Connecting to the Next Generation Science Standards

The chart below makes one set of connections between the instruction outlined in this article and the *NGSS*. Other valid connections are likely; however, space restrictions prevent us from listing all possibilities.

**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.**

**Science and Engineering Practices**

**Developing and Using Models**

Modeling in grades 6–8 builds on K–5 experiences and progresses to developing, using, and revising models to describe, test, and predict more abstract phenomena and design systems

* Develop and use a model to describe phenomena.

**Disciplinary Core Ideas**

[**ESS1.A: The Universe and Its Stars**](http://www.nap.edu/openbook.php?record_id=13165&page=173)

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

[**ESS1.B: Earth and the Solar System**](http://www.nap.edu/openbook.php?record_id=13165&page=175)

* This model of the solar system can explain eclipses of the sun and the moon.

**Crosscutting Concept(s)**

**Patterns**

* [Patterns can be used to identify cause-and-effect relationships.](http://www.nap.edu/openbook.php?record_id=13165&page=85)

***Connections to Nature of Science***

**Scientific Knowledge Assumes an Order and Consistency in Natural Systems**

* Science assumes that objects and events in natural systems occur in consistent patterns that are understandable through measurement and observation.

Connections to the *Common Core State Standards* (NGAC and CCSSO 2010)

#### ELA/Literacy

* **SL.8.5** - Integrate multimedia and visual displays into presentations to clarify information, strengthen claims and evidence, and add interest. (MS-ESS1-1)

#### Mathematics

* **6.RP.A.1** - Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. (MS-ESS1-1)
* **7.RP.A.2** - Recognize and represent proportional relationships between quantities. (MS-ESS1-1)
* **MP.4** - Model with mathematics. (MS-ESS1-1)

**Connections to Classroom**

#### Connection to the classroom: Students are able to explain why eclipses only occur roughly 6 months apart by using several 3D models.

#### Students describe the motion of the Moon orbiting the Earth with an inclined orbit of a Hulu hoop. They predict what phases will occur in different positions and when eclipses will occur.

* Students calculate times of eclipse and compare that to the incremental period of new moons, seeing that it is roughly 6 new moon’s that align with the NASA eclipse data.
* Students see that the Moon’s orbital plane inclination reduces the number of times where the Sun-Earth-Moon line up to only 2 locations that are roughly 6 months apart.