Science Department
Grade 6 Curriculum

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Scope and Sequence

Month	Earth's Place in the Universe
April	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. (MS-ESS1-1) ● Earth and its solar system are part of the Milky Way galaxy, which is one of many galaxies in the universe. (MS-ESS1-2)
May	Earth and the Solar System ● The solar system consists of the sun and a collection of objects, including planets, their moons, and asteroids that are held in orbit around the sun by its gravitational pull on them. (MS-ESS1-2) (MS-ESS1-3) ● 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. (MS-ESS1-1) ● The solar system appears to have formed from a disk of dust and gas, drawn together by gravity. (MS-ESS1-2)
June	The History of Planet Earth ● The geologic time scale interpreted from rock strata provides a way to organize Earth's history. Analyses of rock strata and the fossil record provide only relative dates, not an absolute scale. (MS-ESS1-4)

Unit 1

Earth's Place in the Universe

Summary and Rationale

This unit is broken down into three sub-ideas: the universe and its stars, Earth and the solar system, and the history of planet Earth. Students examine the Earth's place in relation to the solar system, the Milky Way galaxy, and the universe. There is a strong emphasis on a systems approach and using models of the solar system to explain the cyclical patterns of eclipses, tides, and seasons. There is also a strong connection to engineering through the instruments and technologies that have allowed us to explore the objects in our solar system and obtain the data that support the theories explaining the formation and evolution of the universe. Students examine geosciences data in order to understand the processes and events in Earth's history. The crosscutting concepts of patterns, scale, proportion, and quantity and systems and systems models provide a framework for understanding the disciplinary core ideas. Students are expected to demonstrate proficiency in developing and using models and analyzing and interpreting data. Students are also expected to use these practices to demonstrate an understanding of the core ideas.

Recommended Pacing

10-12 weeks

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.
MS-ESS1-2	Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system.
MS-ESS1-3	Analyze and interpret data to determine scale properties of objects in the solar system.
MS-ESS1-4	Construct a scientific explanation based on evidence from rock strata for how the geologic time scale is used to organize Earth's 4.6-billion-year-old history.
Interdisciplinary Connections	
RST.6-8.1	Cite specific textual evidence to support analysis of science and technical texts. (MS-ESS1-3)
RST.6-8.7	Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table). (MS-ESS1-3)
SL.8.5	Integrate multimedia and visual displays into presentations to clarify information, strengthen claims and evidence, and add interest. (MS-ESS1-1),(MS-ESS1-2)
MP.2	Reason abstractly and quantitatively. (MS-ESS1-3)
MP.4	Model with mathematics. (MS-ESS1-1),(MS-ESS1-2)

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),(MS-ESS1-2),(MS-ESS1-3)
7.RP.A.2	Recognize and represent proportional relationships between quantities. (MSESS1-1),(MS-ESS1-2),(MS-ESS1-3)
6.EE.B.6	Use variables to represent numbers and write expressions when solving a real world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set. (MS-ESS1-2)
7.EE.B.6	Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities. (MS-ESS1-2)
Integration of Technology	
8.1	All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and create and communicate knowledge.
8.2	All students will develop an understanding of the nature and impact of technology, engineering, technological design, computational thinking and the designed world as they relate to the individual, global society, and the environment.

Instructional Focus

Enduring Understandings:	**Essential Questions:**
Patterns of the apparent motion of the sun, the moon, and stars in the sky can be observed, described, predicted, and explained with models. Earth and its solar system are part of the Milky Way galaxy, which is one of many galaxies in the universe. The solar system consists of the sun and a collection of objects, including planets, their moons, and asteroids that are held in orbit around the sun by its gravitational pull on them. This model of the solar system can explain eclipses of the sun and 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. The solar system appears to have formed from a disk of dust and gas, drawn together by gravity. The geologic time scale interpreted from rock strata provides a way to organize Earth's history. Analyses of rock strata and the fossil record provide only relative dates, not an absolute scale.	Why do objects in space appear to move? What is the cause of seasons? What is the cause of lunar phases? What causes solar and lunar eclipses? How did our solar system form? What role does gravity play in our solar system? What causes tides? How does the size of Earth compare to other objects in our solar system?

Evidence of Learning (Assessments)	
Pre-Assessment Do Now/Exit Tickets Formal quiz/test assessments Inquiries/Labs Sun-Earth-Moon Unit Assessment	
Objectives (SLO)	
Students will know: Patterns in the apparent motion of the sun, moon, and stars in the sky can be observed, described, predicted, and explained with models. The Earth and solar system 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. Patterns can be used to identify cause-and-effect relationships that exist in the apparent motion of the sun, moon, and stars in the sky. Science assumes that objects and events in the solar system systems occur in consistent patterns that are understandable through measurement and observation. Gravity plays a role in the motions within galaxies and the solar system. Gravity is the force that holds together the solar system and the Milky Way galaxy and controls orbital motions within them. Earth and its solar system are part of the Milky Way galaxy, which is one of many galaxies in the universe. The solar system consists of the sun and a collection of objects, including planets, their moons, and asteroids, that are held in orbit around the sun by its gravitational pull on them. The solar system appears to have formed from a disk of dust and gas, drawn together by gravity. Models can be used to represent the role of gravity in the motions and interactions within galaxies and the solar system.	Students will be able to: Develop and use a physical, graphical, or conceptual model to describe patterns in the apparent motion of the sun, moon, and stars in the sky. Develop and use models to explain the relationship between the tilt of Earth's axis and seasons. Analyze and interpret data to determine similarities and differences among objects in the solar system.

