



The Features of our Solar System

The **solar system** is made up of the Sun, the nine planets that orbit the Sun and various natural satellites (moons), asteroids, comets and meteors.



The Terrestrial Planets

Terrestrial planets are those planets (and possibly dwarf planets) that are similar to Earth — with bodies largely composed of rock: Mercury, Venus, Earth and Mars. Venus is the planet which is the closest size to Earth but because of its thick poisonous atmosphere creating extremely hot surface temperatures, Mars is the closest in environment to Earth.

The Gas Giants

The Gas Giants are planets with a composition largely made up of gaseous material and are significantly more massive than terrestrials: Jupiter, Saturn, Uranus, Neptune. Ice giants are a sub-class of gas giants, distinguished from gas giants by their lack of hydrogen and helium, and a significant composition of rock and ice: Uranus and Neptune.

The Planets of the Solar System (not shown to scale)

Mercury

Radius (Earth 1:0.38)

Distance from Sun AU (Earth 1:0.39)

Spin (day) 58.7 days

Orbit (year) 87.9 days

Cloud top temperature -180°C to 430°C




Moons 0


Gravity (Earth 1:0.38)

Because its surface consists of rough, porous, dark-coloured rock, Mercury is a poor reflector of sunlight. Mercury has only an extremely thin atmosphere, containing sodium and potassium, apparently spreading from the crust of the planet.

In 1991 powerful radio telescopes on Earth revealed signs of vast sheets of ice in Mercury's polar regions



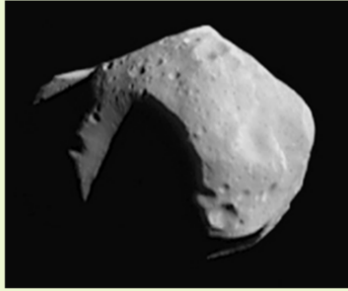
<p>Venus Radius (Earth 1:0.95) Distance from Sun AU (Earth 1:0.72) Spin (day) 243 days - Retrograde Orbit (year) 224.7 days Average Surface temperature 460°C Moons 0 Gravity (Earth 1:0.98) The surface pressure is 96 times that on the Earth —denser than water; the atmosphere of the planet consists almost wholly of carbon dioxide (CO₂). The cloud base is at 50 km and the cloud particles are mostly concentrated sulfuric acid. Venus rotates very slowly on its axis, and the direction is retrograde (opposite to that of the Earth).</p>	
<p>Earth Radius 6,378km Distance from Sun (AU=1)149,600,00km Spin (day) 23.93 hours Orbit (year) 365.26 days Average Surface temperature 15°C Moons 1 Gravity 9.8ms⁻² The Earth and its satellite, the Moon, also move together in an elliptical (nearly circular) orbit about the Sun. The temperature of the Earth allows for water to exist in its three states and it is the only planet where life is found.</p>	
<p>Mars Radius (Earth 1:0.53) Distance from Sun AU (Earth 1:1.52) Spin (day) 24.6 hours Orbit (year) 686.9 days Average Surface temperature -87°C to 17°C Moons 2 Gravity (Earth 1:0.38) The reddish colour of the planet results from its heavily oxidized, or rusted, surface. Conspicuous bright caps, composed of frozen water and CO₂, mark the planet's polar regions</p>	
<p>Jupiter Radius (Earth 1:11.2) Distance from Sun AU (Earth 1:5.2) Spin (day) 9.9 hours Orbit (year) 11.9 years Cloud top temperature -125°C Moons 16 Gravity (Earth 1:2.34) Jupiter's composition is very similar to that of the original gas cloud from which the solar system formed—a composition that survives in today's Sun. The proportion of helium is about 24 per cent, close to the amount in the Sun. Proportions of heavier elements, such as carbon, nitrogen, and sulfur have been increased by billions of years of bombardment by meteoroids and comets.</p>	

<p>Saturn Radius (Earth 1:9.42) Distance from Sun AU (Earth 1:9.54) Spin (day) 10.6 hours Orbit (year) 29.5 years Cloud top temperature -140°C Moons at least 18 Gravity (Earth 1:0.93) The average density of Saturn is only one eighth that of the Earth, as the planet consists mainly of hydrogen. The enormous weight of Saturn's atmosphere causes the core to be compressed into a metallic state. The visible rings may be only 5 m thick. They are thought to consist of aggregates of rock, frozen gases, and water ice.</p>	
<p>Uranus Radius (Earth 1:4.01) Distance from Sun AU (Earth 1:19.2) Spin (day) 17.2 hours - retrograde Orbit (year) 84 years Cloud top temperature -200°C Moons at least 27 Gravity (Earth 1:0.90) Uranus's axis is "lying down" in relation to its orbit. The consequence is that each pole faces the Sun for 42 years (half the "year" of Uranus) and then is in darkness for 42 years. Uranus's atmosphere consists largely of hydrogen and helium, with a trace of methane. The two largest moons are Oberon and Titania.</p>	
<p>Neptune Radius (Earth 1:3.88) Distance from Sun AU (Earth 1:30.1) Spin (day) 16.1 days Orbit (year) 164.8 years Cloud top temperature -200°C Moons 8 The temperature of the surface of Neptune is about -218° C much like Uranus, which is more than 1.5 billion km closer to the Sun. Scientists assume, therefore, that Neptune must have some internal heat source. The atmosphere consists mostly of hydrogen and helium, but the presence of up to three per cent methane gives the planet its striking blue colour.</p>	
<p>Pluto (and Charon) – Dwarf Planet Radius (Earth 1:0.18) Distance from Sun AU (Earth 1:29.4) Spin (day) 6.4 days Orbit (year) 247.7 years Mass (Earth 1:0.002) Surface temperature -220°C Approximately one-fifth the mass of the Earth's Moon, Pluto is primarily composed of rock and ice. It has an eccentric squashed orbit that is highly tilted with respect to the other planets and takes it closer to the Sun than Neptune during a portion of its orbit. Pluto and its largest satellite, Charon, could be considered a binary system because they are closer in size than any of the other known celestial pair combinations in the solar system.</p>	

