



**2019 - 2020**



**Fourth Grade  
SCIENCE  
Curriculum Map**

**Volusia County Schools**

**Next Generation Sunshine State Standards**

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# Next Generation Sunshine State Standards

The Next Generation Sunshine State Standards for science are organized *by grade level* for grades K-8 and *by Bodies of Knowledge* for grades 9-12. Eighteen Big Ideas are encompassed in grades K-12 and build in rigor and depth as students advance. Each grade level includes benchmarks from the four Bodies of Knowledge (Nature of Science, Earth and Space Science, Physical Science, and Life Science).

## Fourth Grade Overview

**Fourth Grade focuses instructional delivery for science within the following twelve (12) Big Ideas/Standards:**

### **Nature of Science**

- Big Idea 1 – The Practice of Science
- Big Idea 2 – The Characteristics of Scientific Knowledge
- Big Idea 3 – The Roles of Theories, Laws, Hypotheses, and Models

### **Earth and Space Science**

- Big Idea 5 – Earth in Space and Time
- Big Idea 6 – Earth Structure

### **Physical Science**

- Big Idea 8 – Properties of Matter
- Big Idea 9 – Changes in Matter
- Big Idea 10 – Forms of Energy
- Big Idea 11 – Energy Transfer and Transformations
- Big Idea 12 – Motion of Objects

### **Life Science**

- Big Idea 16 – Heredity and Reproduction
- Big Idea 17 – Interdependence

# Fourth Grade

## Instructional Scope and Sequence

Weeks 1 – 38	Weeks of Instruction	Topic	Instructional Sequence	Body of Knowledge	4 <sup>th</sup> Grade Assessments
Nature of Science standards embedded in instruction.	Weeks 1 – 2	Introduction to Science	August 12 – August 23	Nature of Science	
	Weeks 3 – 6	Earth’s Patterns and Space	August 26 – September 20	Earth and Space Science	04 VST 1A (9/16-9/20)
	Weeks 7 – 12	Earth’s Features	September 23 – November 1		04 VST 1B (10/28-11/1)
	Weeks 13 – 17	Matter	November 4 – December 13	Physical Science	04 VST 2A (12/9-12/13)
	Weeks 18 – 27	Energy & Motion AND Human Uses of Energy	December 16 – March 6		04 VST 2B (3/2-3/6)
	Weeks 28 – 31	Plants and Animals	March 9 – April 10	Life Science	04 VST 3 (5/11-5/29)
	Weeks 32 – 36	Living Things & The Environment	April 13 – May 15		
	Weeks 37 – 38	Enrichment	May 18 – May 29	Nature of Science	

Digital Curriculum Maps and other instructional support documents are available on the grade level Science Canvas site under the Curriculum Map and Instructional Resources button. All suggested resources are available on the grade level Science Canvas site under the Curriculum Resources button.

### What is a STEM Week?

STEM Weeks are periods of time dedicated to the implementation of an interdisciplinary, standards-rich experience that poses an age-appropriate, real-world problem to be solved through collaborative and creative measures. See Canvas for STEM week materials.

<b>S</b>	<b>scientific Literacy</b>	<b>T</b>	<b>echnological Literacy</b>	<b>E</b>	<b>ngineering Literacy</b>	<b>M</b>	<b>athematical Literacy</b>
the ability to use scientific knowledge and processes to understand the natural world as well as the ability to participate in decisions that affect it		the ability to know how to use new technologies, understand how new technologies are developed, and have the skills to analyze how new technologies affect us, our nation, and the world		the ability to understand how technologies are developed via the engineering design process using problem-based lessons in a manner that integrates lessons across multiple subjects		the ability to analyze, reason, and communicate ideas effectively to pose, formulate, solve, and interpret solutions to mathematical problems in a variety of situations	

# The Demand of Standard (DOS)

## Core Action 1: Science Instructional Practice Guide (IPG)

The benchmarks in the **Next Generation Sunshine State Standards (NGSSS)** identify knowledge and skills students are expected to acquire at each grade level, with the underlying expectation that students also demonstrate critical thinking.