Science assumes that objects and events in the solar systems occur in consistent patterns that are understandable through measurement and observation.
Objects in the solar system have scale properties.
Data from Earth-based instruments, space-based telescopes, and spacecraft can be used to determine similarities and differences among solar system objects.
The solar system consists of the sun and a collection of objects, including planets, their moons, and asteroids that are held in orbit around the sun by its gravitational pull on them.
Time, space, and energy phenomena in the solar system can be observed at various scales, using models to study systems that are too large.
Engineering advances have led to important discoveries in space science, and scientific discoveries have led to the development of entire industries and engineered systems.

Suggested Resources/Technology Tools

Carolina Science STC "Researching the Sun-Earth-Moon System"
Starry Night Enthusiast computer program
BrainPop:

- Seasons
- Solstice & Equinox
- Eclipses
- Tides
- Gravity
- Big Bang

Crash Course Kids Videos: Space Science Playlist
Seasons Interactive
PBS Why Do We Have Seasons?
TedED Reasons for the Seasons
Moon Giant
Lunar Cycle Challenge
Birthday Moons Assignment
Eclipse Interactive
National Geographic Solar Eclipse 101
National Geographic Lunar Eclipse 101
Newsela - How do animals react to eclipses?
Moon Phases and Tides Website
Tides Virtual Lab
Newsela: What are auroras?

Modifications

Teachers can choose from any of the suggested modifications that follow based upon teaching style, instructional method and needs of individual students.

General Modifications for students struggling to learn:

- Focus on building relationships in the classroom.
- Control the stressors for the student and manage alternate pathways for completion of assignments.
- Provide feedback utilizing a growth mindset and praise what is done correctly based upon effort, attitude and strategy.
- Boost engagement with material by providing opportunities of differentiation, group work and alternative assignments/assessments where appropriate.

ELL

- Provide additional wait time for student responses to questions to allow students the ability to undergo the process of translation between languages, composition of response and attempted response.
- Simplification of sentence structure and repetition of questions/sentences exactly as stated before trying to rephrase to allow ELL students to hear the sentence and try to comprehend it.
- Rephrase idioms and teach their meanings as when learning a new language, translations are often very literal. IE "Take a stab at it." Ensure students understand what is meant.
- Use directed reading activities. Ensure preview of text before assigned/read, provide pre-reading questions about the main idea and offer help utilizing key words.
- Allow the use of Google Translate where appropriate.
- Utilize bilingual reading texts provided by the STC program.

G/T

Utilize differentiation in the areas of acceleration, enrichment, and grouping. Examples include, but are not limited to:

- interdisciplinary and problem-based assignments with planned scope and sequence
- advance, accelerated, or compacted content
- abstract and advanced higher-level thinking
- allowance for individual student interests
- assignments geared to development in areas of affect, creativity, cognition, and research skills
- complex, in-depth assignments
- diverse enrichment that broadens learning
- variety in types of resources
- internships, mentorships and independent study where applicable

504/IEP

Modifications and accommodations must be aligned to stated plan and uphold expectations of the plan lawfully. Every student requires a different set of accommodations based upon need. Examples specific to science practice include, but are not limited to:

- Note taker or lab assistant
- Group lab assignments
- Use of scribe
- Adjustable tables and lab equipment within reach
- Classrooms, labs and field trips in accessible locations
- Additional time and separate room for test taking
- Additional time for in-class assignments
- Additional time in lab
- Visual and tactile instructional demonstrations
- Computer with voice output, spelling and grammar checker
- Seating in the front of the class
- Tactile drawings and graphs, and three-dimensional models
- Assignments in electronic format
- Large-print handouts, lab signs and equipment labels

- TV monitor connected to microscope to enlarge images
- Computer equipped to enlarge screen characters and images
- Auditory lab warning signals
- Adaptive lab equipment (talking calculators, talking thermometers, light probes, tactile timers)
- Staples on sticks to indicate units of measurement
- Visual warning system for lab emergencies

21ST CENTURY LIFE AND CAREER STANDARDS

Please select all standards that apply to this unit of study:

- ❑ Act as a responsible and contributing citizen and employee.
- ❑ Apply appropriate academic and technical skills.
- ❑ Attend to personal health and financial well being.
- ❑ Communicate clearly and effectively and with reason.
- ❑ Consider the environmental social and economic impacts of decisions.
- ❑ Demonstrate creativity and innovation.
- ❑ Employ valid and reliable research strategies.
- ❑ Utilize critical thinking to make sense of problems and persevere in solving them.
- ❑ Model integrity, ethical leadership, and effective management.
- ❑ Plan education and career paths aligned to personal goals.
- ❑ Use technology to enhance productivity.
- ❑ Work productively in teams while using cultural global competence.

Suggestions on integrating these standards can be found at: http://www.state.nj.us/education/cccs/2014/career/9.pdf

LINKS TO CAREERS:

Science Buddies: Careers
Astronomer
Meteorologist
Aerospace Engineers
Mechanical Engineers
NASA jobs

Optional Extensions:

NASA Solar System Exploration
Pull of the Planets
Sunbeams and Sundials