



Name: _____ Date: _____

Student Exploration: Eclipse

Vocabulary: corona, eclipse, lunar eclipse, penumbra, solar eclipse, umbra

Prior Knowledge Questions (Do these BEFORE using the Gizmo.)

1. Stand with your back to a lamp and your hand in front of you. Where does your shadow fall?

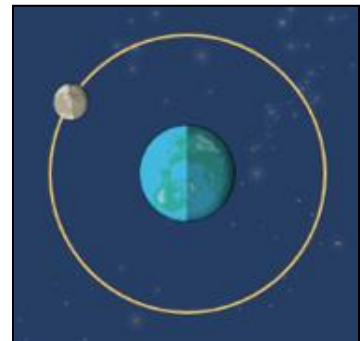
2. Face the lamp directly and stretch your hand in front of you. Is it possible to place your hand so you no longer see the lamp? _____ Explain. _____

3. When your hand blocks your view of the lamp, where does the shadow of your hand fall?

Gizmo Warm-up

1. In the *Eclipse Gizmo*, make sure all shadows are off. Click **Play** (▶) or **Fast forward** (▶|) and watch the Moon's orbit.

How does the view of the **Sun from Earth** (lower right corner of the Gizmo) change? Click **Pause** (||) and describe it.



An **eclipse** is the blocking or darkening of a celestial body (such as the Sun or the Moon). When part or all of the Sun disappears from view, it is called a **solar eclipse**.

2. Click **Play** or **Fast forward** and watch the **Moon from Earth**. How does this view change?

When the Moon is darkened, it is a **lunar eclipse**.



<p>Activity A: Solar eclipses</p>	<p><u>Get the Gizmo Ready:</u></p> <ul style="list-style-type: none"> Click Reset (↺). 	
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Question: What causes a solar eclipse?

- Observe: Experiment with Gizmo to decide why a solar eclipse occurs. (You can click **Play** or **Fast forward**, or simply drag the Moon around its orbit while the Gizmo is paused.)
- Form hypothesis: What do you think causes a solar eclipse?

- Run Gizmo: Turn on the **Moon shadow**. Click **Play** or drag the Moon until a solar eclipse occurs. How are the Earth, Moon, and Sun arranged at this time? Sketch them below.


Solar eclipse
(Show Earth, Moon, and Sun in your sketch.)

- Draw conclusions: During a solar eclipse, what is causing the Earth’s view of the Sun to be darkened?

- Analyze: The faint outer atmosphere of the Sun, called the **corona**, is visible in the view on the right. Manipulate Gizmo until you see this. What is needed for this to happen?



Corona

Activity B: Lunar Eclipses	<u>Get the Gizmo Ready:</u> <ul style="list-style-type: none"> • Click Reset. • Turn off the Moon shadow, but keep the Earth shadow on. 	 <p>Moon from Earth</p>
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Question: What causes a lunar eclipse?

1. Form hypothesis: What do you think causes a lunar eclipse? (Use your knowledge of solar eclipses and feel free to run the Gizmo to help you.)

2. Run Gizmo: Click **Play** or drag the Moon until you see a lunar eclipse. Sketch and label the Earth, Moon, and Sun at this time.

Lunar eclipse
 (Show Earth, Moon, and Sun in your sketch.)

3. Draw conclusions: What causes the Moon to be darkened in a lunar eclipse? _____

4. Analyze: Shadows have two parts. The dark inner part is called the **umbra**. The areas of partial darkness on the edges are called the **penumbra**. Because of this, there are three different types of lunar eclipses. Explore them in the Gizmo, and sketch them below.

Description	Moon fully in penumbra	Moon in both umbra and penumbra	Moon fully in umbra
Name	Penumbral eclipse	Partial lunar eclipse	Total lunar eclipse
Sketch of Moon (describe colors)	Color:	Colors:	Color: