The order of the planets in the Solar System: Which planet is closest to the sun?

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(Audio overview file created by AI)

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What is a planet?

The simple answer to this question is that a planet is a celestial body that orbits a star. However, this answer isn't entirely accurate and doesn't take into account its complex nature. Everyone knows about the eight planets in our solar system, but what some may not know is that there are other celestial bodies that were once considered planets, but have since been stripped of that title. Pluto is one of those planets that previously had its planetary status revoked after new scientific discoveries came to light. There is still a great deal of debate about whether these celestial bodies should be considered planets.

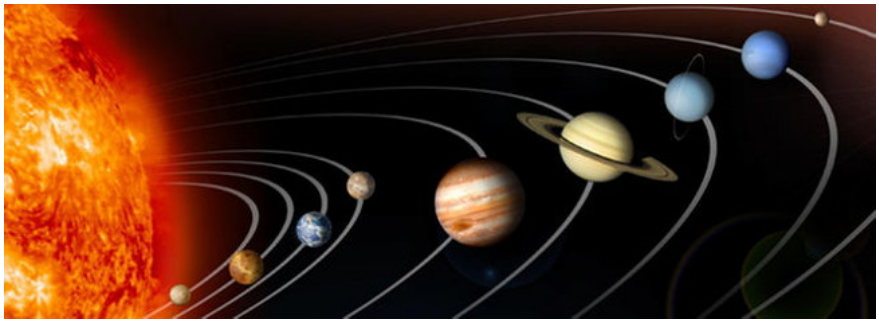
The most accurate and widely used definition of a planet stipulates that a planet must accomplish three things:

1. It must orbit a star.
2. It has to be large enough to have sufficient gravitational force to keep it spherical.
3. It must be large enough so that its gravitational pull can push all other similarly sized objects near its orbit around the Sun.

Keep reading to discover the order of the planets in the solar system!

Since the discovery of **Pluto** in 1930, schoolchildren have been taught about the nine planets in our solar system. From the late 1990s onwards, things began to change, with astronomers debating whether *Pluto is actually a planet* .

In a highly controversial decision, the *International* Astronomical **Union** finally decided in 2006 to classify Pluto as a " *dwarf planet* ," removing it from the list of " *true planets* " in our solar system. Thus, only **eight planets remain in our solar system** .



However, astronomers are now searching for another planet in our solar system, a " *true ninth planet* ," after evidence of its existence was published on January 20, 2016. Scientists call it " *Planet Nine* ," which is about 10 times the mass of Earth and 5,000 times the mass of Pluto.

Here's what you need to know about the Solar System, as well as the order of the 8 (or 9) planets, starting with the planet closest to the Sun and active outside the Solar System: **Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune -** and the " **Ninth Planet** " *(Planet Nine*).

Frequently Asked Questions about the Solar System

Are there any other solar systems in the Milky Way galaxy?

Yes, many! If you had asked anyone 30 years ago, the answer would have been "we don't know." But with advances in science and technology, astronomers have discovered more than 5,000 planets orbiting stars other than our sun (the so-called exoplanets). And because so many of them orbit the same star, it's possible to estimate around 4,000 other solar systems within the Milky Way galaxy.

Does the solar system move?

It is entirely possible, and in many ways. First, all exoplanets orbit their stars, just as our planets (like Earth and Mars) orbit our suns. Furthermore, our solar system, like all other systems, orbits the black hole at the center of the Milky Way! But even more so, some other solar systems actually have not one but two or more stars (like Tatooine!) – and these stars orbit each other, along with their exoplanets.

Do all stars have solar systems?

This is a crucial question! Scientists are only just beginning to explore what processes drive the formation and evolution of other solar systems, and what we can learn about the history of our solar system. Many other stars may have exoplanets orbiting them, but perhaps not all of them do. On average, studies estimate about one to two exoplanets orbiting each star – but that's just an average! Some stars might have eight, others might have none.

The IAU defines a true planet as a celestial body orbiting the sun that is not a satellite of another object; large enough to be able to rotate by its own gravity (but not large enough to begin undergoing nuclear fusion, like a

star); and having "cleared the neighborhood" of most other orbiting celestial bodies.