The levels—**Level 1, Level 2, and Level 3**—form an ordered description of the demands a standard may make on a student.

Instruction in the classroom should match, at a minimum, the demand of standard of the learning target in the curriculum map.

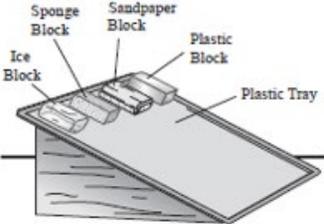
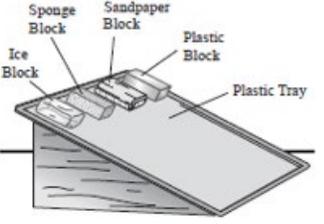
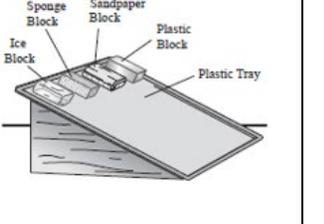
Level 1: Recall	Level 2: Basic Application of Concepts & Skills	Level 3: Strategic Thinking & Complex Reasoning
<p>The recall of information such as a <b>fact, definition, or term</b>, as well as performing a simple science process or <b>procedure</b>.</p> <p>Level 1 only requires students to demonstrate a rote response, use a well-known formula, <b>follow a set well-defined procedure</b> (like a recipe), or perform a clearly defined series of steps.</p>	<p>The engagement of some <b>mental processing beyond recalling or reproducing a response</b>. The content knowledge or process involved is more complex than in Level 1.</p> <p>Level 2 requires that students make some decisions as to how to approach the question or problem. Level 2 activities include <b>making observations</b> and <b>collecting data</b>; classifying, organizing, and <b>comparing data</b>; <b>representing and displaying data</b> in tables, graphs, and charts. Some action verbs, such as “explain,” “describe,” or “interpret,” may be classified at different DOK levels, depending on the complexity of the action. For example, interpreting information from a simple graph, requiring reading information from the graph, is at Level 2. An activity that requires interpretation from a complex graph, such as making decisions regarding features of the graph that should be considered and how information from the graph can be aggregated, is at Level 3.</p>	<p>Requires <b>reasoning, planning, using evidence</b>, and a higher level of thinking than the previous two levels. The cognitive demands at Level 3 are complex and abstract. The complexity does not result only from the fact that there could be <b>multiple answers</b>, a possibility for both Levels 1 and 2, but because the multi-step task requires more <b>demanding reasoning</b>.</p> <p>In most instances, requiring students to explain their thinking is at Level 3; requiring a very simple explanation or a word or two should be at Level 2. An activity that has more than one possible answer and requires students to justify the response they give would most likely be a Level 3. Level 3 activities include drawing conclusions from observations; <b>citing evidence</b> and <b>developing a logical argument</b> for concepts; <b>explaining phenomena</b> in terms of concepts; and using concepts to <b>solve non-routine problems</b>.</p>
<p>Some examples that represent, but do not constitute all of Level 1 performance, are:</p> <ul style="list-style-type: none"> <li>Recall or recognize a fact, term, or property.</li> <li>Represent in words or diagrams a scientific concept or relationship.</li> <li>Provide or recognize a standard scientific representation for simple phenomena.</li> <li>Perform a routine procedure such as measuring length.</li> <li>Identify familiar forces (e.g. pushes, pulls, gravitation, friction, etc.)</li> <li>Identify objects and materials as solids, liquids, or gases.</li> </ul>	<p>Some examples that represent, but do not constitute all of Level 2 performance, are:</p> <ul style="list-style-type: none"> <li>Specify and explain the relationship among facts, terms, properties, and variables.</li> <li>Identify variables, including controls, in simple experiments.</li> <li>Distinguish between experiments and systematic observations.</li> <li>Describe and explain examples and non-examples of science concepts.</li> <li>Select a procedure according to specified criteria and perform it.</li> <li>Formulate a routine problem given data and conditions.</li> <li>Organize, represent, and interpret data.</li> </ul>	<p>Some examples that represent, but do not constitute all of Level 3 performance, are:</p> <ul style="list-style-type: none"> <li>Identify research questions and design investigations for a scientific problem.</li> <li>Design and execute an experiment or systematic observation to test a hypothesis or research question.</li> <li>Develop a scientific model for a complex situation.</li> <li>Form conclusions from experimental data.</li> <li>Cite evidence that living systems follow the Laws of Conservation of Mass and Energy.</li> <li>Explain how political, social, and economic concerns can affect science, and vice versa.</li> <li>Create a conceptual or mathematical model to explain the key elements of a scientific theory or concept.</li> <li>Explain the physical properties of the Sun and its dynamic nature and connect them to conditions and events on Earth.</li> <li>Analyze past, present, and potential future consequences to the environment resulting from various energy production technologies.</li> </ul>

