea, in 2004.

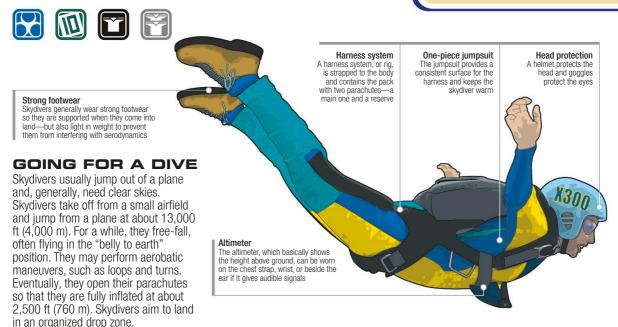
SPORT OVERVIEW

Launching themselves into thin air from a great height, usually from an airplane, skydivers go into free fall for a period of time before opening a parachute to enable them to land in a drop zone at a safe speed. It is usually a recreational sport, but experienced skydivers take part in competitions and may engage in variations, such as freestyle, formation skydiving, skysurfing, blade running, and freeflying.

SKYDIVING

NEED2KNOW

- There are more than 1,000 skydiving drop zones around the world, including more than 500 in Europe.
- Skydivers can also jump from helicopters and hot-air balloons.
- If the main parachute malfunctions or fails to open, the skydiver jettisons it and instead deploys their reserve parachute.



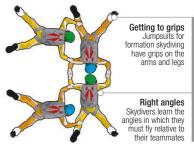
PARACHUTES

Free-falling skydivers travel at speeds of 120 mph (190 kph) or more. The parachutes they use, which are usually self-inflating ram-air wings, are designed to cope with opening in these conditions. The parachutes have steering lines and toggles that the skydivers use to control their flight and to land safely.



FORMATION SKYDIVING

During the period of free fall, skydivers can get together to perform formation skydiving, also called relative work. They come together—sometimes in the hundreds—for a short time and form various patterns, which they have first practiced carefully on the ground. Canopy formation, also called canopy relative work, is another skill in which skydivers open their canopies as soon as they jump. They come together to create a stack with formations such as biplane and diamond.



COMING TOGETHER

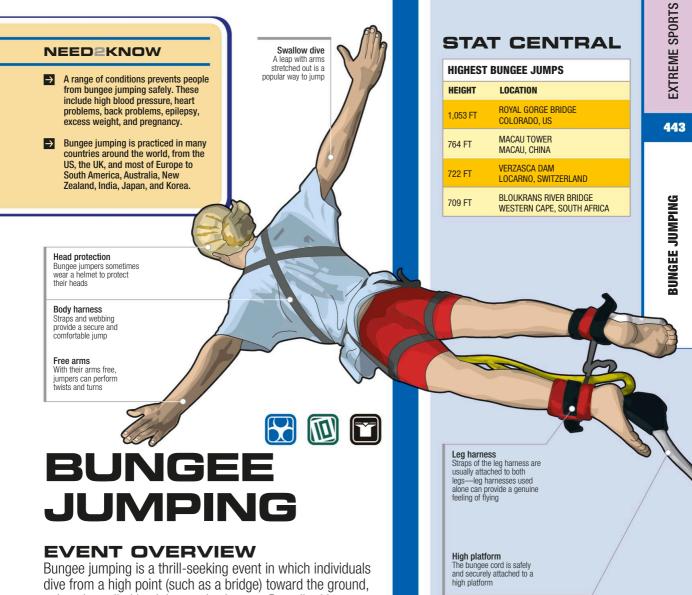
Formation skydivers come together in a prearranged picture. They know exactly the right angle in which to arrive, where to grip the teammate next to them, and what the signals are to progress to the next stage.

INSIDE STORY

World, regional, and national skydiving competitions take place in a number of parachuting disciplines—from artistic events, such as freestyle, skysurfing, and freeflying, to canopy formation, accuracy landing, and formation skydiving. There are usually categories for men. women, teams, and juniors.

INTERNATIONAL PARACHUTING COMMISSION (IPC)

Skydiving and parachuting activities are governed by the International Parachuting Commission, one of several air sports commissions run by the Fédération Aéronautique International (FAI). The IPC organizes international championships and is responsible for verifying world records.



Bungee jumping is a thrill-seeking event in which individuals dive from a high point (such as a bridge) toward the ground, only to be pulled back by an elastic rope. Described by many as the ultimate adrenaline rush, this event is almost exclusively a recreational pastime and is rarely a competitive sport.

HIGH POINTS

Bridges, balloons, cranes, and towers are some of the high points that bungee jumpers use for their dives. Some of the most famous include the Bloukrans Rivers Bridge in South Africa, the Verzasca Dam in Switzerland, and the Kawarau Bridge in New Zealand. Commercial bungee operators often use mobile cranes that provide high points of about 164 ft (50 m).

TAKING THE PLUNGE

Totally reliable elastic ropes are vital to the safety of an event that is fraught with danger. Cords made of strands of latex rubber are either enclosed or exposed depending on the kind of extension and bounce required. Bungee jumpers are weighed carefully and equipped with body harnesses before going to the platform where they take the plunge. The jump lasts a few seconds and includes a few rebounds. The cord absorbs most of the g-forces so that the jumper slows down steadily without experiencing a sharp jolt to the system.

INSIDE STORY

Inspired by the land divers of Pentecost Island in the Pacific islands of Vanuatu, four members of the Dangerous Sports Club tied elastic rope to their ankles and jumped off the Clifton Suspension Bridge in England in 1979, so initiating the modern era of bungee jumping.

PROMOTING SAFETY

Many bungee-jumping clubs around the world have extremely good safety records because they have introduced fail-safe mechanisms to protect their jumpers. In some countries, the sport is regulated. For example, clubs in Great Britain are affiliated to the British Elastic Rope Sports Association (BERSA), which is an organization that promotes safety, training, and licensing.

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