

# FYI

## What is a Planet?

Planets, along with the sun, are the principal components of our solar system. Despite this, the term “planet” is actually very hard to define. The definition has changed over time, and it is still changing. In August 2006, the International Astronomical Union (IAU) stated that, in our solar system, a **planet** is a celestial body that:

- is in orbit around the sun
- has sufficient mass for its self-gravity to overcome rigid body forces so that it assumes a hydrostatic equilibrium (nearly round) shape
- has cleared the neighborhood around its orbit

With the third criterion of this definition, Pluto, long considered to be the ninth planet in the solar system, was excluded. Pluto has not “cleared the neighborhood around its orbit.” Pluto is part of the Kuiper Belt, which includes thousands of objects. (The IAU’s definition did not specify how this “cleared the neighborhood” criterion is to be measured in general, but the IAU definitely stated that Pluto does not qualify and instead is to be considered a dwarf planet.) Therefore, as of 2009, the eight planets of our solar system are:

- Mercury
- Venus
- Earth
- Mars
- Jupiter
- Saturn
- Uranus
- Neptune

### Classifications

Planets can be put into different categories. For example, they can be assigned by composition—what they are made of—into two or three types:

- **Rocky:** Planets that are largely made of rock. In our solar system, the terrestrial planets are Mercury, Venus, Earth, and Mars. Also, most of the moons in the solar system, including Earth’s moon, are rocky. The term **terrestrial** is sometimes used for these worlds, though it is not an official IAU term.
- **Gas giant:** Planets that are made largely of gaseous material. In our solar system, the gas giants are Jupiter, Saturn, Uranus,

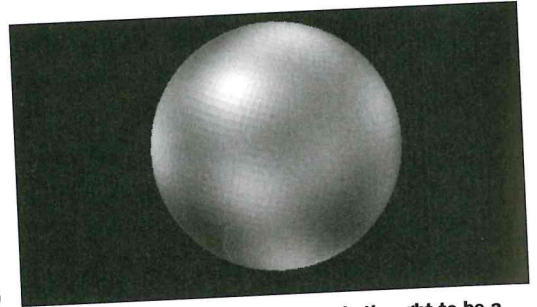


Figure 1-2: Image of Pluto, previously thought to be a planet. (Figures 1-2, 1-3, and 1-4 are NOT to scale with each other.)

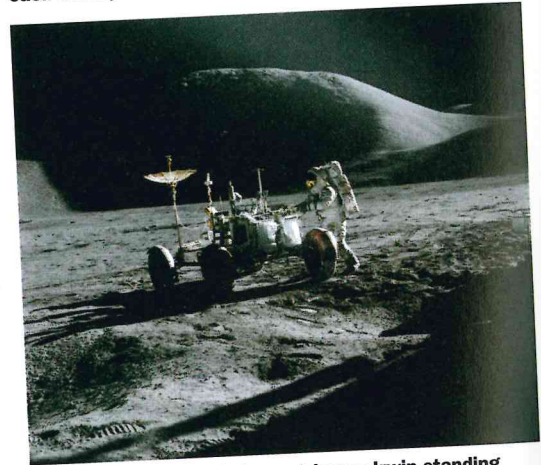


Figure 1-3: Image of Astronaut James Irwin standing near the Lunar Rover



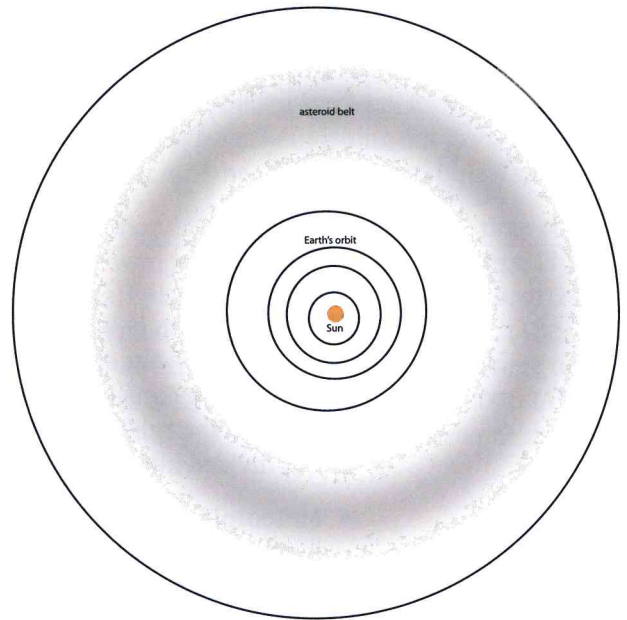
Figure 1-4: Image of Jupiter, a jovian, or gaseous planet

and Neptune. The term **jovian** is sometimes used for these worlds, though it also is not an official IAU term.

- Icy: Sometimes a third category of planet (or moon) is included for worlds that are made largely of water ice. Pluto is considered an icy dwarf planet.

The planets can also be put into categories related to their location in the solar system. For example, they can be divided into two categories according to their position relative to the **asteroid belt**, a region of the solar system between the planets Mars and Jupiter where there is a concentration of **asteroids**—small, solid objects orbiting the sun that did not come together to form a planet.

- An **inner planet** is any of the planets that are closer to the sun than the asteroid belt is. In other words, they are the planets “inside” the asteroid belt. The inner planets are Mercury, Venus, Earth, and Mars.
- An **outer planet** is any of the planets that are farther from the sun than the asteroid belt is. They are “outside” the asteroid belt. The outer planets are Jupiter, Saturn, Uranus, and Neptune.



**Figure 1-5:** Diagram of the orbits of the inner planets, the asteroid belt, and the orbit of Jupiter, the first of the outer planets.

## Important Characteristics

Planets have many characteristics, some of which are more important than others. For example, a planet's distance from the sun is an extremely important factor. It affects the amount of energy available on the planet. It also affects the temperature of the planet.

Whether or not a planet has an atmosphere is another important planetary characteristic. An atmosphere affects the planet's temperature, helping to reflect and trap energy from the sun. It protects the planet's surface from radiation and from asteroids, meteoroids, and other space debris. Atmospheric processes such as wind shape the surface of the planet.

Surface gravitation—the gravitational force experienced on the surface of a planet—isn't a commonly considered planetary characteristic, but it is an important one. Surface gravitation is determined by a planet's size and mass, and affects both how much an object weighs on the planet, and the ability of the planet to retain an atmosphere.

Planetary characteristics related to a planet's **habitability**—a planet's suitability for supporting life—are also very important. Habitability characteristics are one of the primary factors guiding our current explorations of the planets (and moons) within our solar system. These characteristics include the presence of water, the presence of certain elements and building blocks in usable forms, and an appropriate source of energy.

## Checking In

1. Why is Pluto no longer considered a planet? Do you agree? Why or why not?
2. What are two types of categories scientists use to classify the planets in our solar system?