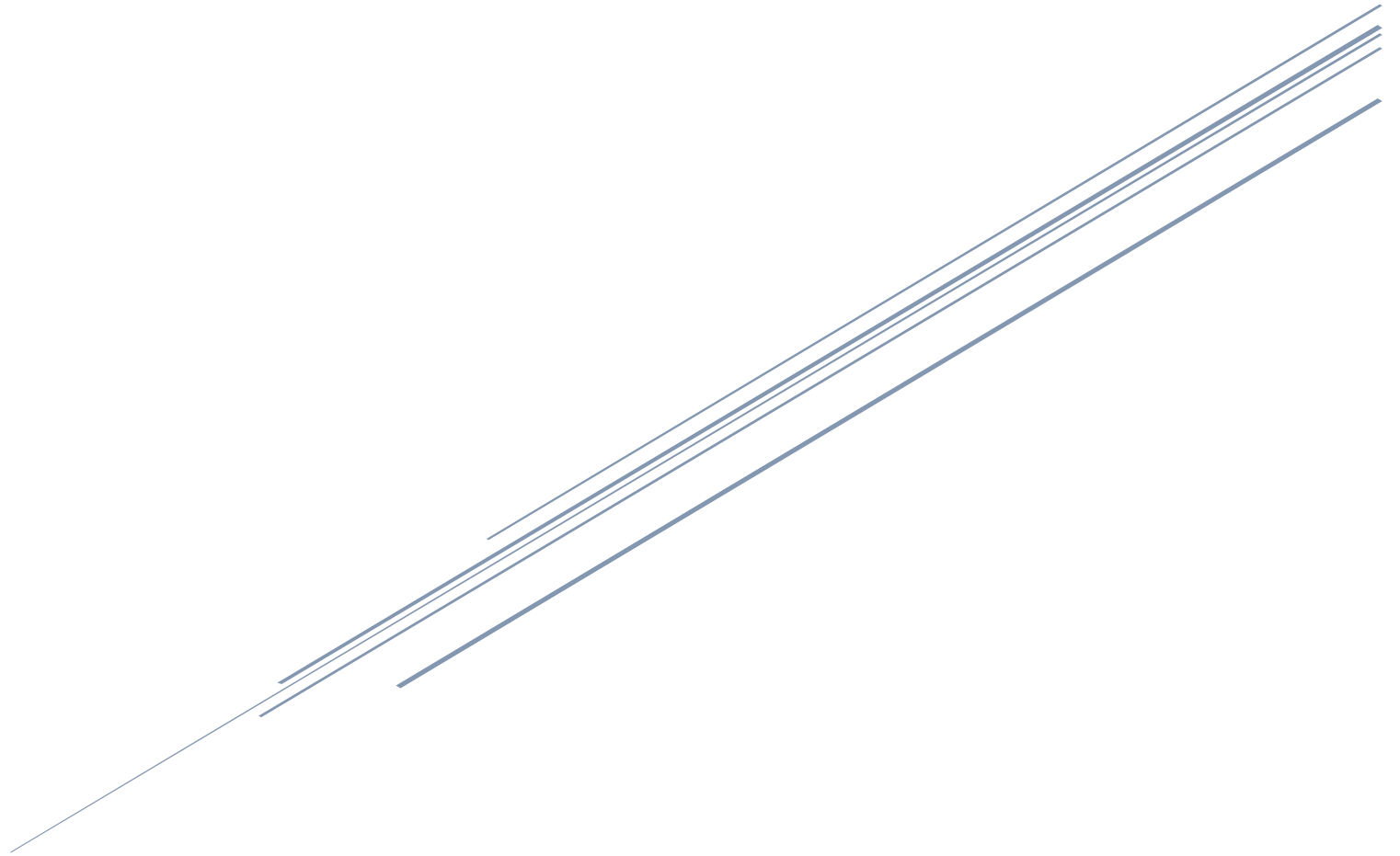


6TH GRADE SCIENCE CURRICULUM MAP

2023-2024



Wa-Nee Community Schools
NorthWood Middle School

Scope and Sequence

Nine Weeks	Units	Standards
1 st Nine Weeks	The Scientific Method	Science and Engineering Process Standards SEPS.1 Posing questions (for science) and defining problems (for engineering) SEPS.2 Developing and using models and tools SEPS.3 Constructing and performing investigations SEPS.4 Analyzing and interpreting data SEPS.5 Using mathematics and computational thinking SEPS.6 Constructing explanations (for science) and designing solutions (for engineering) SEPS.7 Engaging in argument from evidence SEPS.8 Obtaining, evaluating, and communicating information These are also addressed throughout the year.
2 nd Nine Weeks	Ecosystems (Life Science)	6.LS.1 Investigate and describe how homeostasis is maintained as living things seek out their basic needs of food, water, shelter, space, and air. 6.LS.2 Describe the role of photosynthesis in the flow of energy in food chains, energy pyramids, and food webs. Create diagrams to show how the energy in animals' food used for bodily processes was once energy from the sun. 6.LS.3 Describe specific relationships (predator/prey, consumer/producer, parasite/host) and symbiotic relationships between organisms. Construct an explanation that predicts why patterns of interactions develop between organisms in an ecosystem. 6.LS.4 Investigate and use data to explain how changes in biotic and abiotic components in a given habitat can be beneficial or detrimental to native plants and animals. 6.LS.5 Research invasive species and discuss their impact on ecosystems.
3 rd Nine Weeks	Energy, Forces, Motion, and Matter (Physical Science)	6.PS.1 Distinguish between the terms position, distance, and displacement, as well as, the terms speed and velocity. 6.PS.2 Describe the motion of an object graphically showing the relationship between time and position. 6.PS.3 Describe how potential and kinetic energy can be transferred from one form to another.
4 th Nine Weeks	Solar System (Earth and Space Science) Electricity (Physical Science)	6.ESS.1 Describe the role of gravity and inertia in maintaining the regular and predictable motion of celestial bodies.