While this definition is somewhat limited, it has helped to differentiate what should and shouldn't be considered planets—a problem that arose as astronomers discovered more and more planet-like objects in the solar system. Pluto is among those celestial bodies that didn't make the list and was reclassified as a dwarf planet.

The problem with Pluto, aside from its small size and unusual orbit, is that it doesn't clear its own debris—it shares space with a lot of other objects in the Kuiper Belt. However, 'demoting' Pluto remains controversial.

The IAU's planetary definition also classifies other small, round objects as dwarf planets, including Kuiper Belt objects Eris, Haumea, and Makemake.

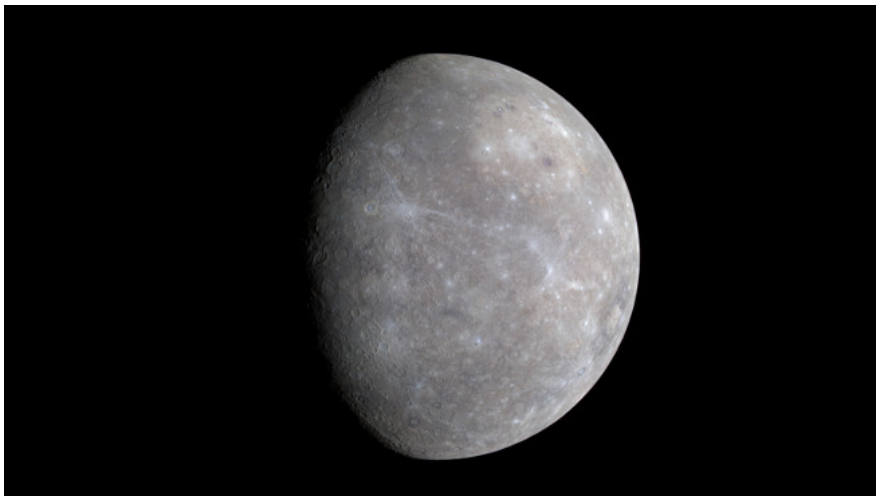
Ceres, a round object in the asteroid belt between Mars and Jupiter, was also excluded. Ceres was considered a planet when it was discovered in 1801, but was later 'demoted' to asteroid. This decision wasn't entirely satisfactory because Ceres is much larger (and rounder) than other asteroids. Therefore, in 2006, astronomers revised the definition, classifying Ceres as a dwarf planet. Some astronomers even consider Ceres to be the tenth planet.

Here's a brief overview of the eight actual planets in our solar system, in order from closest to farthest from the sun:

The order of the planets

Here is a brief overview of our **solar system , in order from the inside out:**

Mercury



Mercury is the planet closest to the Sun, only slightly larger than Earth's moon. Its daytime side is heated by sunlight, reaching temperatures of 450 degrees Celsius (*840 degrees Fahrenheit*), but at night, temperatures plummet to hundreds of degrees below freezing. Mercury has virtually no atmosphere to absorb the impact of meteorites, so its surface is "pitted" with many large craters, much like the moon. After a four-year mission, NASA's **MESSENGER** spacecraft has revealed views of these planets that have defied astronomers' expectations.

1. **Discovery** : Known to the ancient Romans and Greeks and observable with the naked eye.
2. **Named after** : Messenger of the Roman gods
3. **Diameter** : 4,878 km
4. **Orbit** : 88 Earth days
5. **Date** : 58.6 Earth days

Mercury is slightly larger than the Moon—15,329 km around its equator. Mercury's radius, the distance from its core to its surface, is 2,440 km. Mercury is about 2.6 times smaller than Earth.

