

UNIT/ORGANIZING PRINCIPLE: BODY OF KNOWLEDGE: THE NATURE OF SCIENCE		Pacing: First Nine Weeks		
Essential Question(s)	<p><b>Big Idea 1: The Practice of Science</b></p> <p>A. Scientific inquiry is a multifaceted activity.</p> <p>B. The processes of science frequently do not correspond to the traditional portrayal of “the scientific method.”</p> <p>C. Scientific argumentation is a necessary part of scientific inquiry.</p> <p>D. Scientific knowledge is based on observation and inference. (requires creativity, questions, and explanations)</p> <p><b>Big Idea 2:</b></p> <p>A. Scientific knowledge is based on empirical evidence, and is appropriate for understanding the natural world, but it provides only a limited understanding of the supernatural, aesthetic, or other ways of knowing, such as art, philosophy, or religion.</p> <p>B. Scientific knowledge is durable and robust, but open to change.</p> <p>C. Because science is based on empirical evidence it strives for objectivity, but as it is a human endeavor the processes, methods, and knowledge of science include subjectivity, as well as creativity and discovery.</p> <p><b>Big Idea 3:</b></p> <p>A. The terms that describe examples of scientific knowledge, for example; “theory”, “law”, “hypothesis”, and “model” have very specific meanings and functions within science.</p>			
Concepts/ Content	Learning Targets/Skills Students will:	Benchmarks Complexity	Key Vocabulary	Houghton Mifflin Textbook
Weeks 1 – 2 (ongoing throughout the year)  Scientific Inquiry	<ul style="list-style-type: none"> <li>Raise questions about the natural world, use appropriate reference materials that support understanding to obtain information, conduct both individual and team investigations through free exploration and systematic investigations, and generate appropriate explanations based on those explorations.</li> <li>Ask questions about the natural world and used selected reference material to find information, observe, explore, identify findings, and share information.</li> <li>Explore, observe, and select an object or picture to solve a simple problem.</li> </ul>	SC.4.N.1.1 <i>High</i>	<b>bias</b> <b>control group</b> <b>data</b> <b>dependent</b> <b>variable</b> <b>conclusions</b> <b>experiment</b> <b>experimental</b> <b>design</b> <b>flaws</b> <b>hypothesis</b> <b>independent</b> <b>variables</b> <b>investigation</b> <b>multiple trials</b>	S2 – Do What Scientists Do S4 – Think Like a Scientist S 6 – Science Inquiry S 8 – Inquiry Process

			<b>problem results scientific method variable</b>	
	<ul style="list-style-type: none"> <li>Compare the observations made by different groups using multiple tools and seek reasons to explain the differences across groups.</li> </ul>	<b>SC.4.N.1.2</b> <i>High</i>		
	<ul style="list-style-type: none"> <li>Explain that science does not always follow a rigidly defined method (“the scientific method”) but that science does involve the use of observations and empirical evidence.</li> </ul>	<b>SC.4.N.1.3</b> <i>Moderate</i>		
	<ul style="list-style-type: none"> <li>Attempt reasonable answers to scientific questions and cite evidence in support.</li> <li>Relate findings to predefined science questions.</li> <li>Answer questions about objects and actions related to science.</li> </ul>	<b>SC.4.N.1.4</b> <i>High</i>		
	<ul style="list-style-type: none"> <li>Compare the methods and results of investigations done by other classmates.</li> <li>Compare own observations with observations of others.</li> <li>Identify information based on observations of self and others.</li> </ul>	<b>SC.4.N.1.5</b> <i>Moderate</i>		S14 – Make Decisions
	<ul style="list-style-type: none"> <li>Keep records that describe observations made, carefully distinguishing actual observations from ideas and inferences about the observations.</li> <li>Record observations using drawings, dictation, or pictures.</li> <li>Communicate observations and findings through use of pictures, writing, or charts.</li> </ul>	<b>SC.4.N.1.6</b> <i>High</i>		

