

# Harsh Planet

## What is known about Venus?

Science-fiction writers once imagined Venus (VEE-nuhs) to be a humid planet with lush, tropical forests. Nothing could be further from the truth. On Venus, sulfuric acid rain falls on a surface that is not much different from the inside of an active volcano.

### Active Reading

**8 Identify** Underline the definitions of the terms *prograde rotation* and *retrograde rotation* that appear in the text.

## Venus Is Similar to Earth in Size and Mass

Venus has often been called "Earth's twin." At 12,104 km, the diameter of Venus is 95% the diameter of Earth. Venus's mass is around 80% of Earth's. And the gravity that you would experience on Venus is 89% of the gravity on Earth.

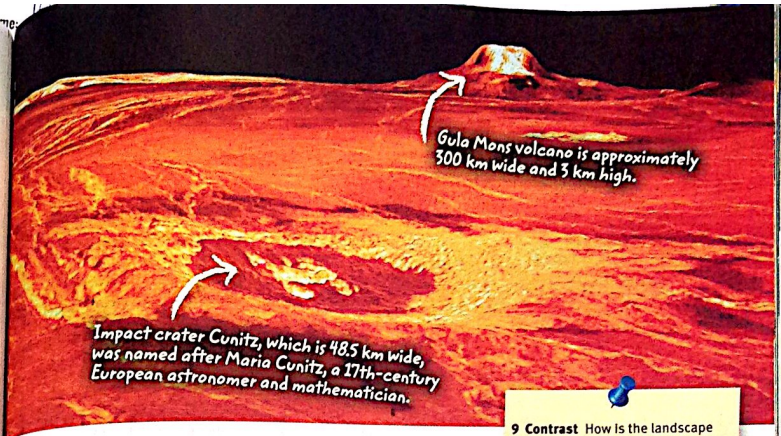
The rotation of Venus is different from the rotation of Earth. Earth has *prograde rotation*. *Prograde rotation* is the counterclockwise spin of a planet about its axis as seen from above the planet's north pole. Venus, however, has *retrograde rotation*. *Retrograde rotation* is the clockwise spin of a planet about its axis as seen from above its north pole.

Venus differs from Earth not only in the direction in which it spins on its axis. It takes more time for Venus to rotate once about its axis than it takes for the planet to revolve once around the sun. Venus has the slowest period of rotation in the solar system.

Statistics Table for Venus

Distance from the sun	0.72 AU
Period of rotation	243 days (retrograde rotation)
Period of revolution	225 days
Tilt of axis	177.4°
Diameter	12,104 km
Density	5.20 g/cm <sup>3</sup>
Average surface temperature	465 °C
Surface gravity	89% of Earth's gravity
Number of satellites	0

Venus has landforms such as highlands and plains, volcanoes, and impact craters.



Gula Mons volcano is approximately 300 km wide and 3 km high.

Impact crater Cunitz, which is 485 km wide, was named after Maria Cunitz, a 17th-century European astronomer and mathematician.

**9 Contrast** How is the landscape of Venus different from the landscape of Earth?

## Venus Has Craters and Volcanoes

In 1990, the powerful radar beams of NASA's *Magellan* spacecraft pierced the dense atmosphere of Venus. This gave us our most detailed look ever at the planet's surface. There are 168 volcanoes on Venus that are larger than 100 km in diameter. Thousands of volcanoes have smaller diameters. Venus's surface is also cratered. These craters are as much as 280 km in diameter. The sizes and locations of the craters on Venus suggest that around 500 million years ago something happened to erase all of the planet's older craters. Scientists are still puzzled about how this occurred. But volcanic activity could have covered the surface of the planet in one huge outpouring of magma.

## The Atmosphere of Venus Is Toxic

Venus may have started out like Earth, with oceans and water running across its surface. However, after billions of years of solar heating, Venus has become a harsh world. Surface temperatures on Venus are hotter than those on Mercury. Temperatures average around 465 °C. Over time, carbon dioxide gas has built up in the atmosphere. Sunlight that strikes Venus's surface warms the ground. However, carbon dioxide in the atmosphere traps this energy, which causes temperatures near the surface to remain high.

Sulfuric acid rains down onto Venus's surface, and the pressure of the atmosphere is at least 90 times that of Earth's atmosphere. No human—or machine—could survive for long under these conditions. Venus is a world that is off limits to human explorers and perhaps all but the hardest robotic probes.

### Active Reading

**10 Identify** As you read the text, underline those factors that make Venus an unlikely place for life to exist.