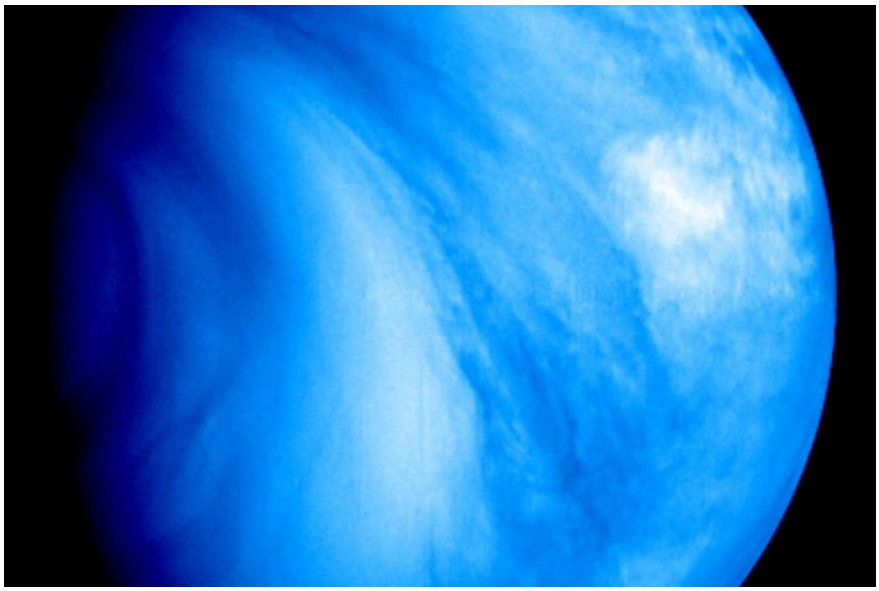
Despite the intense heat the planet faces as it rotates, permanently shaded areas, such as some polar craters, may contain layers of ice. The drastic temperature changes from day to night make it impossible for life to develop on Mercury.

Despite being the closest planet to the Sun, Mercury is not the hottest planet in the solar system. Venus's dense atmosphere creates a greenhouse effect, resulting in its temperature being higher than Mercury's.

Mercury's orbit is elongated, resembling an oval or egg shape around the Sun. This means its distance from the Sun varies throughout its orbit, ranging from 46 million to 70 million kilometers. Mercury orbits the Sun at a speed of nearly 47 kilometers per second—almost 60% faster than Earth's orbit.

A day on Mercury is very long because the planet rotates very slowly. A day on Mercury lasts for 59 Earth days. But because of its fast orbit, a year on Mercury is only 88 Earth days.

Venus



The southern hemisphere of Venus, observed in the ultraviolet region. Image source: ESA
The second planet from the Sun, **Venus,** is extremely hot, even hotter than Mercury. Its atmosphere is highly toxic. The surface pressure on Mercury would crush and kill you.

Scientists describe Venus's position as an **out-of-control greenhouse effect** . Venus's size and structure are similar to Earth's, and its dense, toxic atmosphere traps heat in this runaway greenhouse effect. But strangely,

Venus rotates slowly in the opposite direction to most other planets.

The Greeks believed that Venus consisted of two distinct objects – one representing the sky in the morning and the other in the evening. Because it is often brighter than any other object in the sky – except for the sun and moon – Venus has given rise to numerous reports of unidentified flying objects *(UFOs*).

1. **Discovery** : Known to the ancient Romans and Greeks and observable with the naked eye.
2. **Named after** : The Roman goddess of love and beauty.
3. **Diameter** : 12,104 km
4. **Orbit** : 225 Earth days
5. **Date** : 241 Earth Day

Earth

The third planet from the Sun, **Earth** is a water planet (*Waterworld*), with two-thirds of its surface covered by oceans and is the only known planet to harbor life. Earth's atmosphere is rich in nitrogen and oxygen to sustain life. Earth's surface rotates on its axis at a speed of 467 meters per second – approximately 1,000 mph (1,600 kph) – at the equator. The planet orbits the Sun at a speed of 29 km per second.

1. **Diameter** : 12,760 km
2. **Orbit** : 365.24 days
3. **Date** : 23 hours, 56 minutes

