Unit 4 -Earth, Moon, and the Sun

Content Area: **Template**
Course(s):
Time Period: **Full Year**
Length: **Full Year**
Status: **Published**

Unit Overview

The Earth, Moon, and Sun unit begins as students take on the role of student astronomers, tasked with advising an astrophotographer who needs to take photographs of the Moon for a fictional magazine called About Space. The astrophotographer can only take pictures of specific features on the Moon at certain times. In order to provide advice about when to take photographs of the Moon as well as how to take photographs of a lunar eclipse, students will need to investigate where the Moon's light comes from, what causes the characteristic changes in the appearance of the Moon that we observe, and what conditions are required to view phenomena, such as particular moon phases and lunar eclipses.

Enduring Understandings

The Moon does not make its own light; the sun illuminates the Moon.
When a model is "to scale," object sizes and distances are larger or smaller than in the real world but the same relative to one another. Some models need to be "not to scale" to be useful.
The sun illuminates the half of the Moon that is facing it, and the other half is dark. Light from the sun travels in straight lines.
From Earth we can only see the half of the Moon that is facing us. Because the Moon moves to different positions around Earth, we see different amounts of the illuminated half of the Moon. This is why we see different phases of the Moon.
There is a pattern to the position of the Moon because the Moon orbits around Earth. It takes about one month for the Moon to orbit Earth, so it takes about one month to see the full pattern of moon phases. This pattern repeats with every orbit of the Moon.
During a lunar eclipse, the Moon is completely dark because Earth blocks sunlight from hitting the Moon.
Lunar eclipses can only happen when Earth is in between the sun and the Moon. Lunar eclipses do not happen every time Earth is in between the sun and the Moon.
The Moon is only completely dark when the sun, Earth, and the Moon are in a straight line, with Earth in the middle.

Essential Questions

What is an astrophotographer?
Where does the Moon get it's light?
Why is part of the Moon dark?
How can we predict how the Moon will change appearances from day to day?
If half of the Moon is always illuminated, why does its appearance from Earth change?
What makes the Moon completely dark during a lunar eclipse?
Why isn't there a lunar eclipse every time Earth is in between the sun and the Moon?

Learning Objectives

Use a simple physical model with foam balls to explore how the view of the Moon from Earth changes as the Moon orbits.
Understand how scale must always be considered when considering large objects and distances. 3. Translate their ideas from models that are mostly not to scale in order to describe their understanding of the full scale of the Earth, Moon, and sun system.
Represent their ideas about scale by creating visual models in the Earth, Moon, and Sun Modeling Tool.
Use the Sim to investigate where the moon gets its light.
Use a moon sphere model to observe light and dark on the Moon.
Gather evidence in the Sim to explain why part of the moon is dark.
Use the Modeling Tool to show light and dark on the Moon.
Use the Moon sphere model to gather evidence about why the Moon's appearance from Earth changes.
Predict and observe the Moon at different positions using the Sim

Standards: Content

SCI.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.
SCI.MS-ESS1-2	Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system.
SCI.MS-ESS1-3	Analyze and interpret data to determine scale properties of objects in the solar system.

Standards: Interdisciplinary

Assessment Evidence

Formative	
Summative	
Alternative & Benchmark	
Assessment Evidence Resource	

Instructional Resources

Instructional Resource List

Curricular Mandates

Below are the curricular requirements as defined in NJ Administrative Code and Statute

	Amistad		Diversity, Equity, and Inclusion
	Holocaust		LGBT and Disabilities (Grades 6-12)
	Climate Change		Asian American & Pacific Islander

Social Emotional Learning (SEL) Competencies

NJ Social and Emotional Learning Competencies & Sub-Competencies

	Self-Awareness		Relationship Skills
	Responsible Decision-Making		Social Awareness
	Self-Management		

21st Century Skills & Themes

	Global and Cultural Awareness		Technology Literacy		Planning and Budgeting
	Creativity and Innovation		Financial Institutions		Risk Management and Insurance
	Information and Media Literacy		Digital Citizenship		Economic and Government Influences
	Critical Thinking and Problem Solving		Credit Profile		Career Awareness and Planning
	Civic Financial Responsibility		Financial Psychology		