	<ul style="list-style-type: none"> <li>Recognize and explain that scientists base their explanations on evidence.</li> <li>Recognize ways that scientists perform experiments, make observations, and gather evidence, such as by observations or measuring.</li> </ul>	<b>SC.4.N.1.7</b> <i>Moderate</i>		
	<ul style="list-style-type: none"> <li>Recognize that science involved creativity in designing experiments.</li> </ul>	<b>SC.4.N.1.8</b> <i>Moderate</i>		
	<ul style="list-style-type: none"> <li>Explain that science focuses solely on the natural world.</li> <li>Associate science with the natural work in the local environment.</li> </ul>	<b>SC.4.N.2.1</b> <i>Moderate</i>		
	<ul style="list-style-type: none"> <li>Explain that models can be 3-dimensional, 2-dimensional, an explanation in your mind, or a computer model.</li> <li>Identify different types of models, such as a replica, a picture, or animation.</li> <li>Match a model that is a replica to a real object.</li> </ul>	<b>SC.4.N.3.1</b> <i>Moderate</i>		
	<ul style="list-style-type: none"> <li>Investigate how technology and tools help to extend the ability of humans to observe very small and very large things.</li> <li>Recognize and identify tools, such as telescope and a magnifier.</li> </ul>	<b>SC.4.E.6.5</b> <i>High</i>		S11 – What is Technology? A 14 Micrographia  F26 Telephone Through Time

Essential Question(s)	<b>Big Idea 8</b> All objects and substances are made of matter. Classified by physical and chemical properties.	<b>Big Idea 9</b> Matter can undergo a variety of changes. Matter can be changed physically or chemically.		
Concepts/Content	Learning Targets/Skills Students will:	Benchmarks Complexity	Key Terminology	Houghton Mifflin Text
Week 3-4  States of Matter	<ul style="list-style-type: none"> <li>Identify the three states of matter (gas, liquid, solid)</li> <li>Matter has two fundamental properties: matter takes up space and matter has mass.</li> <li>Identify properties and common uses of water in each of its states. (ice is a solid)</li> </ul>	SC.4.P.8.2 <i>Low</i>	atom * matter * molecule physical property states of matter	E12.1 Matter Everywhere (E6 – 11)  (E48 Changes in State)
Weeks 5-7  Properties of Matter	<ul style="list-style-type: none"> <li>Mass is the amount of matter (or “stuff”) in an object.</li> <li>Weight is the measure of force of attraction (gravitational force) between an object and Earth.</li> <li>Measure and compare objects and materials based on their physical properties including: mass, shape, volume, color, hardness, texture, odor, taste, attraction to magnets.</li> </ul>	SC.4.P.8.1 <i>Moderate</i>	metric system mass * volume * weight chemical property density *	E12.2 Measuring Matter (E14 – 21)  E12.3 Physical and Chemical Properties (E24 – 31)  (E50 Matter Stays Same)
Week 8  Changes in Matter	<ul style="list-style-type: none"> <li>Explore the Law of Conservation of Mass by demonstrating that the mass of a whole object is always the same as the sum of its parts.</li> <li>Identify that a whole object weighs the same as all of its parts together.</li> </ul>	SC.4.P.9.1 <i>Low</i>  SC.4.P.8.3 <i>Moderate</i>	energy * physical change *	E13.1 Physical Changes (E38 – 41)
Week 9  Magnetism	<ul style="list-style-type: none"> <li>Investigate and describe that magnets can attract magnetic materials &amp; attract/repel other magnets</li> <li>Identify objects a magnet will attract.</li> <li>Demonstrate that magnets can attract other magnets.</li> </ul>	SC.4.P.8.4 <i>High</i>	magnet * magnetic poles	F15.3 Magnets (F62 – 65) F74 Nature’s Living Battery

