

[Print](#)[Close](#)

## World Book at NASA

Mercury is the planet nearest the sun. It has a diameter of 3,032 miles (4,879 kilometers), about two-fifths of Earth's diameter. Mercury orbits the sun at an average distance of about 36 million miles (58 million kilometers), compared with about 93 million miles (150 million kilometers) for Earth.

Because of Mercury's size and nearness to the brightly shining sun, the planet is often hard to see from the Earth without a telescope. At certain times of the year, Mercury can be seen low in the western sky just after sunset. At other times, it can be seen low in the eastern sky just before sunrise.

### Orbit

Mercury travels around the sun in an elliptical (oval-shaped) orbit. The planet is about 28,580,000 miles (46,000,000 kilometers) from the sun at its closest point, and about 43,380,000 miles (69,820,000 kilometers) from the sun at its farthest point. Mercury is about 48,000,000 miles (77,300,000 kilometers) from Earth at its closest approach.

Mercury moves around the sun faster than any other planet. The ancient Romans named it Mercury in honor of the swift messenger of their gods. Mercury travels about 30 miles (48 kilometers) per second, and goes around the sun once every 88 Earth days. The Earth goes around the sun once every 365 days, or one year.

### Rotation

As Mercury moves around the sun, it rotates on its axis, an imaginary line that runs through its center. The planet rotates once about every 59 Earth days -- a rotation slower than that of any other planet except Venus. As a result of the planet's slow rotation on its axis and rapid movement around the sun, a day on Mercury -- that is, the interval between one sunrise and the next -- lasts 176 Earth days.

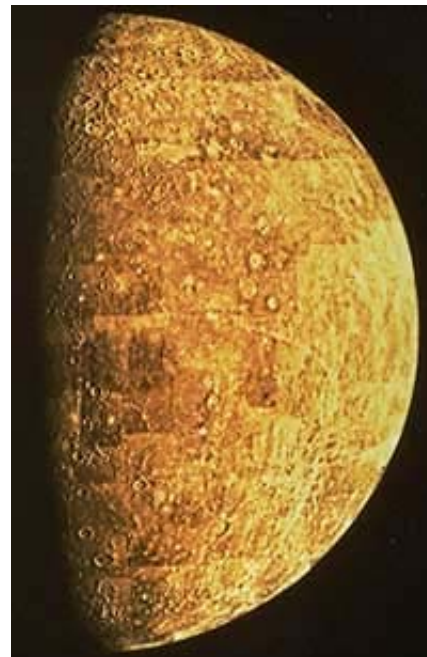
Until the mid-1960's, astronomers believed that Mercury rotated once every 88 Earth days, the same time the planet takes to go around the sun. If Mercury did this, one side of the planet would always face the sun, and the other side would always be dark. However, radar studies conducted in 1965 showed that the planet rotates once in about 59 days.

### Phases

When viewed through a telescope, Mercury can be seen going through "changes" in shape and size. These apparent changes are called phases, and resemble those of the moon. They result from different parts of Mercury's sunlit side being visible from the Earth at different times.

As Mercury and the Earth travel around the sun, Mercury can be seen near the other side of the sun about every 116 days. At this point, almost all its sunlit area is visible from the Earth. It looks like a bright, round spot with almost no visible marks. As Mercury moves around the sun toward the Earth, less and less of its sunlit area can be seen. After about 36 days, only half its surface is visible. After another 22 days, it nears the same side of the sun as the Earth, and only a thin sunlit area is visible. The amount of sunlit area that can be seen increases gradually after Mercury passes in front of the sun and begins moving away from the Earth.

When Mercury is on the same side of the sun as the Earth is, its dark side faces the Earth. The planet is usually not visible at this point because Mercury and the Earth orbit the sun at different angles. As a result, Mercury does not always pass directly between the Earth and the sun. Sometimes Mercury is directly between the Earth and the sun. When this



The planet Mercury was first photographed in detail on March 29, 1974, by the U.S. probe Mariner 10. The probe was about 130,000 miles (210,000 kilometers) from Mercury. Image credit: NASA

occurs, every 3 to 13 years, the planet is in transit and can be seen as a black spot against the sun.

