

## Getting to Know: The Moon

Have you ever had a chance to look closely at the full moon? For thousands of years, people have been gazing up at the moon's surface in wonder. Some cultures have myths about a giant rabbit that lives on the moon. Other cultures talk about the "man in the moon." Can you see why they might have come up with these different stories?

The shapes we see on the moon's surface are actually landforms. Just like Earth, the moon has highlands, lowlands, and mountains. However, the moon's geography is also different from Earth's geography in many ways. It has no atmosphere to protect it from debris in space and no wind or water to erode the landscape. The moon is Earth's closest neighbor in space, but the two are very different.



Many cultures have stories and myths about the moon and its formation. Scientists now know that the moon formed as a result of an asteroid's impact with Earth.

### What is the moon?

Many planets in the solar system have moons. However, the moon, called *Luna* by the ancient Romans, is Earth's only natural satellite. The moon completes one orbit of Earth every 28 days. It is one-fourth the size of Earth and has one-sixth of Earth's gravity. The moon does not have an atmosphere nor does it contain any water. The composition of the moon is mainly basalt and silica, and its surface is covered with rock, soil, and dust.

Scientists think that the moon formed very early in Earth's history. When Earth was still a large sphere of molten rock, scientists think a large asteroid impacted our planet. The force of the impact caused molten rock from Earth and the remains of the asteroid to be ejected into space. This material began orbiting Earth, and gradually, it began to coalesce to form the spherical body that became the moon. Thus, the moon formed from the material that made up the Earth. This is why the moon's composition is very similar to the composition of Earth's mantle and crust.



#### **Misconception 1: We can only see the moon at night, right?**

The moon can appear very bright during the night, but it can also be visible during daylight hours when it is in certain positions around Earth. The moon is more noticeable at night because it is often the brightest object in the sky.

### What are the physical features of the moon?

On the surface of the moon, the main physical features are maria, highlands, rilles, and craters. *Maria* are the large dark patches that you can easily see on the moon's surface when the moon is full. They were named "maria," which is Latin for "sea," because people originally thought that they were large seas on the moon's surface. Actually, maria are large basins, or lowlands, on the moon's surface. Maria are dark because they are filled with solidified basaltic lava, which flowed onto the moon's surface as the moon was cooling. The brighter patches on the moon's surface are highlands.

Craters are another distinctive feature of the moon's surface. They are evidence of rock and debris that impacted the moon's surface over its long history. Because the moon does not have an atmosphere or liquid water, relatively little weathering or erosion occurs on the moon's surface. Thus, the moon's surface records millions of years of impacts. The moon's surface also has mountains and winding trenches called *rilles* where lava once flowed.

### ***Why does the moon appear to shine?***

The moon actually does not produce any light of its own. Instead, the moon reflects light from the Sun. At any given time, half of the moon is shining with this reflected light. We see different parts of the lit surface at different times of the month.

### ***What are lunar phases?***

A *lunar phase*, or a phase of the moon, refers to the appearance of the moon as seen from Earth. As the moon orbits Earth, different portions of its illuminated surface are visible. During a full moon, we see the entire illuminated surface of the moon. During a new moon, we see a very thin sliver of the moon's illuminated surface. The lunar phases vary cyclically as the moon orbits Earth.



This image shows the different phases of the moon. The moon's phases occur because different portions of the moon's illuminated surface are visible at different times of the month.

### ***Why don't we ever see the far side of the moon?***

The moon orbits the Earth at exactly the same speed that it rotates on its own axis. For this reason, the same side of the moon is always facing Earth. The side of the moon that we cannot see is called the far side of the moon. Interestingly, there are few maria on the far side of the moon. This is because as the moon formed, Earth's gravitational attraction caused molten lava to flow onto the moon's surface. This effect was most pronounced on the side of the moon that faced Earth.



#### **Misconception 2: *The moon appears to change shape because it is in Earth's shadow. Is this true?***

That is incorrect. The moon appears to change shape because we see different portions of its illuminated surface as it orbits Earth. The moon is only in Earth's shadow during a lunar eclipse.

It is still interesting to look up at night and see "the man in the moon," but now you know that his "face" is created by physical features just like the mountains and valleys found on Earth. In this lesson you will learn other interesting facts about the moon.