



Marietta City Schools

District Unit Planner

Everything on the unit planner must be included on the unit curriculum approval statement.

Science Grade 6 Advanced Studies

Unit title	<i>Earth-Moon-Sun</i>	MYP year	1	Unit duration (hrs)	20.25 Hours
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Mastering Content and Skills through INQUIRY (Establishing the purpose of the Unit): *What will students learn?*

GaDoE Standards

Standards

S6E2. Obtain, evaluate, and communicate information about the effects of the relative positions of the sun, Earth, and moon.

- Develop and use a model to demonstrate the phases of the moon by showing the relative positions of the sun, Earth, and moon.
- Construct an explanation of the cause of solar and lunar eclipses.
- Analyze and interpret data to relate the tilt of the Earth to the distribution of sunlight throughout the year and its effect on seasons.

S6E3. Obtain, evaluate, and communicate information to recognize the significant role of water in Earth's processes. d. Analyze and interpret data to create graphic representations of the causes and effects of waves, currents, and tides in Earth's Systems.

S6E6. Obtain, evaluate, and communicate information about the uses and conservation of various natural resources and how they impact the Earth. (Spiraled in each unit)

- Ask questions to determine the differences between renewable/sustainable energy resources (examples: hydro, solar, wind, geothermal, tidal, biomass) and nonrenewable energy resources (examples: nuclear: uranium, fossil fuels: oil, coal, and natural gas), and how they are used in our everyday lives.

Gifted Standards

Strand 2: Creative Thinking Skills: Students will develop and utilize creative thinking through a variety of products and problem solving.

Strand 3: Higher Order Thinking and Problem- Solving Skills: Students will develop and utilize critical thinking, higher order thinking, logical thinking and problem solving skills in various situations.

Strand 4: Advanced Communication and Collaboration Skills: Students will develop advanced communication and collaboration skills in working toward a common goal with shared accountability for the final outcome.

Strand 5: Emotional Development of Self: Students will develop understanding of self and how one's own unique abilities influence interactions with others.

Prior Student Knowledge: (REFLECTION – PRIOR TO TEACHING THE UNIT) In 4th grade, students should have mastered the following:

S4E2. Obtain, evaluate, and communicate information to model the effects of the position and motion of the Earth and the moon in relation to the sun as observed from the Earth.

- Develop a model based on observations to describe the repeating pattern of the phases of the moon (new, crescent, quarter, gibbous, and full).
- Construct an explanation of how Earth's orbit, with its consistent tilt, affects seasonal changes.

Concepts/Skills to be Mastered by Students

- Lunar Cycle (Eclipses)
- Seasons
- Elliptical Orbit
- Tilt of the Earth
- Revolution/Rotation
- Direct/Indirect Sunlight
- Gravity
- Tides

Key Vocabulary: (KNOWLEDGE & SKILLS)

Lunar cycle, elliptical orbit, phases, crescent moon, quarter moon, gibbous moon, waxing, waning, spring tides, neap tides, solar eclipse, lunar eclipse, penumbra, umbra, shadow, partial, total, annular, tilt, seasons, synchronous rotation, tidally locked, tides (high and low, neap and spring), rotation, revolution, orbit, axis, horizon, gravitational pull, weathering, erosion, deposition, beaches, barrier islands

Year-Long Anchoring Phenomena: (LEARNING PROCESS)

Earth is the only planet in our solar system that is able to support life.

Unit Phenomena (LEARNING PROCESS)

Why doesn't everyone experience four seasons?

Optional:

Why do we see the moon in different phases?

What causes solar and lunar eclipses?

Possible Preconceptions/Misconceptions: (REFLECTION – PRIOR TO TEACHING THE UNIT)

Some students may be under the impression that the moon actually changes shape as it progresses through each of the phases.

Students are likely unaware that the Earth and moon are tidally locked (we always see the same side of the moon). Students often have difficulty correctly positioning the sun, Earth, and moon in order to see the natural progression of its phases. Student experiences may have been limited to 2D modeling.

Students may confuse the orientation of the Earth, moon, and sun for solar and lunar eclipses.

Students may have difficulty interpreting a model in order to identify the seasons in the Northern and Southern Hemisphere based on the orientation of the sun and the Earth, as well as the Earth's Tilt.

Students may need opportunities to visualize the angles at which the sun appears in the sky relative to the horizon as it relates to seasonal changes.

Students may confuse solstices and equinoxes.

Students may not have foundational knowledge about what tides are, what they look like, and what causes tides.

