

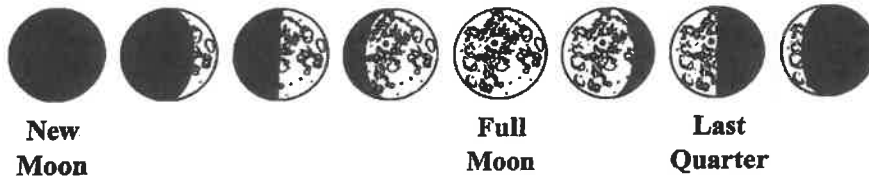
# How Do Eclipses Occur?

## Phases of the Moon

The moon is a satellite of Earth. A satellite is an object that orbits a planet. Scientists have made artificial satellites that orbit Earth.

The moon is Earth's natural satellite. Earth's gravity keeps the moon in its orbit around Earth. Together, Earth and its moon orbit the sun.

The moon does not give off its own light. Instead, the moon reflects the light of the sun. The sun lights the half of the moon that is facing it. As the moon orbits Earth, different parts of the moon's near side are lit by the sun. That is why the moon's shape seems to change from night to night. Each different shape of the moon is called a phase of the moon. Phases change in a cycle that repeats about once a month.



**The Moon**

<b>Temperature</b> (at the equator)	Noon: 127°C (260°F) Night: -173°C (-279°F)
<b>Rotation</b>	27 days, 7 hours, 43 minutes
<b>Revolution</b> (time to orbit around Earth)	27 days, 7 hours, 43 minutes

## Lunar Eclipse

When an object blocks a path of light, a shadow forms. Earth's shadow has two parts. The umbra is the darkest part of the shadow. The penumbra is the lighter part. It surrounds the umbra.

A lunar eclipse occurs when the moon passes through Earth's shadow. Earth is between the sun and the moon and blocks the sun's light from reaching the moon's surface.

There are three types of lunar eclipse. A total lunar eclipse occurs when the whole moon passes through the umbra. A partial lunar eclipse occurs when part of the moon passes through the umbra. A penumbral eclipse occurs when the moon passes only through the penumbra.

## Solar Eclipse

Sometimes the moon blocks the sun's light and casts a shadow. The moon's shadow also has an umbra and a penumbra.

A solar eclipse occurs when the moon passes between Earth and the sun. The moon blocks the path of the sun's light and casts a shadow on Earth. In a full or partial solar eclipse, the moon's shadow covers only a small part of Earth's surface.

During a total solar eclipse, the sky gets dark as the moon moves in front of the sun. The corona is a shining ring of light from the sun's outside edge. It is all you can see of the sun during a total eclipse.



## Planetary Transits

Sometimes a planet passes between the sun and Earth. This is called planetary transit. From Earth, only Venus and Mercury have planetary transits because they are the only two planets between Earth and the sun.

Planetary transits occur much less often than eclipses. Why? It takes much longer for a planet to orbit the sun than it does for the moon to orbit Earth.

Name \_\_\_\_\_

Date \_\_\_\_\_

# How Do Eclipses Occur?

Write answers to the questions on the lines below.

1. Why does the moon appear to change shape from night to night?

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2. What are the two regions of Earth's shadow during an eclipse?

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3. What part of the sun is visible during a total solar eclipse?

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4. What is planetary transit?

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5. From Earth, what two planets have planetary transits?

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6. **Main Idea** Explain the difference between a solar eclipse and a lunar eclipse.

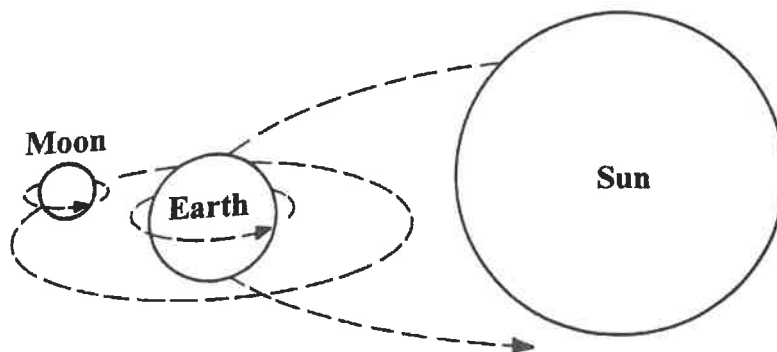
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Name \_\_\_\_\_ Date \_\_\_\_\_

7. **Vocabulary** Define the terms *umbra* and *penumbra*.

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8. **Reading Skill: Sequence** The word *wane* means "to decrease gradually in power or intensity." Sketch and label four of the waning moon phases starting with a full moon.

9. **Critical Thinking: Analyze** Explain why you won't see the moon at night during its new moon phase.

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10. **Inquiry Skill: Infer** A transit of a certain planet is never visible from Earth. What can you infer about the orbit of that planet around the sun?

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11. **Test Prep** What would you observe in a location where the moon's penumbral shadow falls on Earth?

- A a partial lunar eclipse
- B a partial solar eclipse
- C a planetary transit
- D a full moon