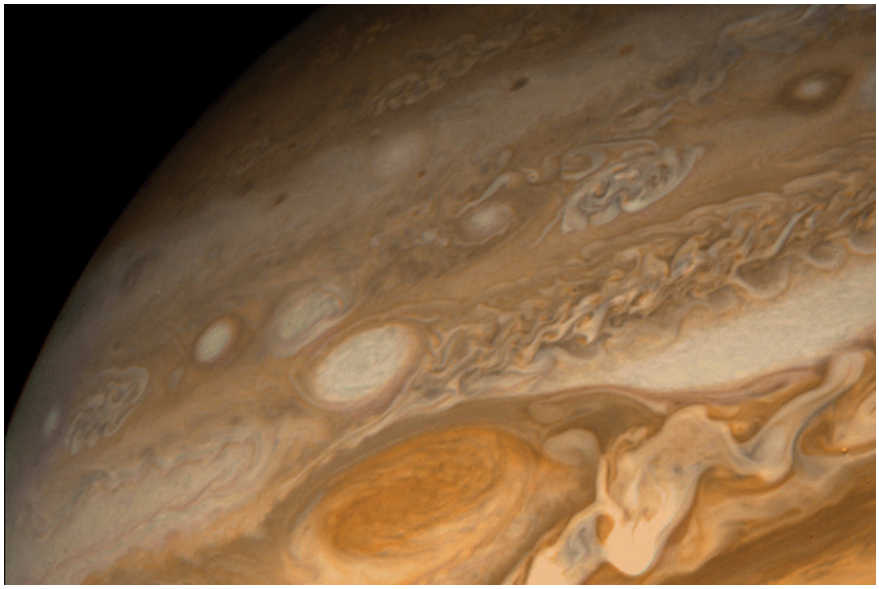
Mars

The fourth planet from the Sun, **Mars,** is a rocky and cold planet. Dust, an iron oxide, is abundant on its surface, giving it its characteristic reddish color. Mars shares similarities with Earth: a rocky surface with mountains and valleys, and a storm system ranging from tornado-like storms **—** like swirling dust-carrying winds—to planet-engulfing dust storms. The surface of Mars **is** covered in dust, and the planet is teeming with frozen water. Scientists believe Mars will eventually be covered in liquid water as temperatures rise, although it is currently a cold, desert-like planet.

Mars' atmosphere is too thin for liquid water to exist on the planet's surface for any length of time. Scientists believe that ancient Mars had conditions suitable for life and hope that signs of past life – even present-day biology – may exist on the **Red Planet** .

1. **Discovery** : Known to the ancient Romans and Greeks and observable with the naked eye.
2. **Named after** : The Roman god of war.
3. **Diameter** : 6,787 km.
4. **Orbit** : 687 Earth days.
5. **Date** : Just over one Earth day (24 hours, 37 minutes).