Key concept	Related concept(s)	Global context
<p style="text-align: center;">Change</p> <p>Change is a conversion, transformation or movement from one form, state or value to another. Inquiry into the concept of change involves understanding and evaluating causes, processes and consequences.</p>	<p>Systems (MYP/CCC) Models (MYP/CCC)</p>	<p>Motion and orientation in time and space Orientation in space and time explores personal histories; homes and journeys; turning points in humankind; discoveries; explorations and migrations of humankind; the relationships between and the interconnectedness of individuals and civilizations from personal, local and global perspectives.</p>
Statement of inquiry		
System models can be used to demonstrate and explain the motion and orientation of the Earth, Moon, and Sun.		
Inquiry questions		
<p>Factual</p> <p>What are the different phases of the moon? What are solar and lunar eclipses? What does the Earth experience during a solar eclipse? What is a tide?</p> <p>Conceptual</p> <p>Why do we see different phases of the moon? How does the orientation of the Earth, moon, and sun affect the phase of the moon that we see? Why do solar and lunar eclipses occur? Why are solar and lunar eclipses only visible at certain times? How do the Earth, moon, and sun align during solar and lunar eclipses? Why do some parts of the world have four distinct seasons, while others do not? Why does the number of hours of daylight increase and decrease over the course of a year? How does this relate to seasonal changes? How do tides impact the coast of Georgia?</p> <p>Debatable</p> <p>How can I make a three-dimensional model that best illustrates the phases of the moon while showing the relative positions of the sun, Earth, and moon? How would systems on Earth be impacted if the moon no longer revolved around the Earth? How could the moon phases be used as a reliable calendar?</p>		

Based upon the patterns of weathering, erosion, and deposition along the Georgia coast, where along the coast would you choose to live?

MYP Objectives	Assessment Tasks	
<i>What specific MYP objectives will be addressed during this unit?</i>	<i>Relationship between summative assessment task(s) and statement of inquiry:</i>	<i>List of common formative and summative assessments.</i>
<p>Criterion A: Knowing and Understanding</p> <p>ii. Apply scientific knowledge and understanding to solve problems set in familiar situations and suggest solutions to problems set in unfamiliar situations</p> <p>iii. Interpret information to make scientifically supported judgments</p> <p>Criterion C: Processing and Evaluating</p> <p>i. present collected and transformed data</p> <p>ii. interpret data and outline results using scientific reasoning</p> <p>iii. discuss the validity of a prediction based on the outcome of the scientific investigation</p> <p>iv. discuss the validity of the method</p> <p>v. describe improvements or extensions to the method</p>	<p>Students will have a choice in demonstrating and explaining the motion and orientation of the moon or sun by constructing either a solar eclipse or lunar eclipse. Students will have to also provide an explanation of either a solar eclipse or a lunar eclipse.</p>	<p><u>Mid- Unit Assessment:</u></p> <p>Moon Phases</p> <p>Eclipses- Solar and Lunar</p> <p><u>Summative Assessment(s):</u></p> <p>Paper 1 (Common Multiple Choice Assessment)</p> <p>Paper 2 Earth-Moon-Sun (Student-Choice Short Answer Assessment)</p>

<p>Criterion D: Reflecting on the Impacts of Science</p> <p>iii. apply scientific language effectively</p> <p>outcome of the scientific investigation</p> <p>iv. discuss the validity of the method</p> <p>v. describe improvements or extensions to the method</p> <p>Criterion D: Reflecting on the Impacts of Science</p> <p>iii. apply scientific language effectively</p>		
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Approaches to learning (ATL)

Category: Thinking
Cluster: Critical-Thinking
Skill Indicator: Use models and simulations to explore complex systems and issues. Gather and organize relevant information to formulate an argument.
Research: Finding, interpreting, judging and creating information.
Collaboration: Working effectively with others.

Learning Experiences
 Add additional rows below as needed.

Objective or Content	Learning Experiences	Personalized Learning and Differentiation
<p>S6E2 c. Analyze and interpret data to relate the tilt of the Earth to the distribution of sunlight throughout the year and its effect on seasons.</p>	<p>Earth on the Move or A Year Viewed from Space- Students will analyze and interpret data to understand how the angle of the sun relates to the amount of solar energy received at a given area on Earth's surface.</p>	<ul style="list-style-type: none"> ● Capstone Connections ● Discovery Education High School Environmental Science Techbook

<p>S6E2 a. Develop and use a model to demonstrate the phases of the moon by showing the relative positions of the sun, Earth, and moon.</p>	<p>Predictable Moon Activity- Students will develop and use a model of the Earth sun moon system to make predictions of cyclic patterns of lunar phases.</p>	<ul style="list-style-type: none"> ● Extensions – Enrichment Tasks/Projects ● NGSS Case Study 7: Gifted and Talented Students ● Next Generation Science Standards: “All Standards, All Students”
<p>S6E2 b. Construct an explanation of the cause of solar and lunar eclipses.</p>	<p>Develop a model and construct an explanation (a CER) of the causes of Solar and Lunar Eclipses</p>	
<p>Content Resources</p>		
<p>Georgia Grade 6 Science Solar System and Beyond Instructional Segment</p> <p>Discovery Education Grade 6 Science Techbook</p> <p>Discovery Education High School Environmental Science Techbook</p>		
<p>Capstone Connections</p>		
<p>Environmental Sustainability Explorations</p>		