

Stars

[Environment](#), [Earth](#)



Stars A star is a massive, luminous sphere of plasma held together by gravity. The nearest star to Earth is the Sun, which is the source of most of the energy on the planet.

Solar System The Solar System consists of the Sun and its planetary system of eight planets, their moons, and other non-stellar objects. It formed 4.6 billion years ago from the gravitational collapse of a giant molecular cloud. The vast majority of the system's mass is in the Sun, with most of the remaining mass contained in Jupiter. The four smaller inner planets, Mercury, Venus, Earth and Mars, also called the terrestrial planets, are primarily composed of rock and metal.

Sun The Sun is the star at the center of the Solar System. It is almost perfectly spherical and consists of hot plasma interwoven with magnetic fields. It has a diameter of about 1,392,684 km, about 109 times that of Earth, and its mass (about 2×10^{30} kilograms, 330,000 times that of Earth) accounts for about 99.86% of the total mass of the Solar System.[14] Chemically, about three quarters of the Sun's mass consists of hydrogen, while the rest is mostly helium. The remainder (1.69%, which nonetheless equals 5,628 times the mass of Earth) consists of heavier elements, including oxygen, carbon, neon and iron, among others.

Mercury Mercury is the smallest and closest to the Sun of the eight planets in the Solar System,[a] with an orbital period of about 88 Earth days. Seen from the Earth, it appears to move around its orbit in about 116 days, which is much faster than any other planet. This rapid motion may have led to it being named after the Roman deity Mercury, the fast-flying messenger to the gods. Since it has almost no atmosphere to retain heat, Mercury's surface experiences the greatest temperature variation of all the planets, ranging from 100 K ($\hat{\sim}$ 173 °C; $\hat{\sim}$ 280 °F) at night to 700 K (427 °C;

800 °F) during the day. Mercury's axis has the smallest tilt of any of the Solar System's planets (about 1° 30', 30 of a degree), but it has the largest orbital eccentricity.[a] At aphelion, Mercury is about 1.5 times as far from the Sun as it is at perihelion. Mercury's surface is heavily cratered and similar in appearance to Earth's Moon, indicating that it has been geologically inactive for billions of years. Venus Venus is the second planet from the Sun, orbiting it every 224.7 Earth days.[11] The planet is named after the Roman goddess of love and beauty. After the Moon, it is the brightest natural object in the night sky, reaching an apparent magnitude of -4.6 , bright enough to cast shadows.[13] Because Venus is an inferior planet from Earth, it never appears to venture far from the Sun: its elongation reaches a maximum of 47.8° . Venus reaches its maximum brightness shortly before sunrise or shortly after sunset, for which reason it has been referred to by ancient cultures as the Morning Star or Evening Star. Earth Earth is the third planet from the Sun, and the densest and fifth-largest of the eight planets in the Solar System. It is also the largest of the Solar System's four terrestrial planets. It is sometimes referred to as the world or the Blue Planet.[22] Earth formed approximately 4.54 billion years ago, and life appeared on its surface within its first billion years.[23] Earth's biosphere then significantly altered the atmospheric and other basic physical conditions, which enabled the proliferation of organisms as well as the formation of the ozone layer, which together with Earth's magnetic field blocked harmful solar radiation, and permitted formerly ocean-confined life to move safely to land. Mars Mars is the fourth planet from the Sun and the second smallest planet in the Solar System. Named after the Roman god of war, it is often described as the "

Red Planet", as the iron oxide prevalent on its surface gives it a reddish appearance.[14] Mars is a terrestrial planet with a thin atmosphere, having surface features reminiscent both of the impact craters of the Moon and the volcanoes, valleys, deserts, and polar ice caps of Earth. The rotational period and seasonal cycles of Mars are likewise similar to those of Earth, as is the tilt that produces the seasons. Mars is the site of Olympus Mons, the second highest known mountain within the Solar System (the tallest on a planet), and of Valles Marineris, one of the largest canyons. Jupiter Jupiter is the fifth planet from the Sun and the largest planet in the Solar System.[13] It is a gas giant with mass one-thousandth that of the Sun but is two and a half times the mass of all the other planets in the Solar System combined. Jupiter is classified as a gas giant along with Saturn, Uranus and Neptune. Together, these four planets are sometimes referred to as the Jovian or outer planets. The planet was known by astronomers of ancient times,[14] and was associated with the mythology and religious beliefs of many cultures. The Romans named the planet after the Roman god Jupiter.[15] When viewed from Earth, Jupiter can reach an apparent magnitude of -2.94 , making it on average the third-brightest object in the night sky after the Moon and Venus. (Mars can briefly match Jupiter's brightness at certain points in its orbit.) Saturn Saturn is the sixth planet from the Sun and the second largest planet in the Solar System, after Jupiter. Named after the Roman god Saturn, its astronomical symbol (♄) represents the god's sickle. Saturn is a gas giant with an average radius about nine times that of Earth.[12][13] While only one-eighth the average density of Earth, with its larger volume Saturn is just over 95 times more massive than Earth.[14][15][16] Saturn's interior is

probably composed of a core of iron, nickel and rock (silicon and oxygen compounds), surrounded by a deep layer of metallic hydrogen, an intermediate layer of liquid hydrogen and liquid helium and an outer gaseous layer.[17] The planet exhibits a pale yellow hue due to ammonia crystals in its upper atmosphere. Uranus is the seventh planet from the Sun. It has the third-largest planetary radius and fourth-largest planetary mass in the Solar System. Uranus is similar in composition to Neptune, and both are of different chemical composition than the larger gas giants Jupiter and Saturn. For this reason, astronomers sometimes place them in a separate category called "ice giants". Uranus's atmosphere, although similar to Jupiter's and Saturn's in its primary composition of hydrogen and helium, contains more "ices" such as water, ammonia, and methane, along with traces of hydrocarbons.[12] It is the coldest planetary atmosphere in the Solar System, with a minimum temperature of 49 K (-224°C). It has a complex, layered cloud structure, with water thought to make up the lowest clouds, and methane thought to make up the uppermost layer of clouds.[12] In contrast, the interior of Uranus is mainly composed of ices and rock.[11]

Neptune is the eighth and farthest planet from the Sun in the Solar System. It is the fourth-largest planet by diameter and the third-largest by mass. Neptune is 17 times the mass of Earth and is somewhat more massive than its near-twin Uranus, which is 15 times the mass of Earth but not as dense.[12] On average, Neptune orbits the Sun at a distance of 30.1 AU, approximately 30 times the Earth—Sun distance. Named for the Roman god of the sea, its astronomical symbol is $\♆$, a stylised version of the god Neptune's trident. Neptune was the first planet found by mathematical

prediction rather than by empirical observation. Unexpected changes in the orbit of Uranus led Alexis Bouvard to deduce that its orbit was subject to gravitational perturbation by an unknown planet. Moon The Moon is the only natural satellite of the Earth,[d][7] and the fifth largest satellite in the Solar System. It is the largest natural satellite of a planet in the Solar System relative to the size of its primary,[e] having 27% the diameter and 60% the density of Earth, resulting in 1/81 its mass. The Moon is the second densest satellite after Io, a satellite of Jupiter. The Moon is in synchronous rotation with Earth, always showing the same face with its near side marked by dark volcanic maria that fill between the bright ancient crustal highlands and the prominent impact craters. It is the brightest object in the sky after the Sun, although its surface is actually very dark, with a reflectance similar to that of coal. Its prominence in the sky and its regular cycle of phases have, since ancient times, made the Moon an important cultural influence on language, calendars, art and mythology.