\*Adapted from: <http://www.cpalms.org/textonly.aspx?ContentID=23&UrlPath=/page23.aspx>

# Demand of Standard and Complexity

## Core Action 1: Science Instructional Practice Guide (IPG)

Every standard is assigned a demand of standard (DOS) indicator. The teaching and assessment of that standard must reflect the rigor of the DOS.

Low (Level 1)	Moderate (Level 2)	High (Level 3)
<p>Students will:</p> <ul style="list-style-type: none"> <li>• <b>retrieve information</b> from a chart, table, diagram, or graph</li> <li>• <b>recognize</b> a standard scientific representation of a simple phenomenon</li> <li>• <b>complete</b> a familiar single-step procedure or equation using a reference sheet</li> </ul>	<p>Students will:</p> <ul style="list-style-type: none"> <li>• <b>interpret</b> data from a chart, table, or simple graph</li> <li>• <b>determine</b> the best way to organize or present data from observations, an investigation, or experiment</li> <li>• <b>describe</b> examples and non-examples of scientific processes or concepts</li> <li>• <b>specify or explain</b> relationships among different groups, facts, properties, or variables</li> <li>• <b>differentiate</b> structure and functions of different organisms or systems</li> <li>• <b>predict or determine</b> the logical next step or outcome</li> <li>• <b>apply and use concepts</b> from a standard scientific model or theory</li> </ul>	<p>Students will:</p> <ul style="list-style-type: none"> <li>• <b>analyze</b> data from an investigation or experiment and formulate a conclusion</li> <li>• <b>develop</b> a generalization from multiple data sources</li> <li>• <b>analyze and evaluate</b> an experiment with multiple variables</li> <li>• <b>analyze</b> an investigation or experiment to identify a flaw and propose a method for correcting it</li> <li>• <b>analyze</b> a problem, situation, or system and make long-term predictions</li> <li>• <b>interpret, explain, or solve</b> a problem involving complex spatial relationships</li> </ul>
Sample Level 1 Item	Sample Level 2 Item	Sample Level 3 Item
<p>Felipe and Marsha were studying forces and decided to do an experiment. They placed four equally sized blocks made of different materials on an elevated plastic tray. They watched each of the blocks move down the tray. Their setup is shown below.</p>  <p>Which of the following forces causes the blocks to move down the tray?</p> <p>A. Electric B. Friction <b>C. Gravity</b> D. Magnetic</p>	<p>Felipe and Marsha were studying forces and decided to do an experiment. They placed four equally sized blocks made of different materials on an elevated plastic tray. They watched each of the blocks move down the tray. Their setup is shown below.</p>  <p>Which block would experience the least amount of friction as it moved down the tray?</p> <p>A. <b>Ice Block</b> B. Sponge Block C. Sandpaper Block D. Plastic Block</p>	<p>Felipe and Marsha were studying forces and decided to do an experiment. They placed four equally sized blocks made of different materials on an elevated plastic tray. They watched each of the blocks move down the tray. Their setup is shown below.</p>  <p>Which of the following conclusions can Felipe and Marsha make about the forces that cause the blocks to move down the tray?</p> <p>A. The force of friction is the same on each block. B. The force of friction causes the speed of each block to increase. C. The force of gravity causes all the blocks to move at the same speed. <b>D. The force of gravity is greater than the force of friction on all the blocks.</b></p>

\*Adapted from Webb's Depth of Knowledge and FLDOE Specification Documentation, Version 2.

