



Solar and Lunar Eclipses

Prep Time: 10 minutes

Grades: 6-8

Lesson Time: 50-60 minutes

Essential Questions:

- What causes a solar eclipse?
- What causes a lunar eclipse?

Objectives:

- Model how lunar and solar eclipses occur.
- Determine the timing necessary for both phenomena to occur.

Standards:

- MS-ESS1-1- Develop and use a model of the Earth-sun-moon system to describe the cyclic patterns of lunar phases, eclipses of the sun and moon, and seasons.
- RI.5.9 - Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably.
- SL.5.5 - Include multimedia components (e.g., graphics, sound) and visual displays in presentations when appropriate to enhance the development of main ideas or themes.

Teacher Prep:

- Materials (explore portion): attached images, scissors, glue, paper, pen or pencil.
- Materials (explain portion): globe, lamp with exposed lightbulb, Styrofoam ball attached to some sort of stick.
- Materials (elaborate): laptop with projector capabilities.

Teacher Notes/Background:

- If you are unable to use YouTube, the video referenced in Elaborate can be found [here](#) and is titled "Discovering the Sun's Mysteriously Hot Atmosphere."
- Lunar eclipse: only happens during a full moon when the Moon passes through the Earth's shadow from the Sun.
- Lunar eclipses happen a few times a year and the Moon appears red because of how light passes through Earth's atmosphere on its way to the Moon.
- Solar eclipse: only happens during a new moon when the Moon is lined up perfectly between the Sun and the Earth.
- During a solar eclipse, the Moon appears to block out the Sun.

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Engage (5 minutes)	<p>What's the Difference?</p> <ul style="list-style-type: none"> • Ask students if they know the difference between a solar eclipse and a lunar eclipse. • Which occurs more often: solar or lunar? • What does the moon look like during a lunar eclipse? • What role does the moon play in a solar eclipse? 	<p>Materials:</p> <p>N/A</p>
Explore (5 minutes)	<p>Order the Objects:</p> <ul style="list-style-type: none"> • Print out the Sun, Moon, and Earth images attached and have students organize them either on their desks or glue them to a piece of paper that model what order they need to be in for each eclipse to happen. • Students should build both a lunar and solar eclipse diagram. • Students should label the diagrams. 	<p>Materials:</p> <ul style="list-style-type: none"> • Scissors • Glue • Paper • Pen or pencil
Explain (20 minutes)	<p>Model the Eclipses:</p> <ul style="list-style-type: none"> • Turn on the lamp and ask students what this part of the model represents. • Position the lamp so that it is shining on the globe. • Pick up the Styrofoam ball on the stick and ask the students what part of the model this represents. • Move the Styrofoam ball around the globe to model a solar and lunar eclipse. • Turn the globe to model that depending on the Earth's rotation, solar eclipses happen at different points. 	<p>Materials:</p> <ul style="list-style-type: none"> • Lamp • Globe • Styrofoam ball • Stick
Elaborate (10 minutes)	<p>Video:</p> <ul style="list-style-type: none"> • What else could a solar or lunar eclipse tell us about our Sun or the Moon? • Show the following video based on the mission of the Parker Solar Probe to elaborate on how total solar eclipses have helped us learn more about our Sun. • Play the animation of the solar eclipse, pause it at the path of the full eclipse and elaborate on how this allows us to observe the outer layers of the Sun more clearly. 	<p>Materials:</p> <ul style="list-style-type: none"> • Link to video • Link to animation • Laptop with projector capabilities
Evaluate (5 minutes)	<p>Wrap Up:</p> <ul style="list-style-type: none"> • Tell students to imagine they are a scientist studying a total solar eclipse. What would they study during the eclipse? Maybe they would study the effect on plant growth during years where there is an eclipse. Would they study how viewing an eclipse without glasses damages the human eye? • Allow students to brainstorm individually or in small groups and share out. 	<p>Materials:</p> <ul style="list-style-type: none"> • Pen/pencil • Paper

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Extensions and Enrichment:

- Students can make their own diagrams of the positioning of the Sun, Moon, and Earth instead of cutting out the images attached. Using a ruler, they can measure their drawings to draw the objects to scale.

Additional Resources:

- <https://svs.gsfc.nasa.gov/12698>

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