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		<p>6.ESS.2 Design models to describe how Earth's rotation, revolution, tilt, and interaction with the sun and moon cause seasons, tides, changes in daylight hours, eclipses, and phases of the moon.</p> <p>6.ESS.3 Compare and contrast the Earth, its moon, and other planets in the solar system, including comets and asteroids. (Comparisons should be made in regard to size, surface features, atmospheric characteristics, and the ability to support life.)</p> <p>6.PS.4 Investigate the properties of light, sound, and other energy waves and how they are reflected, absorbed, and transmitted through materials and space.</p>
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Standards Addressed Throughout the Year in many labs, activities, and projects:

Engineering

- 6-8.E.1 Identify the criteria and constraints of a design to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.
- 6-8.E.2 Evaluate competing design solutions using a systematic process to identify how well they meet the criteria and constraints of the problem.
- 6-8.E.3 Analyze data from investigations to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.
- 6-8.E.4 Develop a prototype to generate data for repeated investigations and modify a proposed object, tool, or process such that an optimal design can be achieved.

Literacy Standards

- 6-8.LST.1.1: Read and comprehend science and technical texts within a range of complexity appropriate for grades 6-8 independently and proficiently by the end of grade 8.
- 6-8.LST.1.2: Write routinely over a variety of time frames for a range of discipline specific tasks, purposes, and audiences.
- 6-8.LST.2.1: Cite specific textual evidence to support analysis of science and technical texts.
- 6-8.LST.2.2: Determine the central ideas or conclusions of a text; provide an accurate, objective summary of the text.
- 6-8.LST.2.3: Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.
- 6-8.LST.3.1: Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6-8 texts and topics.
- 6-8.LST.3.2: Analyze the structure an author uses to organize a text, including how the major sections contribute to the whole and to an understanding of the topic.
- 6-8.LST.3.3: Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text.
- 6-8.LST.4.1: 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).
- 6-8.LST.4.2: Distinguish among facts, reasoned judgment based on research findings, and speculation in a text.
- 6-8.LST.4.3: Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic.
- 6-8.LST.5.1: Write arguments focused on discipline-specific content.
- 6-8.LST.5.2: Write informative texts, including scientific procedures/experiments or technical processes that include precise descriptions and conclusions drawn from data and research.