UNIT/ORGANIZING PRINCIPLE: BODY OF KNOWLEDGE: THE NATURE OF SCIENCE				Pacing: Second Nine Weeks
Essential Question(s)	<b>Big Idea 10: Forms of Energy</b> Energy is involved in all physical processes and is a unifying concept in many areas of science. Energy exists in many forms and has the ability to do work or cause a change.			
Concepts/ Content	Learning Targets/Skills Students will:	Benchmarks Complexity	Key Vocabulary	Houghton Mifflin Textbook
Week 10 – 13  Forms of Energy	<ul style="list-style-type: none"> <li>Observe and describe some basic forms of energy, including light, heat (campfire, stove, heater), sound, electrical (computer, freezer), and the energy of motion (rollercoaster, pinball machine).</li> <li>Identify some familiar changes in materials that result in other materials with different characteristics such as decaying animal or plant matter, burning, rusting, and cooking</li> <li>Explain Potential and kinetic energy</li> </ul>	SC.4.P.10.1 <i>Moderate</i>	light * reflection * refraction * prism heat * Physical change energy Potential and kinetic	F8 Forms of Energy F14.2 How Light Behaves (F12 – 17) F14.4 Thermal Energy (F30 – 37) E13.1 Physical Changes (E38-E41)
	<ul style="list-style-type: none"> <li>Investigate and describe that energy has the ability to cause motion or create change.</li> <li>Describe the results of applying electrical energy (turn on lights or TV, make motors run); heat energy (burn wood, change temperature); and energy in motion (go faster, change direction, rolling a ball).</li> </ul>	SC.4.P. 10.2 <i>Moderate</i>		
	<ul style="list-style-type: none"> <li>Investigate and explain that sound is produced by vibrating objects that pitch depends on how fast or slow the object vibrates.</li> <li>Identify sounds as high or low (pitch).</li> <li>Recognize objects that create sounds.</li> </ul>	SC.4.P.10.3 <i>High</i>	sound vibration volume * pitch	F14.3 Nature of Sound (F20 – 25)
	<ul style="list-style-type: none"> <li>Describe how moving water and air are sources of energy and can be used to move things.</li> <li>Identify machines that use energy from moving water, including a waterwheel.</li> <li>Identify objects that use energy from moving air, such as a pinwheel, sailboat, and windmill.</li> </ul>	SC.4.P.10.4 <i>Moderate</i>	atmosphere *	D10.1 The Atmosphere (D6 – 7)  (D30 The Eye of the Storm)

<b>Essential Question(s)</b>	<b>Big Idea 11: Transformation of Energy</b> Waves involve a transfer of energy without a transfer of matter. Water and sound waves transfer energy through material. Light waves can travel through a vacuum and matter.			
<b>Concepts/ Content</b>	<b>Learning Targets/Skills</b> <b>Students will:</b>	<b>Benchmarks Complexity</b>	<b>Key Terminology</b>	<b>Houghton Mifflin Text</b>
<b>Week 14</b>  <b>Energy Transfer</b>	<ul style="list-style-type: none"> <li>Recognize that heat flows from a hot object to a cold object and that heat flow may cause materials to change temperature.</li> <li>Identify that a hot object will make a cold object warm when they touch.</li> </ul>	<b>SC.4.P.11.1</b> <i>Low</i>	heat * thermal energy	E13.2 Heating and Cooling Matter (E44 – 47)
	<ul style="list-style-type: none"> <li>Identify common materials that conduct heat well (metal) or poorly (plastic).</li> </ul>	<b>SC.4.P.11.2</b> <i>Low</i>		

