



Name: \_\_\_\_\_

Date: \_\_\_\_\_

# Sun - Earth - Moon, Worksheet - 1

An eclipse occurs when some celestial body in the heavens moves into the shadow of another celestial body. Earth has two types of eclipses: a lunar, referring to the moon, and a solar, referring to the sun. These happen when the Sun, Moon, and Earth are all in one straight line. Astronomers call this a syzygy from a Greek word meaning 'to be joined.' The word eclipse comes from a Greek word also, one related to falling, *ékleipsis*. In ancient times, people made up stories to explain the darkening of the earth. Today scientists use the eclipses to study more about nature. Solar eclipses occur when the Moon comes between the Earth and the Sun. They are in a straight line. Every year about two -five solar eclipses occur. There are three types of solar eclipses: total, annular and partial.

A total solar eclipse happens when the Moon completely covers the Sun. It can only be seen from a limited area of Earth. From other angles, it would seem to be a partial eclipse. A partial solar eclipse happens when the Moon covers only a part of the Sun. An annular solar eclipse occurs when the Moon sits squarely on top of and in the center of the Sun and appears smaller than the Sun. A bright colored ring appears to surround the Moon. This is the light from the part of the sun not covered by the Moon. It is called annular from the Latin word for ring, *annulus*. A hybrid solar eclipse can occur when the total eclipse changes to an annular or the reverse partway along the path.

The Moon does not have any light of its own. The only light it gets is what is reflected from the Sun. When the Earth comes between the Sun and the Moon, it blocks the Sun's light from reaching the Moon. This occurrence is called a lunar eclipse.

There are three kinds of lunar eclipses: a total, penumbral and partial. A total lunar eclipse happens when the Earth's shadow completely prevents any light from the Sun from reaching the Moon. The Latin word for shadow, *umbra*, is used as the scientific term for Earth's shadow. A partial lunar eclipse happens when only a part of the Moon's surface is hidden by the Earth's *umbra*. When the Sun, Earth and the Moon are in almost a straight line, the outer or lighter part of the Earth's shadow falls on the Moon, either totally or partially. This is called a penumbral eclipse.

Both Earth and the Moon cast three shadows: an *umbra*, *penumbra*, and *antumbra*. The *umbra* is the dark center part of the shadow. The *penumbra* is the lighter outer part of the shadow. The *antumbra* is a lighter shadow appearing at a distance from the object casting the shadow. It appears only if the light source is larger than the object. It is a lighter part of the shadow. Because the Moon is smaller than the Earth, its *umbra* can cover only a part of the Earth. However, the *penumbra*, a lighter shadow can cover whole continents. Thus, partial solar eclipses occur in one location much more often than total solar eclipses.

Ancient peoples invented many different reasons for the solar eclipses. They tried to think of a reason why the sun seemed to disappear from the Earth for a while. Some civilizations thought that a mythical creature ate or stole the Sun. Vietnamese people thought that a giant dog ate the Sun. The ancient Chinese believed that a dragon ate it. In Hindu mythology, the god Rahu was beheaded for drinking the nectar of the gods. His head flies off and devours the Sun. Koreans believed that mythical dogs were attempting to steal the Sun. Sometimes the people banged pots and pans loudly to scare off the demons who caused the eclipse.



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1) Which of the following is a true statement?

- A: A lunar eclipse occurs when the Earth comes between the Sun and the Moon.
- B: A lunar eclipse occurs when the Moon comes between the Earth and the Sun.
- C: A lunar eclipse occurs when the Sun comes between the Moon and the Earth.
- D: None of the above.

2) Which of the following is a true statement?

- A: A total solar eclipse occurs when the Sun is between the Earth and the Moon.
- B: An eclipse occurs when some celestial body moves into the shadow of another celestial body.
- C: An annular eclipse comes from the Latin word for hide.
- D: None of the above

3) Which of the following is the meaning of the word umbra?

- A: Round
- B: Hidden
- C: Shadow
- D: Lunar

4) Which of the following statements is true?

- A: An annular eclipse occurs when the Earth sits right on top of the Sun.
- B: An annular eclipse occurs when the Moon sits right on top of the Sun.
- C: An annular eclipse is a total eclipse.
- D: About twenty solar eclipses occur every year.

5) Which of the following people believed that a dragon ate the Sun?

- A: Vietnamese
- B: Chinese
- C: Hindu
- D: Koreans

6) Which of the following is not a true statement?

- A: A solar eclipse is an eclipse of the Sun.
- B: A Lunar eclipse is an eclipse of the Moon.
- C: A total solar eclipse can be seen from everywhere on the Earth.
- D: A total solar eclipse can only be seen from a limited area of the Earth.



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## Sun - Earth - Moon, Worksheet - 2

Choose the term that best completes each sentence. Some terms may be used more than once.

astronomy      phase      moon      lunar      orbit      ellipse  
rotation      revolution      gravity      eclipse      solar

1. The movement of Earth around its axis is called \_\_\_\_\_.
2. A(n) \_\_\_\_\_ occurs when the moon's shadow hits Earth or Earth's shadow hits the moon.
3. The path of the Earth as it travels around the sun is called its \_\_\_\_\_.
4. The \_\_\_\_\_ you see depends on how much of the sunlit side of the moon faces the Earth.
5. A(n) \_\_\_\_\_ eclipse occurs at a full moon when Earth is directly between the moon and the sun.
6. Day and night are caused by Earth's \_\_\_\_\_.
7. \_\_\_\_\_ is the study of the moon, stars, and other objects in space.
8. \_\_\_\_\_ is Earth's natural satellite.
9. \_\_\_\_\_ is the movement of the Earth around the sun.
10. A(n) \_\_\_\_\_ eclipse occurs when the moon passes between Earth and the sun.
11. The force of \_\_\_\_\_ pulls the moon and Earth toward each other.
12. A year is caused by Earth's \_\_\_\_\_.
13. The shape of Earth's orbit around the sun is an(n) \_\_\_\_\_.

Write these answers on the back or on another sheet of paper.

14. What is the difference between a multistage rocket and a single-stage rocket?
15. What is the difference between space shuttles and other rockets?
16. Where have we used the term "phases" in this class before?
17. What phase is the moon in during a lunar eclipse?
18. Why is an extra day added to February every four years?