Small Solar System bodies

Asteroid

The term asteroid is generally used to indicate a diverse group of small celestial bodies that drift in the solar system in orbit around the Sun.



Comet

A comet is a small body in the solar system that orbits the Sun and (at least occasionally) exhibits a coma (or atmosphere) and/or a tail.



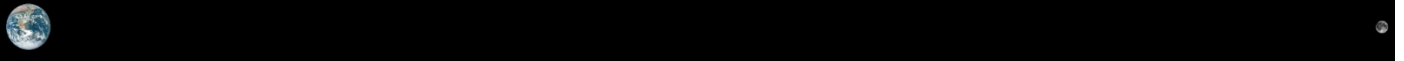
Meteor

A meteor is the visible path of a meteoroid that enters the Earth's (or another body's) atmosphere, commonly called a shooting star or falling star.



The large distances between the components of the solar system

Most of the solar system is empty space; **distances** are so huge it takes a long time to travel between planets. Travelling at the speed of a fast passenger jet, 1000km, it would take 16 days to reach the Moon ~384,000km away. Astronauts reached the Moon in four days however, as they were travelling much faster. They needed to reach at least 40,000km to escape Earth's gravity (called the escape velocity).



Travelling to Mars will take a lot longer, however. Mars is 203 times further away from Earth than the Moon is. Jupiter is 1635 times further away.

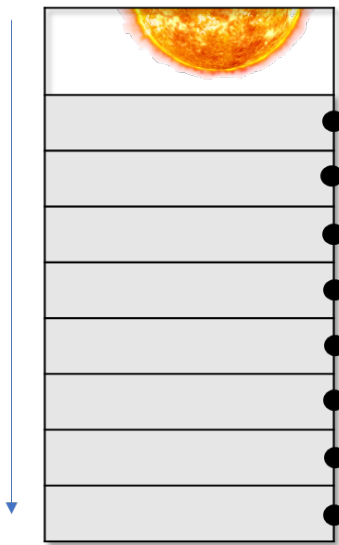
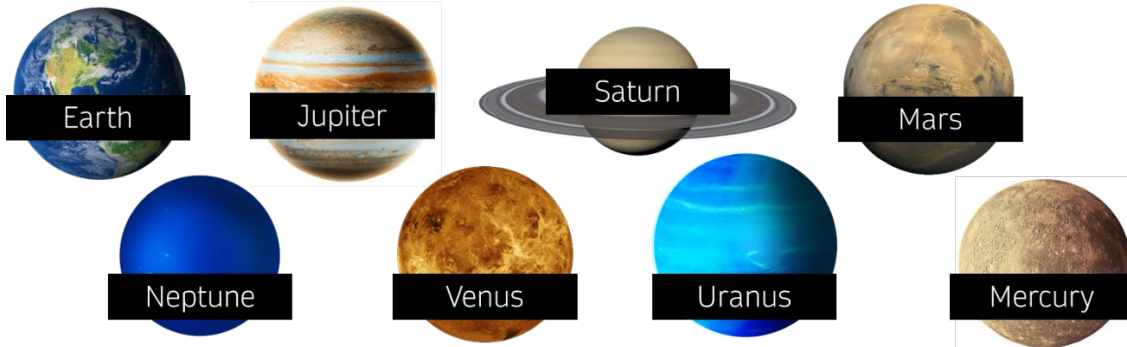
Compared to the large distance between the Earth and the Moon, the distances to the other planets and the Sun is much greater again. The first four planets are relatively close compared to the outer gas planets. Because of the vast distances in the solar system we use Astronomical Units. An **astronomical unit** is the average distance from the Earth to the Sun.



It gets cooler, the further from the Sun



1. Place the planets of the Solar System in their correct order from the Sun.



2. Draw a line to connect the description with the correct planet

- This planet has rusted iron on its surface which gives it its distinct colour.
- The planet has frozen ice at its poles, and large volcanoes.
- This planet has a vast field of frozen ice and rocks circling it, but none knows how long ago they formed.
- This planet has storms that blow as fast as 1,770 kilometers per hour.
- The gases that make up its atmosphere give it its distinct colour
- This planet has a storm on its surface that is visible from Earth, and has lasted for over 340 years.
- This planet has no moons and is a similar size to Earth. A thick atmosphere creates an extreme greenhouse effect.
- This planet spins on its side, and half of the planet is in darkness for each of its very long years.
- This planet is hot, but not too hot for ice – found in some of the craters.
- Rocky, small with the shortest year.
- Water is found naturally in all three states on this planet. It is also found within the 'Goldilocks' zone, so is suitable for life

3. A new planet has been found! Create your own planet and let us know some facts about it.