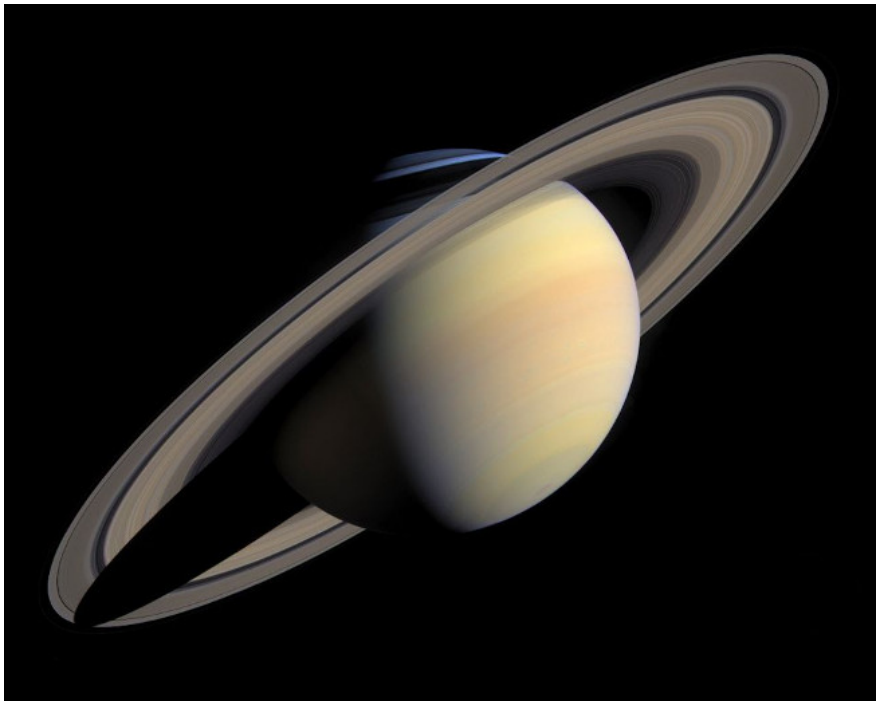
Jupiter



The fifth planet from the Sun, **Jupiter** , is a very large planet, the largest in our solar system. Jupiter is a **gas giant , composed primarily of hydrogen and helium.** *Its* outermost atmosphere is characterized by numerous cloud bands at varying altitudes, a result of aerodynamic turbulence and interaction with storms at its edges. A prominent feature is **the Great** Red *Spot* , a massive storm known to have existed for at least hundreds of years. Jupiter has a strong magnetic field, and with dozens of moons orbiting it, it resembles a miniature solar system.

1. **Discovery** : Known to the ancient Romans and Greeks and observable with the naked eye.
2. **Named after** : Greek and Roman Mythology.
3. **Diameter** : 139,822 km.
4. **Orbit** : 11.9 Earth years.
5. **Date** : 9.8 Earth Hour.

Saturn



Saturn is the sixth planet in terms of median distance from the Sun, best known for its rings. When **Galileo Galilei** first studied Saturn in the early 1600s, he thought it was a three-part object. Unaware that Galileo Galilei had seen a planet with rings, astronomers were puzzled when they saw the miniature drawing—the planet with one large moon and two smaller moons—in Galileo Galilei's notes, as a noun in a sentence describing the discovery.

Over 40 years later, **Christiaan Huygens,** using a telescope with greater magnification, discovered that these were rings, not satellites as Galileo had thought. The rings are made of rock and ice. Scientists are still unsure exactly how Saturn formed. This giant gas planet is composed primarily of hydrogen and helium. In addition, Saturn has many moons.

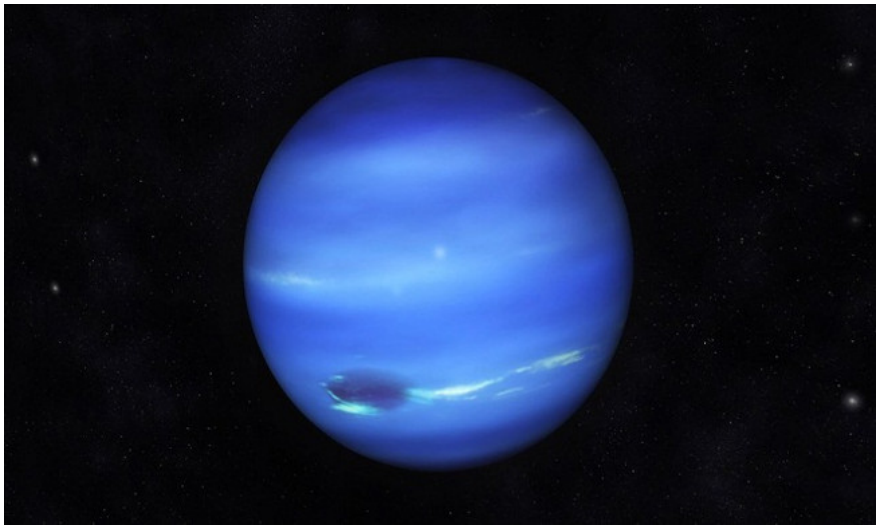
1. **Discovery** : Known to the ancient Romans and Greeks and observable with the naked eye.
2. **Named after** : The Roman god of agriculture.
3. **Diameter** : 120,500 km.
4. **Orbit** : 29.5 Earth years.
5. **Date** : Approximately 10.5 Earth hours.

Uranus

The seventh planet from the Sun, **Uranus** is a unique planet. It is the only gas giant whose equator is perpendicular to its orbit and nearly parallel to the planet's orbital plane. Astronomers believe the planet collided with other objects similar in size before it, causing the tilt. This tilt results in extreme seasons lasting over 20 years, and Uranus's orbital period is 84 Earth years. Uranus is similar in size to Neptune. The methane **in** its atmosphere gives Uranus its bluish-green color and gives it many moons and faint rings.