# The 5E Instructional Model

## Core Action 2: Science Instructional Practice Guide (IPG)

ENGAGEMENT	EXPLORATION	EXPLANATION	ELABORATION	EVALUATION
<p>The engagement phase of the model is intended to capture students' interest and focus their thinking on the concept, process, or skill that is to be learned.</p> <p>During this engagement phase, the teacher is on center stage.</p>	<p>The exploration phase of the model is intended to provide students with a common set of experiences from which to make sense of the concept, process or skill that is to be learned.</p> <p>During the exploration phase, the students come to center stage.</p>	<p>The explanation phase of the model is intended to grow students' understanding of the concept, process, or skill and its associated academic language.</p> <p>During the explanation phase, the teacher and students share center stage.</p>	<p>The elaboration phase of the model is intended to construct a deeper understanding of the concept, process, or skill through the exploration of related ideas.</p> <p>During the elaboration phase, the teacher and students share center stage.</p>	<p>The evaluation phase of the model is intended to be used during all phases of the learning cycle driving the decision-making process and informing next steps.</p> <p>During the evaluation phase, the teacher and students share center stage.</p>
<p><b>What does the teacher do?</b></p> <ul style="list-style-type: none"> <li>• <b>create</b> interest/curiosity</li> <li>• <b>raise</b> questions</li> <li>• <b>elicit</b> responses that uncover student thinking/prior knowledge (preview/process)</li> <li>• <b>remind</b> students of previously taught concepts that will play a role in new learning</li> <li>• <b>familiarize</b> students with the unit</li> </ul>	<p><b>What does the teacher do?</b></p> <ul style="list-style-type: none"> <li>• <b>provide</b> necessary materials/tools</li> <li>• <b>pose</b> a hands-on/minds-on problem for students to explore</li> <li>• <b>provide</b> time for students to "puzzle" through the problem</li> <li>• <b>encourage</b> students to work together</li> <li>• <b>observe</b> students while working</li> <li>• <b>ask</b> probing questions to redirect student thinking as needed</li> </ul>	<p><b>What does the teacher do?</b></p> <ul style="list-style-type: none"> <li>• <b>ask</b> for justification/clarification of newly acquired understanding</li> <li>• <b>use</b> a variety of instructional strategies</li> <li>• <b>use</b> common student experiences to: <ul style="list-style-type: none"> <li>○ develop academic language</li> <li>○ explain the concept</li> </ul> </li> <li>• <b>use</b> a variety of instructional strategies to grow understanding</li> <li>• <b>use</b> a variety of assessment strategies to gauge understanding</li> </ul>	<p><b>What does the teacher do?</b></p> <ul style="list-style-type: none"> <li>• <b>provide</b> new information that extends what has been learned</li> <li>• <b>provide</b> related ideas to explore</li> <li>• <b>pose</b> opportunities (examples and non-examples) to apply the concept in unique situations</li> <li>• <b>remind</b> students of alternate ways to solve problems</li> <li>• <b>encourage</b> students to persevere in solving problems</li> </ul>	<p><b>What does the teacher do?</b></p> <ul style="list-style-type: none"> <li>• <b>observe</b> students during all phases of the learning cycle</li> <li>• <b>assess</b> students' knowledge and skills</li> <li>• <b>look</b> for evidence that students are challenging their own thinking</li> <li>• <b>present</b> opportunities for students to assess their learning</li> <li>• <b>ask</b> open-ended questions: <ul style="list-style-type: none"> <li>○ What do you think?</li> <li>○ What evidence do you have?</li> <li>○ How would you explain it?</li> </ul> </li> </ul>
