

Asteroid

Asteroids are giant space rocks that drift around the inner Solar System. Most lie in a belt between Mars and Jupiter, but some occasionally come dangerously close to the Earth. The smallest are the size of houses, while the largest are big enough to be classified as dwarf planets. Scientists think asteroids are leftovers from the material that formed the planets. All of them together amount to less than a twentieth of the Moon's mass.



Sun

The Sun is like a vast nuclear power station that produces energy by converting hydrogen into helium. It is the only star we can study close up.

Mercury

The closest planet to the Sun, Mercury is also the smallest planet. Its surface is scarred by ancient craters.

Venus

Though similar in size to Earth, Venus is a hellish world where any visiting astronaut would be crushed and boiled alive.

Earth

Our home planet is the only place known to support life, thanks to the liquid water on its surface.

Mars

Mars is a bitterly cold, desert world. Like Earth, it has mountains, canyons, and icy poles.

Saturn

The second biggest planet is striking for the dazzling system of bright rings that encircle it. It has 62 moons and dozens more moonlets.

Orbital distance

The scale bar below shows the relative distances of the planets from the Sun. The distance between one planet and the next increases greatly as we move out through the Solar System.



Jupiter

500 million miles
(805 million km)

Saturn

1,000 million miles
(1,609 million km)

Comet

These small, icy bodies can develop spectacular tails of gas and dust when they approach the Sun.

Uranus

Blue giant Uranus orbits the Sun tipped over on its side, perhaps because of a crash with a smaller planet. It has 27 moons.

Neptune

The most distant planet, Neptune is a blue giant with 13 known moons. It takes Neptune nearly 164 years to orbit the Sun once.

Kuiper Belt

Thousands, if not millions, of small icy bodies occupy the region beyond the planets. The Kuiper Belt is home to dwarf planet Pluto and is a likely source of comets.

Jupiter

The largest planet in the Solar System, Jupiter is more massive than all the other planets put together. It has its own family too, with at least 67 moons, some as big as planets.

The Solar System

The Solar System's planets form two groups. There are four small, inner planets made of rock and metal, and four giant, outer planets made of gas and liquid. Between the two is a belt of rocky bodies called asteroids, and beyond the planets is a zone of icy bodies including dwarf planets and comets. Even farther out is a vast, spherical cloud of more comets—the Oort Cloud. The Solar System has no certain outer boundary.

The Solar System

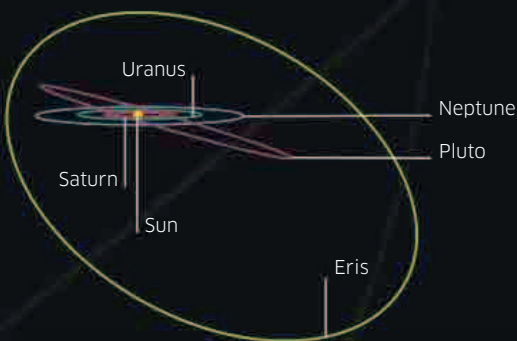
The force of gravity generated by the Sun's vast mass keeps a family of planets and other bodies trapped in orbit around it. Together, the Sun and all these bodies make up our Solar System.

Our Sun formed from a great cloud of dust and gas around 4.6 billion years ago. Vast amounts of matter were drawn in by the developing star, but not all of it was fully absorbed. A tiny fraction of leftover material—a mere 0.14 percent of the Solar System's mass—formed a disc of gas and dust encircling the newborn star. Over millions of years, the grains of dust in this disc clumped together, growing into ever larger bodies until they grew to the size of planets, pulled into spheres by their own gravity. In the inner Solar System, where the Sun's heat was too intense for gases to condense, planets formed from rock and metal. In the outer Solar System, gases condensed to form much bigger planets.

Today the Solar System has eight planets, more than 100 moons, an unknown number of dwarf planets, and countless millions of comets and asteroids.

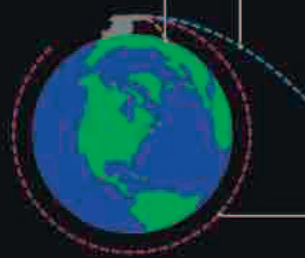
Orbits

Every major body in the Solar System orbits the Sun counterclockwise. The planets are on near-circular orbits in the same plane as the disc of gas and dust from which they formed. Many smaller objects, such as dwarf planets Pluto and Eris, have stretched orbits tilted to this plane. Comets arrive from all directions.



A slow cannonball falls to the ground.

A very fast cannonball escapes Earth's gravity.



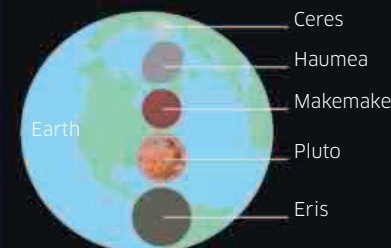
At just the right speed, a cannonball keeps falling but never lands.

How orbits work

English scientist Isaac Newton was the first person to realize why moons and planets travel in orbits: because they are trapped by gravity. To explain his theory, he drew a giant cannon firing cannonballs off Earth. If a cannonball moved fast enough, the curve of its path as it fell back would be gentler than the curve of Earth's shape, and it would never land—it would stay in orbit.

Dwarf planets

Dwarf planets are round in shape but smaller than true planets, and their gravity is not strong enough to sweep their region of space clear of smaller debris. The most famous dwarf planet is Pluto, which was classified as a true planet until 2006.



SIZE COMPARED TO EARTH

Uranus

Neptune

1,500 million miles
(2,414 million km)

2,000 million miles
(3,219 million km)

2,500 million miles
(4,023 million km)