1. **Discovery** : William Herschel in 1781 (Herschel had previously thought it was a star).
2. **Named after** : The ancient Greek god of the sky.
3. **Diameter** : 51,120 km.
4. **Orbit** : 84 Earth years.
5. **Date** : 18 Earth Hour.

Neptune



The eighth planet from the Sun, **Neptune** is known for its incredibly strong winds—sometimes even faster than the speed of sound. Neptune is distant and cold, located 30 times farther from the Sun than Earth. Neptune was the first planet whose existence was predicted using mathematics before its discovery. The irregularities in

Neptune's orbit led the French astronomer **Alexis Bouvard** to suggest to other astronomers that they might be able to create a gravitational pull. The German astronomer **Johann Galle** used calculations to aid in the identification of Neptune using telescopes. Neptune is approximately 17 times larger than Earth.

1. **Discovered** : 1846.
2. **Named after** : The Roman god of water.
3. **Diameter** : 49,530 km.
4. **Orbit** : 165 Earth years.
5. **Date** : 19 Earth Hour.

Pluto (Dwarf Planet)

Pluto , the ninth planet from the Sun, differs from the others in many ways. Pluto is smaller than Earth's Moon. Its orbit lies within Neptune's orbit and then deviates from it. From 1979 to early 1999, Pluto was officially considered the eighth planet from the Sun. However, on February 11, 1999, it followed Neptune's path and then became the most distant planet in the solar system – until it was relegated *to* dwarf planet status.

The dwarf planet Pluto is located 228 years from Neptune. Pluto's orbit is tilted about 17.1 degrees relative to the main plane of the solar system – where other planets orbit –. It is a rocky, cold planet with a very ephemeral atmosphere. NASA's New Horizons mission made the first spaceflight in history to Pluto on July 14, 2015.

1. **Discovered by** Clyde Tombaugh in 1930.
2. **Named after** Hades, the Roman god of the underworld.
3. **Diameter** : 2,301 km.
4. **Orbit** : 248 Earth years.
5. **Date** : April 6th, Earth Day.

Planet Nine

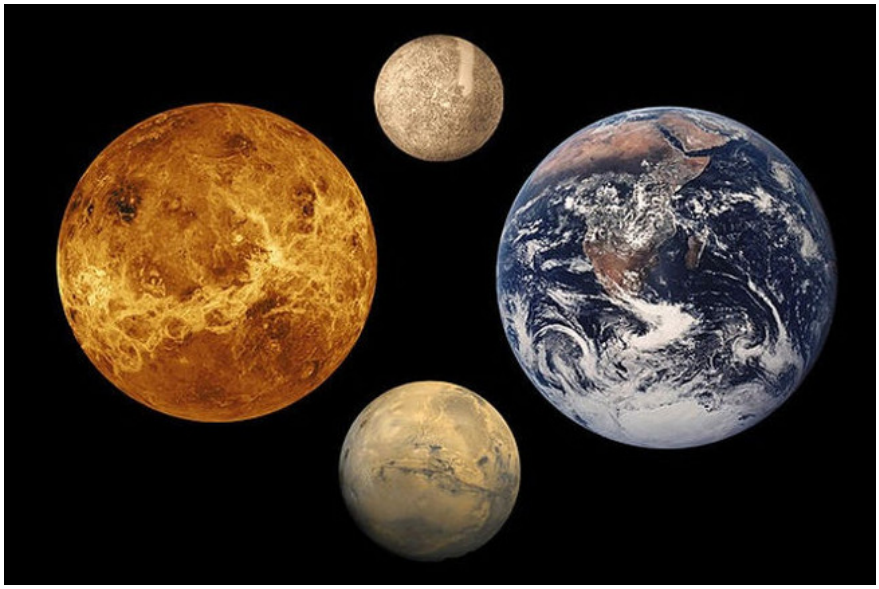
Planet Nine orbits the Sun at a distance 20 times greater than Neptune's orbit. Neptune's orbit is 49,530 km from the Sun at its closest point. The orbit of this strange planet is approximately 600 times farther from the Sun than the Sun's orbit around the star.