<p><b>What does the student do?</b></p> <ul style="list-style-type: none"> <li>• <b>show</b> interest in the topic</li> <li>• <b>reflect and respond</b> to questions</li> <li>• <b>ask</b> self-reflection questions: <ul style="list-style-type: none"> <li>○ What do I already know?</li> <li>○ What do I want to know?</li> <li>○ How will I know I have learned the concept, process, or skill?</li> </ul> </li> <li>• <b>make</b> connections to past learning experiences</li> </ul>	<p><b>What does the student do?</b></p> <ul style="list-style-type: none"> <li>• <b>manipulate</b> materials/tools to explore a problem</li> <li>• <b>work</b> with peers to make sense of the problem</li> <li>• <b>articulate</b> understanding of the problem to peers</li> <li>• <b>discuss</b> procedures for finding a solution to the problem</li> <li>• <b>listen</b> to the viewpoint of others</li> </ul>	<p><b>What does the student do?</b></p> <ul style="list-style-type: none"> <li>• <b>record</b> procedures taken towards the solution to the problem</li> <li>• <b>explain</b> the solution to a problem</li> <li>• <b>communicate</b> understanding of a concept orally and in writing</li> <li>• <b>critique</b> the solution of others</li> <li>• <b>comprehend</b> academic language and explanations of the concept provided by the teacher</li> <li>• <b>assess</b> own understanding through the practice of self-reflection</li> </ul>	<p><b>What does the student do?</b></p> <ul style="list-style-type: none"> <li>• <b>generate</b> interest in new learning</li> <li>• <b>explore</b> related concepts</li> <li>• <b>apply</b> thinking from previous learning and experiences</li> <li>• <b>interact</b> with peers to broaden one's thinking</li> <li>• <b>explain</b> using information and experiences accumulated so far</li> </ul>	<p><b>What does the student do?</b></p> <ul style="list-style-type: none"> <li>• <b>participate</b> actively in all phases of the learning cycle</li> <li>• <b>demonstrate</b> an understanding of the concept</li> <li>• <b>solve</b> problems</li> <li>• <b>evaluate</b> own progress</li> <li>• <b>answer</b> open-ended questions with precision</li> <li>• <b>ask</b> questions</li> </ul>
<p><b>Evaluation of Engagement</b></p> <p>The role of evaluation during the engagement phase is to gain access to students' thinking during the pre-assessment event/activity.</p> <p>Conceptions and misconceptions currently held by students are uncovered during this phase.</p> <p>These outcomes determine the concept, process, or skill to be explored in the next phase of the learning cycle.</p>	<p><b>Evaluation of Exploration</b></p> <p>The role of evaluation during the exploration phase is to gather an understanding of how students are progressing towards making sense of a problem and finding a solution.</p> <p>Strategies and procedures used by students during this phase are highlighted during explicit instruction in the next phase.</p> <p>The concept, process, or skill is formally explained in the next phase of the learning cycle.</p>	<p><b>Evaluation of Explanation</b></p> <p>The role of evaluation during the explanation phase is to determine the students' degree of fluency (accuracy and efficiency) when solving problems.</p> <p>Conceptual understanding, skill refinement, and vocabulary acquisition during this phase are enhanced through new explorations.</p> <p>The concept, process, or skill is elaborated in the next phase of the learning cycle.</p>	<p><b>Evaluation of Elaboration</b></p> <p>The role of evaluation during the elaboration phase is to determine the degree of learning that occurs following a differentiated approach to meeting the needs of all learners.</p> <p>Application of new knowledge in unique problem-solving situations during this phase constructs a deeper and broader understanding.</p> <p>The concept, process, or skill has been and will be evaluated as part of all phases of the learning cycle.</p>	

