

Earth's Moon

Overview

Like the Earth, the moon rotates on an axis and revolves around a larger body, the Earth, because of gravity. Although the moon rotates on its axis, we only see one side of it. We see one face of the moon because its rotation period is the same as its revolution period. As the moon travels its orbit around the Earth, it slowly rotates so one side is constantly facing the Earth. By the end of its revolution, it has also completed one rotation.

Although the moon only shows one side, it appears to change as it goes through its phases. The moon shines because it is reflecting light from the sun. Half of the moon is always illuminated by the sun (except in the case of a lunar eclipse) and the other half is not—it's known as the **dark side of the moon**. When the moon is between the Earth and sun, we only see the dark side (nothing is visible) although the moon is in the sky. This is known as the **new moon**. As the moon revolves around the Earth, we see more and more of the illuminated half, until we see the **full moon** when the moon is on the opposite side of the Earth from the sun. After the full moon, the illuminated side diminishes until the moon reaches the new moon phase again.

The gravitational force of the moon raises the ocean tides on the Earth. A great bulge of water is pulled up on the side of the Earth facing the moon and held there as the Earth rotates beneath

the bulge. This is known as a **high tide**. On the opposite side of Earth, where the gravitational pull of the moon is weakest, another bulge of water is created. On this side of the Earth centrifugal force is stronger than the pull of the moon, and the oceans bulge outward. That is why there are two high tides a day as the Earth rotates below the moon. Because there is only a limited amount of water on our planet, high tides in one place create **low tides** in another.

When the sun, moon and Earth are lined up, the sun's gravitational pull adds to that of the moon and causes especially high tides known as **spring tides**. When the sun, moon and Earth form a right angle with Earth at the corner, we have especially weak tides known as **neap tides**.

In an almost 30-day cycle, the moon revolves around the Earth showing different degrees of its illuminated side. In the beginning of the cycle, when the moon is aligned between the Earth and sun, with its illuminated side facing the sun, we have the first phase called the **new moon**.

Between the new moon and the seventh day of its cycle, we see the **waxing crescent**, a sliver of light on the moon that is gradually getting bigger. By the seventh day, we see the **first quarter**, a half circle of light on the moon's western side.

As the moon revolves around the Earth, the first quarter turns into the **waxing gibbous**. On the 14th day, the



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full moon, a fully illuminated circle, rises at sunset and crosses overhead at midnight.

After the full moon, we see the **waning gibbous** phase, where the illuminated side of the moon gets smaller again. It appears to recede off to the other side of the moon. On the 22nd day, the moon is beginning the **last quarter** phase, once again appearing as a half circle.

On the 26th day we see the **waxing crescent** on the side of the moon, and on the 29th and a half day we see the new moon again; in other words, we see nothing.

