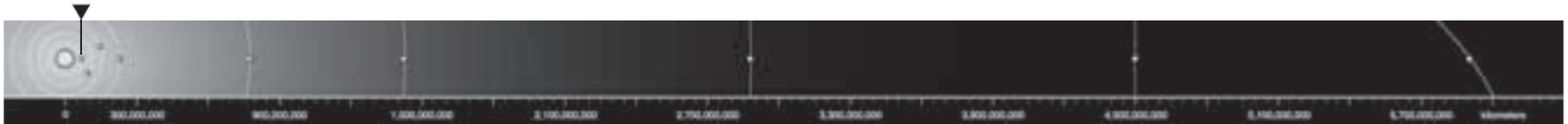
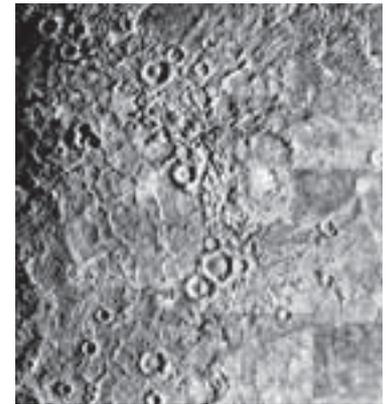


# Mercury



# Mercury



Mercury's elliptical orbit takes the small planet as close as 47 million kilometers (29 million miles) and as far as 70 million kilometers (43 million miles) from the Sun. If one could stand on the scorching surface of Mercury when it is at its closest point to the Sun, the Sun would appear almost three times as large as it does when viewed from Earth. Temperatures on Mercury's surface can reach 430 degrees Celsius (800 degrees Fahrenheit). Because the planet has no atmosphere to retain that heat, nighttime temperatures on the surface can drop to -170 degrees Celsius (-280 degrees Fahrenheit).

Because Mercury is so close to the Sun, it is hard to directly observe from Earth except during twilight. Mercury makes an appearance indirectly, however — 13 times each century, Earth observers can watch Mercury pass across the face of the Sun, an event called a transit. These rare transits fall within several days of May 8 and November 10. The first two transits of Mercury in the 21st century occur May 7, 2003, and November 8, 2006.

Scientists used to think that the same side of Mercury always faces the Sun, but in 1965 astronomers discovered that the planet rotates three times during every two orbits. Mercury speeds around the Sun every 88 days, traveling through space at nearly 50 kilometers (31 miles) per second — faster than any other planet. One Mercury day equals 175.97 Earth days.

Rather than an atmosphere, Mercury possesses a thin "exosphere" made up of atoms blasted off its surface by the solar wind and striking micrometeoroids. Because of the planet's extreme surface temperature, the atoms quickly escape into space. With the thin exosphere, there has been no wind erosion of the surface and meteorites do not burn up due to friction as they do in other planetary atmospheres.

Mercury's surface resembles that of Earth's Moon, scarred by many impact craters resulting from collisions with meteoroids and comets. While there are areas of smooth terrain, there are also lobe-shaped scarps or cliffs, some hundreds of miles long and soaring up to a mile high, formed by early contraction of the crust. The Caloris Basin, one of the largest features on Mercury, is about 1,300 kilometers (800 miles) in diameter. It was the result of an asteroid impact on the planet's surface early in the solar

system's history. Over the next half-billion years, Mercury shrank in radius about 1 to 2 kilometers (0.6 to 1.2 miles) as the planet cooled after its formation. The outer crust contracted and grew strong enough to prevent magma from reaching the surface, ending the period of geologic activity.

Mercury is the second smallest planet in the solar system, larger only than Pluto. Mercury is the second densest planet after Earth, with a large iron core having a radius of 1,800 to 1,900 kilometers (1,100 to 1,200 miles), about 75 percent of the planet's radius. Mercury's outer shell, comparable to Earth's outer shell (called the mantle), is only 500 to 600 kilometers (300 to 400 miles) thick. Mercury's magnetic field is thought to be a miniature version of Earth's, but scientists are uncertain of the strength of the field.

Only one spacecraft has ever visited Mercury: Mariner 10, which imaged about 45 percent of the surface. In 1991, astronomers using radar observations showed that Mercury may have water ice at its north and south poles inside deep craters that are perpetually cold (below -212 degrees Celsius or -350 degrees Fahrenheit). Infalling comets or meteorites might have brought ice to these regions of Mercury, or water vapor might have outgassed from the interior and frozen out at the poles.

A new NASA mission to Mercury called MErcury Surface, Space ENvironment, GEochemistry, and Ranging (MESSENGER) will begin orbiting Mercury in March 2011 to investigate key scientific areas such as the planet's composition, the structure of the core, the magnetic field, and the materials at the poles.

## FAST FACTS

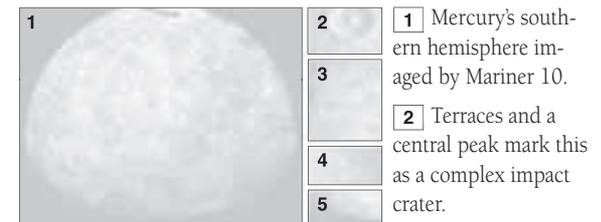
Namesake	Messenger of the Roman gods
Mean Distance from the Sun	57.91 million km (35.98 million mi)
Orbit Period	87.97 Earth days
Orbit Eccentricity (Circular Orbit = 0)	0.206
Orbit Inclination to Ecliptic	7 deg
Inclination of Equator to Orbit	0 deg
Rotation Period	58.65 Earth days
Successive Sunrises	175.97 days
Equatorial Radius	2,440 km (1,516 mi)

Mass	0.055 of Earth's
Density	5.43 g/cm <sup>3</sup> (0.98 of Earth's)
Gravity	0.38 of Earth's
Exosphere Components	hydrogen, helium, oxygen, sodium, potassium, calcium
Temperature Range	-170 to 430 deg C (-280 to 800 deg F)
Known Moons	0
Rings	0

## SIGNIFICANT DATES

- 1631 — Pierre Gassendi uses a telescope to watch from Earth as Mercury crosses the face of the Sun.
- 1965 — Though it was thought for centuries that the same side of Mercury always faced the Sun, astronomers find the planet rotates three times for every two orbits.
- 1974–1975 — Mariner 10 photographs roughly half of Mercury's surface in three flybys.
- 1991 — Scientists using Earth-based radar find signs of ice tucked in permanently shadowed areas of craters in Mercury's polar regions.
- 2004 — MESSENGER launches on a mission to make the most comprehensive study yet of the innermost planet.

## ABOUT THE IMAGES



- 1** Mercury's southern hemisphere imaged by Mariner 10.
- 2** Terraces and a central peak mark this as a complex impact crater.
- 3** A Mariner 10 photomosaic of a portion of the Caloris Basin.
- 4** A scarp (cliff) more than 300 kilometers (185 miles) long extends from upper left to lower right in this image.
- 5** A close-up of Mercury's south pole taken by Mariner 10 in 1974.

## FOR MORE INFORMATION

[solarsystem.nasa.gov/planets/profile.cfm?Object=Mercury](http://solarsystem.nasa.gov/planets/profile.cfm?Object=Mercury)