Scientists cannot directly observe Planet Nine. Its existence is observed through its gravitational effect on other planets in **the Kuiper Belt,** a region at the edge of the solar system where icy objects remain from the birth of the sun and planets.

Scientists **Mike Brown** and **Konstantin Batygin** at the California Institute of Technology in Pasadena describe evidence for Planet 9 in a study published in the Astronomical Journal. This research is based on mathematical models and computer simulations drawing on observations of six other Kuiper Belt objects that are smaller than those in orbits consistent with a similar problem.

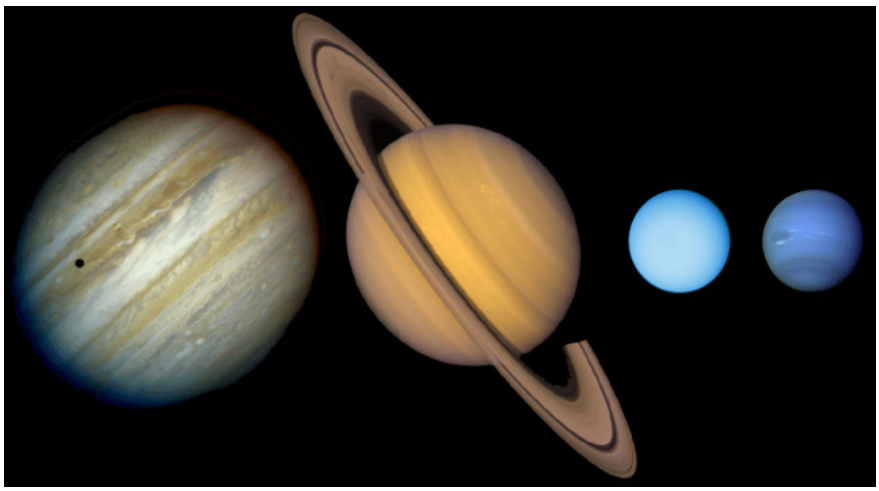
If we emphasize the inclusion of Pluto, that planet would be behind Neptune on the list. Pluto was actually excluded from this list due to its " *excessive tilt* " and elliptical orbit *(two of the reasons for its exclusion*). Interestingly, Pluto was once the eighth planet. For more details, read on below:

Terrestrial planets



The four inner planets are called " *Earth-like planets* " because, like Earth, their surfaces are entirely rocky. Pluto also has a solid surface *(and this surface is very cold*) but it was never included in the same group as the other four Earth-like planets.

Jovian planets



The four large outer planets – Jupiter, Saturn, Uranus, and Neptune – are known as " *Jupiter-like planets* " (*meaning "resembling Jupiter"*). This is because all of these planets are very large compared to Earth and have gas in their nature, rather than rocky surfaces (*"Although some or all of them may have solid cores," astronomers reveal* .) According to NASA, " *two of the planets beyond Mars – Jupiter and Saturn – are called gas giants, while Uranus and Neptune are called ice giants* ." This is because the first two are entirely gas, while the last two are icy. All four planets consist primarily of hydrogen and helium gas.

Dwarf planets

According to the International Astronomical Union (IAU) definition of an official planetary motion: A planet orbiting the Sun that is not a satellite of another planet, large enough to be rounded by its own gravity *(but not so large as to begin undergoing nuclear fusion, like a star for example*), and has " *cleared the neighborhoods* " of most other orbiting objects. Yes, that's a " *piece* ".

The problem with **the dwarf planet Pluto** , besides its small size and unusual orbit, is that it shares space with many other objects in **the Kuiper Belt** , in addition to Neptune. However, the **exclusion** of Pluto from the list remains controversial.

The International Astronomical Union (IAU) definition of a small round planet in the dwarf planet category includes Kuiper Belt objects, Eris, Haumea, and Makemake (which are considered sufficiently large planets).

Additionally, there is another dwarf planet, **Ceres** , a round object in the asteroid belt located between Mars and Jupiter. In fact, Ceres was only considered a planet when it was discovered in 1801 and subsequently classified as an asteroid. Some astronomers would like to consider Ceres as the 10th planet (*not to be confused with Nibiru or Planet X*), but if this assessment is correct, the solar system likely has 13 planets, with many more hidden to be discovered.