## Surface and atmosphere

Mercury's surface appears to be much like that of the moon. It reflects approximately 6 percent of the sunlight it receives, about the same as the moon's surface reflects. Like the moon, Mercury is covered by a thin layer of minerals called silicates in the form of tiny particles. It also has broad, flat plains; steep cliffs; and many deep craters similar to those on the moon. The craters formed when meteors or small comets crashed into the planet. Mercury does not have enough atmosphere to slow down meteoroids and burn them up by friction. The Caloris Basin, Mercury's largest crater, measures about 800 miles (1,300 kilometers) across.



Mercury's interior appears to resemble that of the Earth. Both planets have a rocky layer called a mantle beneath their crust, and both planets have an iron core.

Based on Mercury's size and mass, scientists believe the planet's core makes up about three-fourths of its radius. Earth's core makes up about half of its radius. The discovery of a magnetic field around Mercury led some scientists to believe that the planet's outer core, like Earth's, consists of liquid iron.

The surface of Mercury consists of cratered terrain and smooth plains. Image credit: NASA

Mercury is dry, extremely hot, and almost airless. The sun's rays are approximately seven times as strong on Mercury as they are on the Earth. The sun also appears about 2 1/2 times as large in Mercury's sky as in the Earth's.

Mercury does not have enough gases in its atmosphere to reduce the amount of heat and light it receives from the sun. The temperature on the planet may reach 840 degrees F (450 degrees C) during the day. But at night, the temperature may drop as low as -275 degrees F (-170 degrees C). Because of the lack of atmosphere, Mercury's sky is black. Stars probably would be visible from the surface during the day.

Scans of Mercury made by Earth-based radar indicate that craters at Mercury's poles contain water ice. The floors of the craters are permanently shielded from sunlight, so the temperature never gets high enough to melt the ice.

Mercury is surrounded by an extremely small amount of helium, hydrogen, oxygen, and sodium. This envelope of gases is so thin that the greatest possible atmospheric pressure (force exerted by the weight of gases) on Mercury would be about 0.0000000003 pound per square inch (0.00000000002 kilogram per square centimeter). The atmospheric pressure on the Earth is about 14.7 pounds per square inch (1.03 kilograms per square centimeter).

The plant and animal life of the Earth could not live on Mercury because of the lack of oxygen and the intense heat. Scientists doubt that the planet has any form of life.

## Density and mass

Mercury's density is slightly less than the Earth's (see Density). That is, a portion of Mercury would weigh slightly less than an equal portion of the Earth. Mercury is smaller than the Earth and therefore has much less mass (see Mass). Mercury's smaller mass makes its force of gravity only about a third as strong as that of the Earth. An object that weighs 100 pounds on the Earth would weigh only about 38 pounds on Mercury.

## Flights to Mercury

The United States Mariner 10 became the first and only spacecraft to reach Mercury. The remotely controlled spacecraft flew to within 460 miles (740 kilometers) of Mercury on March 29, 1974. It swept past the planet again on Sept. 24, 1974, and on March 16, 1975. During those flights, the spacecraft photographed portions of the surface of Mercury. It also detected Mercury's magnetic field.

Mariner 10 became the first spacecraft to study two planets. The probe photographed and made scientific measurements of Venus while traveling to Mercury. As the probe flew near Venus, the planet's gravity pulled on the spacecraft, causing it to move faster. Thus, Mariner 10 reached Mercury in less



Mariner 10 is the only space probe

time and by using less fuel than if it had flown directly from the Earth.

In 2004, the United States launched the Messenger probe to Mercury. Messenger was scheduled to fly by Mercury twice in 2008 and once in 2009 before going into orbit around the planet in 2011. The probe was then to orbit Mercury for one Earth year while mapping Mercury's surface and studying its composition, interior structure, and magnetic field.

that has visited the planet Mercury. It flew past Venus in 1974, then made three passes near Mercury in 1974 and 1975. A probe called Messenger, launched in 2004, was scheduled to make its first visit to Mercury in 2008. Image credit: NASA

Contributor: Maria T. Zuber, Ph.D., Professor of Geophysics and Planetary Science, Massachusetts Institute of Technology.

How to cite this article: To cite this article, World Book recommends the following format: Zuber, Maria T. "Mercury." World Book Online Reference Center. 2004. World Book, Inc. (<http://www.worldbookonline.com/wb/Article?id=ar356240>.)

**Find this article at:**

[http://www.nasa.gov/worldbook/mercury\\_worldbook.html](http://www.nasa.gov/worldbook/mercury_worldbook.html)