

Educational Resources from *Phenomenon Science Education*  
Student Proficiency Goals for Performance Expectation **MS-ESS1-1**



**Information about Performance Expectation MS-ESS1-1**

**Performance Expectation 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.

**Clarification Statement.**

*Examples of models can be physical, graphical, or conceptual.*

**Assessment Limits.**

*No specific assessment limits are listed for this Performance Expectation.*

**Science and Engineering Practice (Developing and Using Models)**

- Develop and use a model to describe phenomena.

**Disciplinary Core Idea (ESS1.A: The Universe and Its Stars)**

- Patterns of the apparent motion of the sun, the moon, and stars in the sky can be observed, described, predicted, and explained with models.

**Disciplinary Core Idea (ESS1.B: Earth and the Solar System)**

- This model of the solar system can explain eclipses of the sun and the moon. Earth's spin axis is fixed in direction over the short-term but tilted relative to its orbit around the sun. The seasons are a result of that tilt and are caused by the differential intensity of sunlight on different areas of Earth across the year.

**Crosscutting Concept (Patterns)**

- Patterns can be used to identify cause-and-effect relationships.

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**SEP (Developing and Using Models):**

- Students develop physical and/or conceptual models of the Earth-Sun-Moon System capable of addressing the causes and cyclical patterns of phenomena related to lunar phases, lunar and solar eclipses, and seasons on Earth.
- Students identify the components needed in models that can address the causes and cyclical patterns of phenomena related to lunar phases, lunar and solar eclipses, and seasons on Earth.
- Students identify the roles of the components in their models.
- Students explore limitations of their models in describing the Earth-Sun-Moon System, and in addressing cyclical patterns of phenomena related to lunar phases, lunar and solar eclipses, and seasons on Earth.
- Students use their models to address and make predictions about the causes and cyclical patterns of phenomena related to lunar phases, lunar and solar eclipses, and seasons on Earth.

**DCI (ESS1.A The Universe and Its Stars):**  
**DCI (ESS1.B Earth and the Solar System):**

- Students know the relevant components of the Earth-Sun-Moon System and that those components move in relation to each other in specific and predictable ways to cause lunar phases, lunar and solar eclipses, and seasons on Earth.
- Students know that solar energy travels in a straight line until it interacts with other components of the Earth-Sun-Moon System (e.g., Earth's moon).
- Students know how relevant components of the Earth-Sun-Moon System move with respect to each other to cause lunar phases, lunar and solar eclipses, and seasons on Earth.
- Students understand that lunar phases, lunar and solar eclipses, and seasons on Earth occur in observable patterns, and know the interactions among components of the Earth-Sun-Moon System that cause those patterns.

**CCC (Patterns):**

- Students describe observed patterns of lunar phases and the cyclical nature of phenomena related to lunar and solar eclipses and seasons on Earth.
- Students consider interactions among the relevant components of the Earth-Sun-Moon system that cause the observed patterns of lunar phases and the cyclical nature of phenomena related to lunar and solar eclipses and seasons on Earth.