Essential Question(s)	<b>Big Idea 12: Force &amp; Motion</b> Motion is a key characteristic of all matter that can be observed, described, and measured. The motion of objects can be changed by forces.			
Concepts/ Content	Learning Targets/Skills Students will:	Benchmarks Complexity	Key Terminology	Houghton Mifflin Text
<b>Weeks 15 - 18</b>  <b>Relationship of Force and Motion</b>	<ul style="list-style-type: none"> <li>Recognize that an object in motion always changes its position and may change its direction.</li> <li>Recognize that an object can move in different directions, such as left to right, straight line, zig zag.</li> <li>Recognize that movement causes an object to change position.</li> </ul>	<b>SC.4.P.12.1</b> <i>Low</i>	motion position speed velocity  force * friction * gravity *	F16. 1 Describing and Measuring Motion (F82 – 87)  F16.2 Forces and Motion (F90 – 95)
<b>Measuring Force and Motion</b>	<ul style="list-style-type: none"> <li>Investigate and describe that the speed of an object is determined by the distance it travels in a unit of time and that objects can move at different speeds.</li> <li>Identify speed as how long it takes to travel a certain distance.</li> <li>Recognize an object as moving fast or slow.</li> </ul>	<b>SC.4.P.12.2</b> <i>Moderate</i>		

UNIT/ORGANIZING PRINCIPLE: BODY OF KNOWLEDGE: THE NATURE OF SCIENCE				Pacing: Third Nine Weeks
Essential Question(s)	<b>Big Idea 6: Earth's Surface</b> Humans continue to explore the composition and structure of the surface of the Earth. External sources of energy have continuously altered the features of Earth by means of both constructive and destructive forces.			
Concepts/Content	Learning Targets/Skills Students will:	Benchmarks Complexity	Key Vocabulary	Houghton Mifflin Textbook
Weeks 19 – 21  Earth's Structure	<ul style="list-style-type: none"> <li>Identify the three categories of rocks: igneous (formed by molten rock); sedimentary (pieces of other rocks and fossilized organisms); and metamorphic (formed by heat and pressure).</li> <li>Recognize that rocks are classified by the way they are formed.</li> <li>Sort rocks according to observable characteristics, including, color, shape, size, and texture.</li> <li>Distinguish rocks from other substances found on Earth's surface.</li> </ul>	<b>SC.4.E.6.1</b> <i>Low</i>	igneous rock * metamorphic rock * rock cycle rock sedimentary rock * sediment	C8.1 How Rock Forms (C6 – 11)
	<ul style="list-style-type: none"> <li>Identify the physical properties of common earth-forming minerals, including hardness, color, luster, cleavage, and streak color, and recognize the role of minerals in the formation of rocks.</li> <li>Recognize and sort common minerals, such as rock salt, talc, gold, and silver by their physical properties.</li> </ul>	<b>SC.4.E.6.2</b> <i>Moderate</i>		
Weeks 22 – 23  Changes to Earth's Surface	<ul style="list-style-type: none"> <li>Describe the basic differences between physical weathering (breaking down of rock by wind, water, ice, temperature change, and plants) and erosion (movement of rock by gravity, wind, water, and ice).</li> <li>Recognize the effect of weathering on an object.</li> <li>Recognize examples of weathering and erosion in the environment.</li> </ul>	<b>SC.4.E.6.4</b> <i>Moderate</i>	lava magma deposition * erosion * weathering *	C8.2 Rapid Changes to Earth's Surface (C14 – 23) C8.3 Slow Changes (C26 – 33)

