Unit 6: Interactions Within the Earth, Sun, and Moon System

Content Area: **Science**
Course(s):
Time Period: **Generic Time Period**
Length: **4 weeks**
Status: **Published**

Disciplinary Core Ideas

PS2.B: Types of Interactions

The gravitational force of Earth acting on an object near Earth's surface pulls that object toward the planet's center. (5-PS2-1)

ESS1.A: The Universe and its Stars

The sun is a star that appears larger and brighter than other stars because it is closer. Stars range greatly in their distance from Earth. (5-ESS1-1)

ESS1.B: Earth and the Solar System

The orbits of Earth around the sun and of the moon around Earth, together with the rotation of Earth about an axis between its North and South poles, cause observable patterns. These include day and night; daily changes in the length and direction of shadows; and different positions of the sun, moon, and stars at different times of the day, month, and year. (5-ESS1-2)

Standards

MA.K-12.2	Reason abstractly and quantitatively.
MA.K-12.4	Model with mathematics.
TECH.8.1.5.A.4	Graph data using a spreadsheet, analyze and produce a report that explains the

	analysis of the data.
SCI.5-ESS1-1	Support an argument that differences in the apparent brightness of the sun compared to other stars is due to their relative distances from Earth.
LA.5.RI.5.7	Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently.
LA.5.RI.5.8	Explain how an author uses reasons and evidence to support particular points in a text, identifying which reasons and evidence support which point(s).
LA.5.RI.5.9	Integrate and reflect on (e.g. practical knowledge, historical/cultural context, and background knowledge) information from several texts on the same topic in order to write or speak about the subject knowledgeably.
CAEP.9.2.8.B.3	Evaluate communication, collaboration, and leadership skills that can be developed through school, home, work, and extracurricular activities for use in a career.
TECH.8.1.5.F.CS2	Plan and manage activities to develop a solution or complete a project.
SCI.5-PS2-1	Support an argument that the gravitational force exerted by Earth on objects is directed down.
MA.5.5.G.A.2	Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation.
SCI.5-ESS1-2	Represent data in graphical displays to reveal patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky.
LA.5.RI.5.1	Quote accurately from a text and make relevant connections when explaining what the text says explicitly and when drawing inferences from the text.
LA.5.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.
LA.5.W.5.1	Write opinion pieces on topics or texts, supporting a point of view with reasons and information.
MA.5.5.NBT.A.2	Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10.
TECH.8.1.5.A.1	Select and use the appropriate digital tools and resources to accomplish a variety of tasks including solving problems
CAEP.9.2.8.B.1	Research careers within the 16 Career Clusters ® and determine attributes of career success.

Objectives and Essential Questions

Student Learning Objectives

A) Support an argument that the gravitational force exerted by Earth on objects is directed down (toward the center of the Earth)

B) Support an argument that the apparent brightness of the sun and stars is due to their relative distances

from Earth

C) Represent data in graphical displays to reveal patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky.

Essential Questions

What patterns do we notice when observing the night sky?

What effect does Earth's gravitational force have on objects?

What effect does the relative distance from Earth have on the apparent bightness of the sun and other stars?

What patterns do we notice when observing the sky?

Concepts

Part A

• Cause-and-effect relationships are routinely identified and used to explain change.

• The gravitational force of Earth acting on an object near Earth’s surface pulls that object toward the planet’s center.

Part B

• Natural objects exist from the very small to the immensely large.

• The sun is a star that appears larger and brighter than other stars because it is closer.

• Stars range greatly in their distance from Earth.

Part C

• Similarities and differences in patterns can be used to sort, classify, communicate, and analyze simple rates

of change for natural phenomena.

• The orbits of Earth around the sun and of the moon around Earth, together with the rotation of Earth about an axis between its north and south poles, cause observable patterns. These include:

 Day and night

 Daily changes in the length and direction of shadows

 Different positions of the sun, moon, and stars at different times of the day, month, and year.

Activities and Lessons

Mystery Science - Spaceship Earth Mysteries 1-6 Explorations, Activities and Optional Extras

Mystery 1) Why does the sun rise and set?

Mystery 2) Who set the first clock?

Mystery 3) Why do the stars change with the seasons?

Mystery 4) How can the sun tell you the season?

Mystery 5) Why doesn't the moon always look round?

Mystery 6) What are the wandering stars?

(5-PS2-1)

5th Grade NGSS Science Notebook

Gravity

(5-ESS1-1)

5th Grade NGSS Science Notebook

Stars and Earth

Constellations

NASA How Big, Far, Hot, Old: http://solar-center.stanford.edu/activities/HowBig/How-Big-Far-Hot-Old.pdf

(5-ESS1-2)

5th Grade NGSS Science Notebook

Hours of Daylight

Shadows and Shadow Investigation

Lunar Cycle

Materials and Resources

www.mysteryscience.com

Mystery Sciecne - Spaceship Earth (Sun, Moon, Stars and Planets) Mystery 1-6

5th Grade NGSS Science Notebook

NEWSELA

Stars and Earth - LED tea lights

Youtube, Brainpop Videos

NJ Model Curriculum Open Education Resources: Gravity and Falling Objects - https://nj.pbslearningmedia.org/resource/phy03.sci.phys.mfe.lp_gravity/gravity-and-falling-objects/#.WMAwkW8rLct

Solar System Exploration - http://solarsystem.nasa.gov/planets/solarsystem

Our Super Star - https://nj.pbslearningmedia.org/resource/ess05.sci.ess.eiu.lp_superstar/our-super-

Assessment

Part A

Students who understand the concepts are able to:

• Identify cause-and-effect relationships in order to explain change.

• Support an argument with evidence, data, or a model.

• Support an argument that the gravitational force exerted by Earth on objects is directed down. (“Down” is a local description of the direction that points toward the center of the spherical Earth.) (Assessment does not include mathematical representation of gravitational force.).

Part B

Students who understand the concepts are able to:

• Support an argument with evidence, data, or a model.

• Support an argument that differences in the apparent brightness of the sun compared to that of other stars is due to their relative distances from Earth. (Assessment is limited to relative distances, not sizes, of stars, and does not include other factors that affect apparent brightness, such as stellar masses, age, or stage.)

Part C

Students who understand the concepts are able to:

• Sort, classify, communicate, and analyze simple rates of change for natural phenomena using similarities and differences in patterns.

• Represent data in graphical displays (bar graphs, pictographs and/or pie charts) to reveal patterns that indicate relationships.

• Represent data in graphical displays to reveal patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky. (Assessment

does not include causes of seasons.)

Examples of patterns could include: □

The position and motion of Earth with respect to the sun. □

Selected stars that are visible only in particular months.

Accommodations and Modifications

Group lab/experiment groups

Additional time for classwork

Additional time for assessments

Tests in small group

Use of videos and visual models

Preferential seating

Notes/outlines provided