# The Science and Engineering Practices

## Core Action 3: Science Instructional Practice Guide (IPG)

<p><b>Asking Questions and Defining Problems</b></p> <p>A practice of science is to ask and refine questions that lead to descriptions and explanations of how the natural and designed world(s) works and which can be empirically tested. Engineering questions clarify problems to determine criteria for successful solutions and identify constraints to solve problems about the designed world. Both scientists and engineers also ask questions to clarify ideas.</p>	<p><b>Using Mathematics and Computational Thinking</b></p> <p>In both science and engineering, mathematics and computation are fundamental tools for representing physical variables and their relationships. They are used for a range of tasks such as constructing simulations; solving equations exactly or approximately; and recognizing, expressing, and applying quantitative relationships. Mathematical and computational approaches enable scientists and engineers to predict the behavior of systems and test the validity of such predictions.</p>
<p><b>Developing and Using Models</b></p> <p>A practice of both science and engineering is to use and construct models as helpful tools for representing ideas and explanations. These tools include diagrams, drawings, physical replicas, mathematical representations, analogies, and computer simulations. Modeling tools are used to develop questions, predictions and explanations; analyze and identify flaws in systems; and communicate ideas. Models are used to build and revise scientific explanations and proposed engineered systems. Measurements and observations are used to revise models and designs.</p>	<p><b>Constructing Explanations and Designing Solutions</b></p> <p>The end-products of science are explanations and the end-products of engineering are solutions. The goal of science is the construction of theories that provide explanatory accounts of the world. A theory becomes accepted when it has multiple lines of empirical evidence and greater explanatory power of phenomena than previous theories. The goal of engineering design is to find a systematic solution to problems that is based on scientific knowledge and models of the material world. Each proposed solution results from a process of balancing competing criteria of desired functions, technical feasibility, cost, safety, aesthetics, and compliance with legal requirements. The optimal choice depends on how well the proposed solutions meet criteria and constraints.</p>
<p><b>Planning and Carrying Out Investigations</b></p> <p>Scientists and engineers plan and carry out investigations in the field or laboratory, working collaboratively as well as individually. Their investigations are systematic and require clarifying what counts as data and identifying variables or parameters. Engineering investigations identify the effectiveness, efficiency, and durability of designs under different conditions</p>	<p><b>Engaging in Argument from Evidence</b></p> <p>Argumentation is the process by which evidence-based conclusions and solutions are reached. In science and engineering, reasoning and argument based on evidence are essential to identifying the best explanation for a natural phenomenon or the best solution to a design problem. Scientists and engineers use argumentation to listen to, compare, and evaluate competing ideas and methods based on merits. Scientists and engineers engage in argumentation when investigating a phenomenon, testing a design solution, resolving questions about measurements, building data models, and using evidence to evaluate claims</p>
<p><b>Analyzing and Interpreting Data</b></p> <p>Scientific investigations produce data that must be analyzed in order to derive meaning. Because data patterns and trends are not always obvious, scientists use a range of tools—including tabulation, graphical interpretation, visualization, and statistical analysis—to identify the significant features and patterns in the data. Scientists identify sources of error in the investigations and calculate the degree of certainty in the results. Modern technology makes the collection of large data sets much easier, providing secondary sources for analysis. Engineering investigations include analysis of data collected in the tests of designs. This allows comparison of different solutions and determines how well each meet specific design criteria— that is, which design best solves the problem within given constraints. Like scientists, engineers require a range of tools to identify patterns within data and interpret the results. Advances in science make analysis of proposed solutions more efficient and effective.</p>	<p><b>Obtaining, Evaluating and Communicating Information</b></p> <p>Scientists and engineers must be able to communicate clearly and persuasively the ideas and methods they generate. Critiquing and communicating ideas individually and in groups is a critical professional activity. Communicating information and ideas can be done in multiple ways: using tables, diagrams, graphs, models, and equations as well as orally, in writing, and through extended discussions. Scientists and engineers employ multiple sources to obtain information that is used to evaluate the merit and validity of claims, methods, and designs.</p>

Developed by NSTA using information from Appendix F of the *Next Generation Science Standards* © 2011, 2012, 2013 Achieve, Inc