Essential Question(s)	<p><b>Big Idea 5: Earth in Space and Motion</b></p> <p>Humans continue to explore Earth’s place in space. Gravity and energy influence the formation of galaxies, including our own Milky Way Galaxy, stars, the Solar System, and Earth.</p> <p>Humankind’s need to explore continues to lead to the development of knowledge and understanding of our Solar System.</p>			
Concepts/Content	Learning Targets/Skills Students will:	Benchmarks Complexity	Key Terminology	Houghton Mifflin Text
<p><b>Week 24 – 27</b></p> <p><b>Earth’s Rotation and Revolution</b></p> <p><b>Earth and Moon Movement</b></p> <p><b>Moon Phases</b></p> <p><b>Solar System</b></p>	<ul style="list-style-type: none"> <li>Observe that the patterns of stars in the sky stay the same although they appear to shift across the sky nightly, and different stars can be seen in different seasons.</li> <li>Recognize that there are many stars in the sky with some that create patterns, such as the Big Dipper.</li> </ul>	<p><b>SC.4.E.5.1</b> <i>High</i></p>	<p>constellation * galaxy * star * universe *</p>	<p>D11.1 Earth’s Star (D50 – 53)</p> <p>D11.4 Stars and Galaxies (D76 – 83)</p>
	<ul style="list-style-type: none"> <li>Describe the observable shape of the moon over the course of about a month.</li> <li>Label three phases of the moon, including full (a circle), half (quarter), and crescent.</li> </ul>	<p><b>SC.4.E.5.2</b> <i>Moderate</i></p>	<p>phases of the moon* lunar eclipse</p>	<p>D70 – 71 How the Moon Moves</p>
	<ul style="list-style-type: none"> <li>Recognize that Earth revolves around the Sun in a year and rotates on its axis in a 24-hour day.</li> <li>Recognize that Earth is always turning (rotating).</li> <li>Recognize that that Sun appears to rise and set because of Earth’s rotation in a 24-hour day.</li> </ul>	<p><b>SC.4.E.5.3</b> <i>Moderate</i></p>	<p>axis * rotation</p>	<p>D68 – 69 How the Earth Moves</p> <p>D72 -73 Comparing Planet Motions</p>

	<ul style="list-style-type: none"><li>• Relate that the rotation of Earth (day and night) and apparent movements of the Sun, Moon, and stars are connected.</li><li>• Identify morning, noon, and night.</li><li>• Recognize that the side of Earth facing the Sun has daylight.</li></ul>	<b>SC.4.E.5.4</b> <i>High</i>		
	<ul style="list-style-type: none"><li>• Investigate and report the effects of space research and exploration on the economy and culture of Florida.</li><li>• Identify objects and people related to the space program in Florida.</li><li>• Recognize a space-related object.</li></ul>	<b>SC.4.E.5.5</b> <i>High</i>		(D64 – 65 The Solar System Through Time)  F96 Working Out in Space

UNIT/ORGANIZING PRINCIPLE: BODY OF KNOWLEDGE: THE NATURE OF SCIENCE				Pacing: Fourth Nine Weeks
Essential Question(s)	<b>Big Idea 6:</b> All life, including human civilization, is dependent on Earth's water and natural resources.			
Concepts/ Content	Learning Targets/Skills Students will:	Benchmarks Complexity	Key Vocabulary	Houghton Mifflin Textbook
Week 28  Renewable and Nonrenewable Resources	<ul style="list-style-type: none"> <li>Recognize that humans need resources found on Earth and that these are either renewable or nonrenewable</li> <li>Recognize that some natural resources used by humans are nonrenewable, such as oil.</li> <li>Recognize that some natural resources can run out (non-renewable).</li> <li>Recognize the universal symbol of recycling.</li> </ul>	<b>SC.4.E.6.3</b> <i>Moderate</i>	condensation * evaporation * natural resource * nonrenewable resource * precipitation renewable resource * fossil fuel humus pollution * soil profile topsoil biodegradable conservation * pollutant	C9.1 Renewable Resources (C40 – 45)  C9.2 Nonrenewable Resources (C48 – 57)  C9.3 Conserving Resources (C60 – 67)
	<ul style="list-style-type: none"> <li>Identify resources available in Florida (water, phosphate, oil, limestone, silicon, wind, and solar energy)</li> </ul>	<b>SC.4.E.6.6</b> <i>Low</i>		

