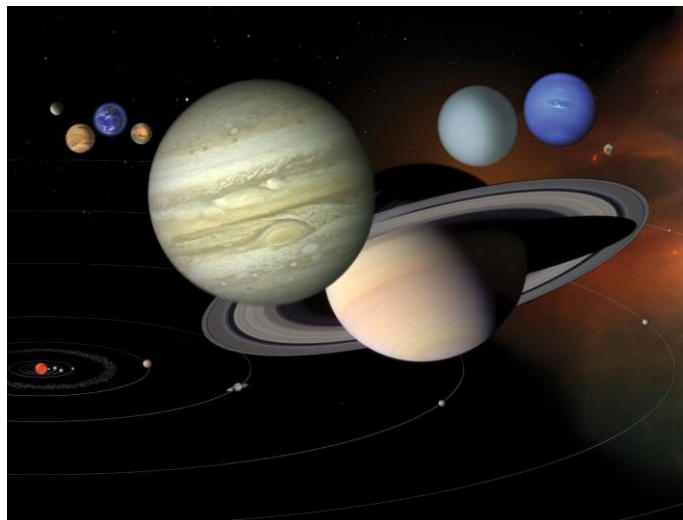


Our Solar System: In Depth



The words *solar system* refer to a star and all of the objects that travel around it -- planets, natural satellites such as [our moon](#), asteroid belts, comets, and meteoroids. We now know there may be more than 5,000 planets orbiting other stars. Our solar system is part of a spiral galaxy known as the Milky Way. The [sun](#), the center of our solar system, holds eight planets and countless smaller objects in its orbit.

Our solar system formed about 4.6 billion years ago. The four planets closest to the sun - [Mercury](#), [Venus](#), [Earth](#), and [Mars](#) - are called the terrestrial planets because they have solid, rocky surfaces. Two of the outer planets beyond the orbit of Mars - [Jupiter](#) and [Saturn](#) - are known as gas giants; the more distant [Uranus](#) and [Neptune](#) are called ice giants. Earth's atmosphere is primarily nitrogen and oxygen. Mercury has a very tenuous atmosphere, while Venus has a thick atmosphere of mainly carbon dioxide. Mars' carbon dioxide atmosphere is extremely thin. Jupiter and Saturn are composed mostly of hydrogen and helium, while Uranus and Neptune are composed mostly of water, ammonia, and methane, with icy mantles around their cores. The Voyager 1 and 2 spacecraft visited the gas giants, and Voyager 2 flew by and imaged the ice giants.

Ceres and the other dwarf planets - [Pluto](#), Eris, Haumea, and Makemake - have similar compositions and are solid with icy surfaces. Two NASA spacecraft have been exploring [dwarf planets](#) - the Dawn mission arrived at Ceres in March 2015 and the New Horizons mission reaches Pluto in that same year in July. After Pluto, New Horizons will explore deeper into the [Kuiper Belt](#).

Moons, rings, and magnetic fields characterize the planets. There are 146 known planetary moons, with at least 27 moons awaiting official recognition. Asteroids and dwarf planets also can have moons, but they are not included in the planetary moon count totals. Moons are not all alike. One (Saturn's Titan) has a thick atmosphere; one has active volcanoes (Jupiter's Io) and another (Jupiter's Europa) may harbor an ocean twice the size of all Earth's oceans combined beneath its frozen surface.

Rings are an intriguing planetary feature. From 1659 to 1979, Saturn was thought to be the only planet with rings. NASA's Voyager missions to the outer planets showed that Jupiter, Uranus, and Neptune also have ring systems. Rings have also been spotted around an asteroid and Phoebe, a moon of Saturn.

Most of the planets have magnetic fields that extend into space and form a magnetosphere around each planet. These magnetospheres rotate with the planet, sweeping charged particles with them.