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6-8.LST.6.1: Plan and develop; draft; revise using appropriate reference materials; rewrite; try a new approach; and edit to produce and strengthen writing that is clear and coherent, with some guidance and support from peers and adults.

6-8.LST.6.2: Use technology to produce and publish writing and present the relationships between information and ideas clearly and efficiently.

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1 Unit: Scientific Method Q1		Standards covered ongoing in this Unit: SEPS.1-8, 6.E.1-4		
Essential Question(s): How do scientists create a reliable, repeatable, testable scientific investigation?				
Key Terms: Scientific method, determine the problem/question, hypothesis, results, conclusions, variables (independent & dependent), constants, controls, anomaly/outlier, quantitative and qualitative data/observations				
Investigation & Duration	Standards	Objectives	Assessment (formative)	Resources
Burning Money, 1 period	SEPS.1	Hypothesis and observation introduction	Successfully creating an “if, then, because” hypothesis	Refer to PowerPoint, lab supplies
Intro to Scientific Method, 1 period	SEPS.1	Familiarize students with 5 step process	Memorization of 5 Steps	PowerPoint with scientific method notes
Penny Drop Lab, 2 periods	SEPS.1	Forming a hypothesis, acquaintance with labs (rules, etc), following the scientific method, consistent results, looking at constants (importance of), trials	Successfully fulfilling stated objectives	Refer to PowerPoint/Lab handout, lab supplies
Cohesive Force of Water Lab (x2), Baggy Demo 1 period	SEPS.1	Forming a hypothesis, problem solving, working as a group, surface tension, polar molecules, cohesive forces, observing surface tension	Successfully understanding and completion of assigned lab	Refer to PowerPoint, lab supplies
How to Write a Hypothesis Practice Guides/Examples, 1 period	SEPS.1	Forming a hypothesis encompassing given scientific situation	Describing their hypothesis for the given problem	How to Write a Hypothesis WS
Creative Candle observation, 1 period	SEPS.2	Successfully documenting observations, careful observations	Science notebook notes	PowerPoint, lab supplies
Quantitative vs. Qualitative Notes, 1 period	SEPS.2,4	Understanding the difference between quantitative and qualitative data/collecting of	Elephant Poem	Refer to PowerPoint, Quantitative/Qualitative Notes
Graduated Cylinder Lab, 3 periods	SEPS.2,4	Collecting Quantitative Data	Successful Completion of Determining Volumes, recording of notes	Refer to PowerPoint, Lab supplies, Notes
Triple Beam Lab, 3 periods	SEPS.2,4	Collecting Quantitative Data	Successful Completion of Recording mass, notes	Refer to PowerPoint, Lab supplies, Notes
Mentos Lab, 2 periods	SEPS.5-6 6.E.4	Manipulating Variables, Successfully Observing the Effects, Designing a Prototype (trial/error)	Understanding How a Variable Impacts an Experiment, Designing and Building their own Prototype	Refer to PowerPoint, Lab supplies