Essential Question(s)	<b>Big Idea 16: Heredity and Reproduction</b> Offspring of plants and animals are similar to, but not exactly like, their parents or each other. Life cycles vary among organisms, but reproduction is a major stage in the life cycle of all organisms.			
Concepts/ Content	Learning Targets/Skills Students will:	Benchmarks Complexity	Key Terminology	Houghton Mifflin Text
<b>Weeks 29 – 30</b>  <b>Plant Reproduction</b>	<ul style="list-style-type: none"> <li>Identify processes of sexual reproduction in flowering plants, including pollination, fertilization (seed production), seed dispersal, and germination.</li> <li>Identify that insects spread pollen to help flowering plants make seeds, grow from their own seeds, and many plants have flowers and leaves.</li> </ul>	<b>SC.4.L.16.1</b> <i>Moderate</i>	chlorophyll leaf photosynthesis * root seed stem embryo germinate life cycle life span	A1.2 Life Processes of Plants (A18-25) A3.1 Plant Life Cycle (A64 – 67)
	<ul style="list-style-type: none"> <li>Compare and contrast the major stages in the life cycles of Florida plants and animals, such as those that undergo incomplete and complete metamorphosis, and flowering and nonflowering seed-bearing plants.</li> </ul>	<b>SC.4.L.16.4</b> <i>Moderate</i>		A3.2 Animal Life Cycles (A70 – 75)
<b>Weeks 31 – 32</b>  <b>Heredity</b>	<ul style="list-style-type: none"> <li>Explain that although characteristics of plants and animals are inherited, some characteristics can be affected by the environment.</li> <li>Recognize that animal behaviors may be shaped by heredity and learning.</li> </ul>	<b>SC.4.L.16.2</b> <i>High</i> <b>SC.4.L.16.3</b> <i>High</i>	inherit behavior learned behavior trait behavior instinct	A3.3 Parents and Offspring (A78 – 83) A4.2 Inherited and Learned Behavior (A100 – 104)

Essential Question(s)	<p><b>Big Idea 17:</b> Plants and animals, including humans, interact with and depend upon each other and their environment to satisfy their basic needs. Both human activities and natural world events can have major impacts on the environment. Energy flows from the sun through producers and consumers.</p>			
Concepts/ Content	Learning Targets/Skills Students will:	Benchmarks Complexity	Key Terminology	Houghton Mifflin Text
<p><b>Weeks 33 – 35</b>  <b>Energy Needs for Life</b></p>	<ul style="list-style-type: none"> <li>Compare seasonal changes in Florida plants and animals to those in other regions of the country.</li> <li>Changes in plants such as presence of flowers and change in leaf color.</li> </ul>	<p><b>SC.4.L.17.1</b> <i>Moderate</i></p>		<p>Florida Key Deer (B72 – 73)</p>
<p><b>Photosynthesis</b>  <b>Food Chains</b>  <b>Decomposers</b></p>	<ul style="list-style-type: none"> <li>Explain that animals, including humans, cannot make their own food and that when animals eat plants or other animals, the energy stored in the food source is passed onto them.</li> <li>Animals must eat plants or other animals to survive.</li> </ul>	<p><b>SC.4.L.17.2</b> <i>Moderate</i></p>		<p>(D48 – 49 Energy from the Sun)</p>
	<ul style="list-style-type: none"> <li>Trace the flow of energy from the Sun as it is transferred along the food chain through the producers to the consumers.</li> <li>Recognize that plants (producers) use energy from the Sun to make their food and animals (consumers) eat plants or other animals for their food.</li> </ul>	<p><b>SC.4.L.17.3</b> <i>Moderate</i></p>	<p>carnivore * food chain * food web * Herbivore * omnivore photosynthesis * predator * prey *</p>	<p>6.1 Path of Energy (B36 – 43) 6.2 Recycling Matter in Ecosystems (B46 – 53)</p>
	<ul style="list-style-type: none"> <li>Recognize ways plants and animals, including humans, can impact the environment.</li> <li>Recognize things that people do to help (recycling) or hurt (pollution) the environment.</li> </ul>	<p><b>SC.4.L.17.4</b> <i>High</i></p>	<p>consumer * pollinator producer * reproduction seed dispersal</p>	<p>B5.3 Roles of Living Things (B22 – 29) (C51 – Pollution) (C60 – Pollutant)</p>