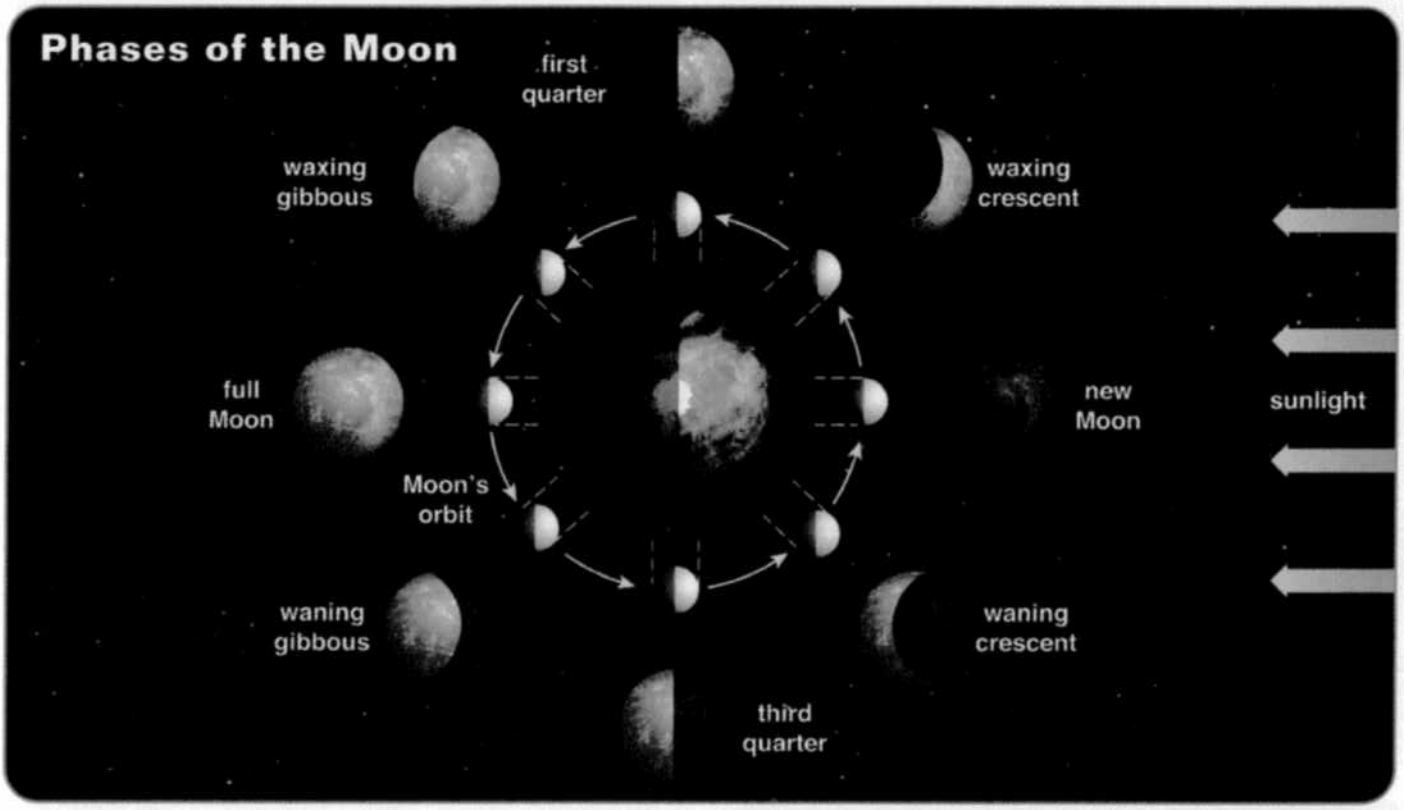

▲ **Figure 18** The Moon passes through a cycle of eight phases during one revolution around Earth. Our view of the Moon changes as we see more or less of the Moon's sunlit side. The outer ring of the diagram shows the view of the Moon during each phase, as viewed from Earth. The inner ring of the diagram shows how the Moon is lighted by the Sun, as viewed from space. The dashed lines indicate the part of the Moon that is visible from Earth.

is lighted, and the other half is dark. From Earth we can see only the lighted part of the Moon that is facing toward Earth at any one time. We cannot see the part of the Moon that is facing away from Earth, no matter whether it is lighted or dark.

As the Moon orbits Earth, we can see different amounts of the Moon's lighted side. Because of this, the Moon's shape appears to change from day to day in a predictable way. We call the Moon's cycle of changes the **phases** of the Moon (Figure 18).

At the *new Moon* phase, the Moon is lined up between Earth and the Sun. All of the Moon's lighted side is facing the Sun, and all of the Moon's dark side is facing Earth. So we see no Moon at all. As the Moon revolves around Earth and away from the Sun, we see a bit more of its lighted side each night and we say the Moon is **waxing.** A few days after the new Moon, we see a thin, *waxing crescent* Moon. Soon we are able to see one-half of the lighted side of the Moon (one-quarter of the whole Moon). This phase is called the *first quarter* Moon. A few days later we can see three-fourths of the lighted side, called the *waxing gibbous* Moon. Eventually we can see the whole round disk of the Moon's lighted side, called the *full Moon.*

Each day after the full Moon, we see less and less of the Moon's lighted side, and we say the Moon is **waning.** The Moon passes through the *waning gibbous* phase. When it reaches the *third quarter* phase, we once again see only half of the lighted side of the Moon. As the Moon continues to wane, we see the *waning crescent* Moon. A few days later, the cycle begins again with a new Moon.

The lunar cycle takes 29.5 days. This is slightly longer than the 27.3 days the Moon takes to orbit Earth, because while the Moon is orbiting Earth, Earth is also moving forward in its orbit around the Sun.