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Key Terms: Scientific method, determine the problem/question, hypothesis, results, conclusions, variables (independent & dependent), constants, controls, anomaly/outlier, quantitative and qualitative data/observations				
Investigation & Duration	Standards	Objectives	Assessment (formative)	Resources
Mean, Median, Mode, Range Notes and Lab 2 periods	SEPS.4,5	Analyzing Data	Demonstrating a successful understanding of these terms and being able to table their data	Lab Supplies (stop watches), Notes, PowerPoint
Using the Scientific Method Breakdown, 1 period	SEPS.3,7	Successfully determining the parts of an experiment	Successfully evaluating the steps of an experiment	Using the Scientific Method WS
M&M Lab, 1 period	SESP.2	Forming a hypothesis, gathering observations, recording data accurately	Documentation of observations in Science notebook	Refer to PowerPoint for procedures/supplies, lab materials
Alka-Seltzer Rocket Lab, 2 periods	SEPS.5,8 6.E.1-4	Manipulating Variables and their effects on end results	Successful results on the manipulated experiment	Lab instructions and supplies, see PPT
Design an Experiment, 1 period	SEPS.2,3,4,6 6.E.1-4	Understanding the steps of the Scientific Method, Design an experiment with a given problem	Successful implementation of scientific method	Handout, notes, PowerPoint
Scientific Method/ Variables & Controls, 1 period	SEPS.3	Review the Scientific Method	Successful completion of review	Handout
Assessment: Jeopardy Review, Quizlet, Multi-team Review game, Unit Exam				

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2 Unit: Matter, Energy, Forces, and Motion				
Essential Question(s): Why do objects speed up, slow down, or change direction?				
Key Terms: Force, Mass, Predict, Speed, Acceleration, Velocity, Average, speed, Predict, Reference frame, Balanced forces, Diagram, Force, Net force, Gravity				
Investigation & Duration	Standards	Objectives	Assessment (formative)	Resources
What is Matter?, 1 period		Define Matter as anything that takes up space and has mass. Solids, Liquids, Gases versus Energy	Demonstrations/Discussion	Notes, PowerPoint
Phases of Matter, 2 periods		Molecule motion. Solids, Liquids, Gases	Venn Diagram, Notes	PowerPoint lesson, demonstration
Changes in States of Matter, 2 periods		Physical Properties vs. Chemical Properties.	Notes, Outline	Demonstration, Notes, PowerPoint Lesson
Density, 4 periods		Students will understand how to determine density of an object—of both regular and irregular shaped objects.	Labs	PowerPoint Lesson, lab materials
Temperature, 2 periods		Students will understand how to measure and convert temperature measurements. Particle movement.	Labs, Notes	PowerPoint Lesson, lab materials, notes
Law of Conservation of Mass, 1 period		Students will demonstrate understanding of the law of conservation of mass.	Notes, Demonstration	PowerPoint Lesson, notes
Periodic Table of Elements, 6 periods		Students will understand atoms, matter, how the periodic table is arranged, and common elements (names and abbreviations)	Lab, Demonstration, Review Activity, Quiz	PowerPoint Lesson, notes, quizzes
Lesson 1: Let's Get Moving, 3 periods	6.PS.1, 6.PS.2, 6.PS.3	Describe preconceptions of energy, forces, and motion.	Evaluating pre-assessment results	Carolina Text, Unit Overview and Lesson Planner
Lesson 2: Force, Velocity, and Acceleration 6 periods	6.PS.1, 6.PS.2, 6.PS.3	Measure speed of an object in motion, speed and acceleration, describe how mass and weight are related	Lab results, science notebook completion	Carolina Text, Unit Overview and Lesson Planner
Lesson 5: Kinetic and Potential Energy, 10 periods	6.PS.1, 6.PS.2, 6.PS.3	Kinetic Energy versus Potential Energy, Kinds of Potential Energy (gravitational, elastic, chemical, etc), Law of Conservation of Energy, Change Mass/Height and its Effects, Dependent	Lab results, science notebook completion	Carolina Text, Unit Overview and Lesson Planner

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Essential Question(s): Why do objects speed up, slow down, or change direction?				
Key Terms: Force, Mass, Predict, Speed, Acceleration, Velocity, Average, speed, Predict, Reference frame, Balanced forces, Diagram, Force, Net force, Gravity				
Investigation & Duration	Standards	Objectives	Assessment (formative)	Resources
		vs Independent Variables, Overview of Kinds of Energy		
Lesson 7: Collisions, 2 periods	6.PS.1, 6.PS.2, 6.PS.3	Law of Conservation of Energy, Energy Transfer, How mass effects momentum, Total Energy in a System, Friction	Lab results, science notebook completion	Carolina Text, Unit Overview and Lesson Planner
Lesson 8: Transformation Energy, 2 periods	6.PS.1, 6.PS.2, 6.PS.3	Synthesize knowledge about energy of forces in motion, Energy is conserved, Types of Energy	Lab results, science notebook completion	Carolina Text, Unit Overview and Lesson Planner
Light, Sound, and Heat Energy, 2 periods	6.PS.4	Investigate the properties of light, sound, and other energy waves.	Lab results, demonstrations	Carolina Text, Unit Overview and Lesson Planner
Assessment(s): Unit Review Activity, End of Unit Exam				

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3 Unit: Ecosystems and their Interactions				
Essential Questions: How do organisms interact with each other and their environments?				
Key Terms: community, ecosystems, habitat, organism, population, biosphere, species, predator, prey, carrying capacity, resources, autotroph, heterotroph, photosynthesis, condensation, evaporation, precipitation, transpiration, food chain/food web, herbivore, carnivore, decomposer, consumer, producer, energy, mutualism, parasitism, commensalism, competition, biotic, abiotic, invasive species				
Investigation & Duration	Standards	Objectives	Assessment (formative)	Resources
Intro to Ecosystems, 1 period		Uncover what students already know and understand about ecosystems.	Pgs 2,3 Questions 2, 3	Carolina Science Book: Ecosystems
Ecosystems are Diverse, 2 periods		Create several KWL charts on various ecosystem topics to determine prior knowledge.		
Pond Ecosystems have Biotic & Abiotic Factors, 2 periods		Create a model of a natural pond ecosystem for classroom observation		
Microscopic Organisms in Pond Ecosystems, 2 periods		Examine the microorganisms/ macroorganisms that will live in the pond.		
Models have Benefits and Limitations, 1 period		Discuss the benefits and limitations of a model pond compared to a real pond. • Students will predict interactions that the organisms in a pond will have.		
Abiotic and Biotic Factors, 1 period		Describe the characteristics of life. Differentiate between biotic and abiotic factors.		
Populations, Communities, and Ecosystems, 1 period		Examine how an organism plays a role in all levels of an ecosystem.		
Pond Observations (Habitats/Ecosystems) 1 period		Analyze the model pond ecosystem to determine its abiotic and biotic factors, consider it as both a habitat and an ecosystem.		
Ecosystems have Limited Resources, 1 period		Obtain information about the needs of plants and animals.		
Carrying Capacity, 2 periods		Relate resource availability to population growth.		

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Pond Observation, 1 period		Analyze the model pond ecosystem to determine its abiotic and biotic factors, consider it as both a habitat and an ecosystem while looking at carrying capacity within the pond.		
Carbon/Nitrogen Cycle, 1 period		Access prior knowledge of the flow of water, carbon, and nitrogen between the biotic and abiotic environments.		
Water Cycle, 1 period		Model the movement of water in ecosystems and determine its benefits and limitations.		
Photosynthesis/Cellular Respiration, 1 period		Investigate the roles of cellular respiration and photosynthesis in the movement of carbon in ecosystems.		
Food Chain/Food Web, 4 periods		Energy flows from one organism to the next, starting with energy from the Sun. Some energy is released, used, and stored at each level of energy transfer.		
Interactions, 4 periods		Different types of relationships exist between organisms across all types of ecosystems. There are patterns in the types of interactions that organisms have. Predator and prey populations rise and fall over time. There are patterns in the predator and prey populations based on the numbers of each. Competition for resources can occur between members of the same species or between members of different species.		
Native vs. Invasive Species, 5 periods		The introduction of a species can have different effects on the native populations. Not all introduced species become invasive. Change to an ecosystem impacts its populations.		

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4 Unit: Sun, Earth, Moon Systems				
Essential Questions: How do the sun, earth, and moon interact to cause tides, seasons, and eclipses?				
Key Terms: rotation, revolution, astronomy, phases of the moon, lunar and solar eclipse, tides, orbit, umbra, penumbra, planets, comets, asteroids, tilt, seasons, tides				
Investigation & Duration	Standards	Objectives	Assessment (formative)	Resources
Sun, Earth, Moon Systems and Movement, 3 periods	6.ESS.1, 6.ESS.2, 6.ESS.3, 6-8.E.1, 6-8.E.2, 6-8.E.3	The Sun-Earth-Moon system has known dimensions. Models can be used in science to show relationships among sets of objects. The Sun-Earth-Moon system can be modeled using simple objects representing the components of the system. All models have limitations. The Moon and Earth rotate on their axes. The Moon orbits Earth while Earth orbits the Sun. A day is the time for Earth to turn once on its axis. A month is the time for one revolution of the Moon around Earth. A year is the time for one revolution of Earth around the Sun. The Sun is very large compared with Earth or the Moon. The distance between Earth and the Sun is very large compared with the distance between Earth and the Moon. Models can change over time. Celestial movements are used to create calendars.	Labs, notes, constructing models, demonstrating understanding, lab report, diagrams	Lab materials, PowerPoint lessons, Carolina: Space Systems Exploration
Moon Phases, 3 periods	6.ESS.1, 6.ESS.2, 6.ESS.3	The appearance of the Moon changes as it orbits Earth. Earth and the Moon orbit on different planes. One half of the Moon is almost always illuminated by the Sun. The portion of the Moon's lit face that is visible from Earth changes as the Moon orbits Earth. Changes in the Moon's appearance as it orbits Earth are called lunar phases. The Moon's orbit results in a cyclical pattern of lunar phases. Waxing means growing larger; waning means becoming smaller. We can see a full moon because the Moon is usually not aligned with Earth and the Sun. When the Moon is between Earth and the Sun, we can only see the unlit side.	Labs, notes, constructing models, demonstrating understanding, lab report, diagrams	Lab materials, PowerPoint lessons, Carolina: Space Systems Exploration
Gravity and Tides, 2 periods	6.ESS.1, 6.ESS.2	Tides are the periodic rise and fall of the sea level and other bodies of water. Tide heights are measured relative to a datum. Graphs of tidal data are used to analyze trends. Tides have regular cycles. Normally, two high and two low tides occur each day. Changes in tidal amplitude are related	Labs, notes, constructing models, demonstrating understanding, lab report, diagrams	Lab materials, PowerPoint lessons, Carolina: Space Systems Exploration

4 Unit: Sun, Earth, Moon Systems				
Essential Questions: How do the sun, earth, and moon interact to cause tides, seasons, and eclipses?				
Key Terms: rotation, revolution, astronomy, phases of the moon, lunar and solar eclipse, tides, orbit, umbra, penumbra, planets, comets, asteroids, tilt, seasons, tides				
Investigation & Duration	Standards	Objectives	Assessment (formative)	Resources
		to the lunar cycle. Graphs can be used to analyze data and detect relationships. between the Moon and Earth (and the Sun and Earth). The Moon has a greater influence than the Sun on tides because it is much closer to Earth. The effects of the Moon and Sun on Earth's tides can be modeled with simple objects to represent parts of the system. Spring tides and neap tides are the result of the Moon and the Sun pulling on the water in Earth's oceans at the same time.		
Solar and Lunar Eclipses, 3 periods	6.ESS.1, 6.ESS.2	Eclipses occur when the Sun, Earth, and Moon align at a time when the Moon crosses the plane of the ecliptic. Lunar eclipses can be total or partial. Solar eclipses can be total, annular, or partial. The type of eclipse seen depends on the relative positions of the Sun, Earth, and Moon. A solar eclipse only occurs during a new moon; the Moon comes between the Sun and Earth and casts a shadow on parts of Earth. A lunar eclipse only occurs during a full moon; Earth comes between the Sun and Moon and casts a shadow on the Moon. The type of eclipse seen depends on the relative positions of the Sun, Earth, and Moon. The timing, duration, and location of solar eclipses can be predicted. What a viewer sees from Earth during a total solar eclipse depends on the location of the viewer. Solar eclipses occur during a new moon, and lunar eclipses occur during a full moon.	Labs, notes, constructing models, demonstrating understanding, lab report, diagrams	Lab materials, PowerPoint lessons, Carolina: Space Systems Exploration
Seasons: Earth's Tilt, 3 periods	6.ESS.1, 6.ESS.2, 6-8.E.1	Earth is tilted on its axis as it orbits the Sun. The tilt of Earth on its axis causes uneven distribution of solar energy on Earth's surface throughout the year. Seasons are the result of different amounts of sunlight falling on a hemisphere at different times of the year. Longer shadows result from sunlight hitting Earth's surface at an oblique angle. The angle at which sunlight hits Earth's	Labs, notes, constructing models, demonstrating understanding, lab report, diagrams	Lab materials, PowerPoint lessons, Carolina: Space Systems Exploration

