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?

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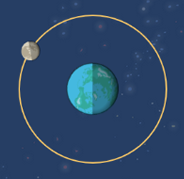
1. Face the lamp directly and stretch your hand in front of you. Is it possible to place your hand so you no longer see the lamp? \_\_\_\_\_\_\_\_\_\_\_ Explain. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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

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**Gizmo Warm-up**



1. In the *Eclipse* Gizmo, make sure all shadows are off. Click **Play** (Play) or **Fast forward** (6) and watch the Moon’s orbit.

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

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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**.

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

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

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| **Activity A:**  **Solar eclipses** | Get the Gizmo Ready:   * Click **Reset** (Reset). | 644SE2 |

**Question: What causes a solar eclipse?**

1. 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.)
2. Form hypothesis: What do you think causes a solar eclipse?

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1. 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.

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

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

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**Corona**

1. 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?

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| **Activity B:**  **Lunar Eclipses** | Get the Gizmo Ready:   * Click **Reset**. * Turn off the **Moon shadow**, but keep the **Earth shadow** on. | 644SE4 |

**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.)

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1. 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.

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

1. Draw conclusions: What causes the Moon to be darkened in a lunar eclipse? \_\_\_\_\_\_\_\_\_\_\_\_

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1. 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.

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| 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: |