

Name: _____ Class: _____

What is an Eclipse?

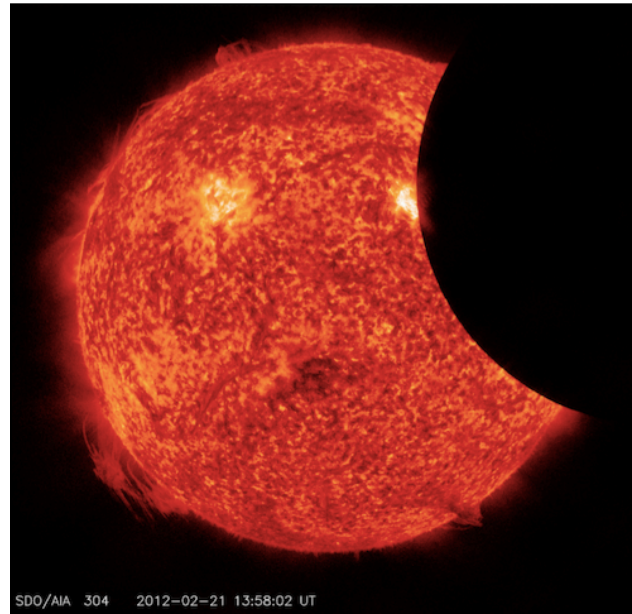
By NASA
2017

Solar and lunar eclipses are some of the beautiful, outerspace events that we are able to witness from Earth. This text details how solar and lunar eclipses occur and provides important information about how to observe them. As you read, take notes on how solar and lunar eclipses occur, as well as how they are different from each other.

- [1] An eclipse takes place when one heavenly body¹ such as a moon or planet moves into the shadow of another heavenly body. There are two types of eclipses on Earth: an eclipse of the moon and an eclipse of the sun.

What Is a Lunar Eclipse?

The moon moves in an orbit² around Earth, and at the same time, Earth orbits the sun. Sometimes Earth moves between the sun and the moon. When this happens, Earth blocks the sunlight that normally is reflected by the moon. (This sunlight is what causes the moon to shine.) Instead of light hitting the moon's surface, Earth's shadow falls on it. This is an eclipse of the moon — a lunar eclipse. A lunar eclipse can occur only when the moon is full.



SDO/AIA 304 2012-02-21 13:58:02 UT

"Untitled" by NASA is in the public domain.

A lunar eclipse can be seen from Earth at night. There are two types of lunar eclipses: total lunar eclipses and partial lunar eclipses.

A total lunar eclipse occurs when the moon and the sun are on exact opposite sides of Earth. Although the moon is in Earth's shadow, some sunlight reaches the moon. The sunlight passes through Earth's atmosphere, which causes Earth's atmosphere to filter out most of the blue light. This makes the moon appear red to people on Earth.

- [5] A partial lunar eclipse happens when only a part of the moon enters Earth's shadow. In a partial eclipse, Earth's shadow appears very dark on the side of the moon facing Earth. What people see from Earth during a partial lunar eclipse depends on how the sun, Earth and moon are lined up.

A lunar eclipse usually lasts for a few hours. At least two partial lunar eclipses happen every year, but total lunar eclipses are rare. It is safe to look at a lunar eclipse.

1. a planet, star, or other object that exists in space
2. the curved path of an object in space around a star, planet, or moon

What Is a Solar Eclipse?

Sometimes when the moon orbits Earth, it moves between the sun and Earth. When this happens, the moon blocks the light of the sun from reaching Earth. This causes an eclipse of the sun, or solar eclipse. During a solar eclipse, the moon casts a shadow onto Earth.

There are three types of solar eclipses.

The first is a total solar eclipse. A total solar eclipse is only visible from a small area on Earth. The people who see the total eclipse are in the center of the moon's shadow when it hits Earth. The sky becomes very dark, as if it were night. For a total eclipse to take place, the sun, moon and Earth must be in a direct line.

- [10] The second type of solar eclipse is a partial solar eclipse. This happens when the sun, moon and Earth are not exactly lined up. The sun appears to have a dark shadow on only a small part of its surface.

The third type is an annular (ANN you ler) solar eclipse. An annular eclipse happens when the moon is farthest from Earth. Because the moon is farther away from Earth, it seems smaller. It does not block the entire view of the sun. The moon in front of the sun looks like a dark disk on top of a larger sun-colored disk. This creates what looks like a ring around the moon.

During a solar eclipse, the moon casts two shadows on Earth. The first shadow is called the umbra (UM bruh). This shadow gets smaller as it reaches Earth. It is the dark center of the moon's shadow. The second shadow is called the penumbra (pe NUM bruh). The penumbra gets larger as it reaches Earth. People standing in the penumbra will see a partial eclipse. People standing in the umbra will see a total eclipse.

Solar eclipses happen once every 18 months. Unlike lunar eclipses, solar eclipses only last for a few minutes.

NEVER look directly at the sun: It can permanently damage your eyes! You must use proper safety equipment to look at any type of solar eclipse.

Why Does NASA Study Eclipses?

- [15] Hundreds of years ago, when people observed the moon during an eclipse, they discovered that the shape of Earth is round. Even after all these years, scientists are still learning about the moon from lunar eclipses. In December 2011, NASA's Lunar Reconnaissance Orbiter gathered data about how quickly the moon's day side (the side that always faces Earth) cools during a lunar eclipse. NASA can learn what the moon's surface is made of from this data. If an area of the moon's surface is flat, it will cool quickly. Scientists use this data to know which areas of the moon are rough with boulders and which are flat.

NASA also studies solar eclipses. Scientists use solar eclipses as an opportunity to study the sun's corona. The corona is the sun's top layer. During an annular eclipse, NASA uses ground and space instruments to view the corona when the moon blocks the sun's glare.

When Is the Next Solar Eclipse?

On Monday, Aug. 21, 2017, all of North America will be treated to an eclipse of the sun. Anyone within the path of totality³ can see one of nature's most awe-inspiring sights — a total solar eclipse. This path, where the moon will completely cover the sun so the sun's corona can be seen, will stretch from Salem, Oregon, to Charleston, South Carolina. Observers outside this path will still see a partial solar eclipse where the moon covers part of the sun's disk.

REMEMBER: NEVER look directly at the sun: It can permanently damage your eyes! You must use proper safety equipment to look at any type of solar eclipse.

"What is an Eclipse" from NASA Knows by Brandi Bernoskie and Heather Deiss (2017) is in the public domain.

3. the moment the moon or sun is completely blocked out during an eclipse

Text-Dependent Questions

Directions: For the following questions, choose the best answer or respond in complete sentences.

1. PART A: Which of the following describes the main idea of the text? [RI.2]
 - A. People often damage their eyes when watching eclipses because they are uninformed about the power of the sun and moon.
 - B. Both solar and lunar eclipses are caused by the movement of Earth and the moon, and can be viewed safely with protective gear.
 - C. While partial eclipses of the sun can be dangerous, full eclipses of the sun are safe for people to view.
 - D. Both solar and lunar eclipses are caused solely by the orbit of Earth around the sun and the spinning of Earth itself.

2. PART B: Which detail from the texts best supports the answer to Part A? [RI.1]
 - A. "An eclipse takes place when one heavenly body such as a moon or planet moves into the shadow of another heavenly body." (Paragraph 1)
 - B. "A lunar eclipse usually lasts for a few hours. At least two partial lunar eclipses happen every year, but total lunar eclipses are rare. It is safe to look at a lunar eclipse." (Paragraph 6)
 - C. "NEVER look directly at the sun: It can permanently damage your eyes! You must use proper safety equipment to look at any type of solar eclipse." (Paragraph 14)
 - D. "This path, where the moon will completely cover the sun so the sun's corona can be seen, will stretch from Salem, Oregon, to Charleston, South Carolina." (Paragraph 17)

3. PART A: Which of the following identifies the main difference between a solar and lunar eclipse? [RI.3]
 - A. the frequency of the eclipse
 - B. how impressive the eclipse is
 - C. where you can see the eclipse from
 - D. which heavenly body is casting the shadow

4. PART B: Which TWO sections from the text best support the answer to Part A? [RI.1]
 - A. "Sometimes Earth moves between the sun and the moon. When this happens, Earth blocks the sunlight that normally is reflected by the moon." (Paragraph 2)
 - B. "A lunar eclipse can be seen from Earth at night. There are two types of lunar eclipses: total lunar eclipses and partial lunar eclipses." (Paragraph 3)
 - C. "At least two partial lunar eclipses happen every year, but total lunar eclipses are rare." (Paragraph 6)
 - D. "Sometimes when the moon orbits Earth, it moves between the sun and Earth. When this happens, the moon blocks the light of the sun from reaching Earth." (Paragraph 7)
 - E. "People standing in the penumbra will see a partial eclipse. People standing in the umbra will see a total eclipse." (Paragraph 12)
 - F. "Solar eclipses happen once every 18 months. Unlike lunar eclipses, solar eclipses only last for a few minutes." (Paragraph 13)

5. How does the final section "When Is the Next Solar Eclipse?" contribute to the text? [RI.5]

Discussion Questions

Directions: Brainstorm your answers to the following questions in the space provided. Be prepared to share your original ideas in a class discussion.

1. Are you interested in seeing the upcoming solar eclipse? Why or why not?
2. In what ways do you think an eclipse could be beautiful? What do you think it might feel like to witness an eclipse?
3. How does the information that scientists collect from observing eclipses help them better understand the world? Have you learned anything from observing the sky? If so, what?