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4 Unit: Sun, Earth, Moon Systems				
Essential Questions: How do the sun, earth, and moon interact to cause tides, seasons, and eclipses?				
Key Terms: rotation, revolution, astronomy, phases of the moon, lunar and solar eclipse, tides, orbit, umbra, penumbra, planets, comets, asteroids, tilt, seasons, tides				
Investigation & Duration	Standards	Objectives	Assessment (formative)	Resources
		<p>surface is more important than Earth’s distance from the Sun in determining seasons. When a hemisphere is tilted toward the Sun, it experiences summer, with longer days. When a hemisphere is tilted away from the Sun, it experiences winter, with shorter days. Earth’s Northern and Southern Hemispheres experience opposite seasons. Equinox Solstice. Ask students to construct a scientific explanation describing how length of day would change as they traveled from the North Pole to the South Pole during summer.</p> <p>Understand what happens at Earth’s poles during the summer and winter solstices. Polar areas receive sunlight 24 hours-a-day during their warmest months. Earth’s surface reflects solar energy. The tilt of Earth on its Axis causes uneven distribution of solar energy on Earth’s surface throughout the year. Seasons are the result of different amounts of sunlight falling on a hemisphere at different times of the year.</p>		
The solar system can be modeled to scale, 2 periods	6.ESS.1, 6.ESS.2, 6.ESS.3, 6-8.E.1, 6-8.E.3	The solar system can be modeled to scale. The planets orbit the Sun in elliptical orbits. The solar system is mostly empty space but does contain the Sun, Earth with its Moon, and seven other planets with their moons.	Labs, notes, constructing models, demonstrating understanding, lab report, diagrams	Lab materials, PowerPoint lessons, Carolina: Space Systems Exploration
Gravity, 3 periods	6.ESS.1	<p>Gravity refers to a force that attracts objects to each other. Surface gravity refers to the gravitational attraction exerted by a planet (or other solar system object) on objects near its surface. Gravitational attraction increases as the masses of objects increase.</p> <p>The gravitational force felt at a planet’s surface decreases with distance from the planet’s center of gravity. The weight of an object depends on the gravitational force exerted on the object. Mass is a measure of how much</p>	Labs, notes, constructing models, demonstrating understanding, lab report, diagrams	Lab materials, PowerPoint lessons, Carolina: Space Systems Exploration

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4 Unit: Sun, Earth, Moon Systems				
Essential Questions: How do the sun, earth, and moon interact to cause tides, seasons, and eclipses?				
Key Terms: rotation, revolution, astronomy, phases of the moon, lunar and solar eclipse, tides, orbit, umbra, penumbra, planets, comets, asteroids, tilt, seasons, tides				
Investigation & Duration	Standards	Objectives	Assessment (formative)	Resources
		matter an object is made of, while weight is a measure of gravity's influence on mass.		