

THIS IS A CLASS SET - PLEASE TAKE NOTES ON THE HANDOUT AND IN YOUR NOTEBOOK

Mercury

1. Smallest

Mercury is the smallest planet in our solar system - only slightly larger than the Earth's moon. If the sun were as tall as a typical front door, Earth would be the size of a nickel and Mercury would be about as big as a green pea.

2. Insider

It is the closest planet to the sun at a distance of about 58 million km (36 million miles) or 0.39 AU.

3. Long Days, Short Years

One day on Mercury (the time it takes for Mercury to rotate or spin once with respect to the stars) takes 59 Earth days. One day-night cycle on Mercury takes 175.97 Earth days. Mercury makes a complete orbit around the sun (a year in Mercury time) in just 88 Earth days.

4. Rough Surface

Mercury is a rocky planet, also known as a terrestrial planet. Mercury has a solid, cratered surface, much like the Earth's moon.

5. Can't Breathe It

Mercury's thin atmosphere, or exosphere, is composed mostly of oxygen (O_2), sodium (Na), hydrogen (H_2), helium (He), and potassium (K). Atoms that are blasted off the surface by the solar wind and small meteoroid impacts create Mercury's exosphere.

6. Moonless

Mercury has no moons.

7. Ringless

There are no rings around Mercury.

8. Robotic Visitors

Only two missions have visited this rocky planet: Mariner 10 in 1974-5 and MESSENGER, which flew past Mercury three times before going into orbit around Mercury in 2011.

9. Tough Place to Live

No evidence for life has been found on Mercury. Daytime Temperatures can reach 430 degrees Celsius (800 degrees Fahrenheit) and drop to -180 degrees Celsius (-290 degrees Fahrenheit) at night. It is unlikely life (as we know it) could survive on this planet.

10. Big Sun

Standing on Mercury's surface at its closest point to the sun, the sun would appear more than three times larger than it does on Earth.

Mercury's eccentric orbit takes the small planet as close as 47 million km (29 million miles) and as far as 70 million km (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 more than three times as large as it does when viewed from Earth. Temperatures on Mercury's surface can reach 800 degrees Fahrenheit (430 degrees Celsius). Because the planet has no atmosphere to retain that heat, nighttime temperatures on the surface can drop to -290 degrees Fahrenheit (-180 degrees Celsius). Instead of an atmosphere, Mercury possesses a thin *exosphere* made up of atoms blasted off the surface by the solar wind and striking micrometeoroids. Because of solar radiation pressure, the atoms quickly escape into space and form a *tail* of neutral particles. Though Mercury's magnetic field at the surface has just one percent the strength of Earth's, it interacts with the magnetic field of the solar wind to episodically create intense *magnetic tornadoes* that funnel the fast, hot solar wind plasma down to the surface. When the ions strike the surface, they knock off neutrally charged atoms and send them on a loop high into the sky.

Mercury's surface resembles that of Earth's Moon, scarred by many impact craters resulting from collisions with meteoroids and comets. Very large impact basins, including Caloris (1,550 km, or 960 miles, in diameter) and Rachmaninoff (306 km, or 190 miles), were created by asteroid impacts on the planet's surface early in the solar system's history. While there are large 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 as the planet's interior cooled and contracted over the billions of years since Mercury formed.

Mercury is the second densest planet after Earth, with a large metallic core having a radius of about 2,000 km (1,240 miles), about 80 percent of the planet's radius. In 2007, researchers used ground-based radars to study the core, and found evidence that it is partly molten (liquid). Mercury's outer shell, comparable to Earth's outer shell (called the mantle and crust), is only about 400 km (250 miles) thick.

The first spacecraft to visit Mercury was Mariner 10, which imaged about 45 percent of the surface. NASA's MErcury Surface, Space ENvironment, GEochemistry, and Ranging ([MESSENGER](#)) mission flew by Mercury three times in 2008-2009 and has been in orbit around the planet since 18 March 2011. Almost the entire planet has now been imaged, revealing a surface that has been shaped both by extensive volcanism and impacts.