# 4<sup>th</sup> Grade SCIENCE INSTRUCTIONAL CALENDAR

2019-2020

Week	Dates	Topic	Lessons	Assessments
1	August 12-16	Introduction to Science	See Canvas for support	
2	August 19-23			
3	August 26-30	Earth's Patterns and Space	Earth's Movement T1 L1	
4	September 2-6 (4 days/Labor Day)		Patterns of Stars in The Sky T1 L2	
5	September 9-13		Moon Phases T1 L3	VST 1A
6	September 16-20 (4 days/PD Day)		Maps and Data T2 L1	
7	September 23-27	Earth's Features	Rocks, Minerals, and Soil T2 L3	
8	September 30-October 4		Weathering and Erosion T2 L4	
9	October 7-11			
10	October 14-18 (4 days/Teacher Duty Day)	Earth's Features	Common Experiment #1	
11	October 21-25	Nature of Science	Natural Resources T2 L5	VST 1B
12	October 28-November 1	Earth's Features	Properties of Matter T3 L1	
13	November 4-8	Matter	States of Matter T3 L2	
14	November 11-15 (4 days/Veterans Day)		Measure Matter T3 L3	
15	November 18-22		Changes in Matter T3 L4	
16	December 2-6		Common Experiment #2	VST 2A
17	December 9-13	Nature of Science	Energy, Speed, and Moving Objects T4 L1	
18	December 16-20 (3 days/Teacher Duty Day)	Energy and Motion	Collisions T4 L2	
19	January 6-10	Energy and Motion	Energy Transfers T4 L3	
20	January 13-17			
21	January 20-24 (4 days/MLK Day)	Nature of Science	STEM Lesson #1	
22	January 27-31	Energy and Motion	Electric Circuits T4 L4	
23	February 3-7	Human Uses of Energy	Natural Resources and Energy T5 L1	
24	February 10-14		Nonrenewable Energy Sources T5 L2	
25	February 17-21 (4 days/Presidents' Day)		Renewable Energy Sources T5 L3	
26	February 24-28		Environmental Impacts of Using Energy T5 L4	
27	March 2-6	Nature of Science	Common Experiment#3	VST 2B
28	March 9-13 (4 days/Teacher Duty Day)	Plants and Animals	Life cycles of Florida Plants T6 L1	
29	March 23-27	Plants and Animals	Life Cycles of Florida Animals T6 L2	
30	March 30-April 3		Plant and Animal Characteristics T6 L3	
31	April 6-10		Animal Behavior T6 L4	
32	April 13-17	Living Things and the Environment	Seasons Affect Plants and Animals T7 L1	
33	April 20-24		Energy from Plants and Animals T7 L2	
34	April 27-May 1		Food Chains and Food Webs T7 L3	
35	May 4-8		Plants, Animals, and Humans Affect T7 L4	
36	May 11-15	Nature of Science	The Environment T7 L5	VST 3
37	May 18-22		Common Experiment #4	
38	May 25-29 (4 days/Memorial Day)		STEM Lesson #2	

NGSSS BODY OF KNOWLEDGE: NATURE OF SCIENCE  
BIG IDEA: The Practice of Science

PACING: Weeks 1-38  
August 12 – May 29

Prerequisite Learning	Kindergarten – SC.K.N.1.1, SC.K.N.1.2, SC.K.N.1.3, SC.K.N.1.4, SC.K.N.1.5	First Grade – SC.1.N.1.1, SC.1.N.1.2, SC.1.N.1.3, SC.1.N.1.4, SC.1.E.5.3
	Second Grade – SC.2.N.1.1, SC.2.N.1.2, SC.2.N.1.3, SC.2.N.1.4, SC.2.N.1.5, SC.2.N.1.6	Third Grade – SC.3.N.1.1, SC.3.N.1.2, SC.3.N.1.3, SC.3.N.1.4, SC.3.N.1.5, SC.3.N.1.6, SC.3.N.1.7

Topic	Learning Targets/Skills	Benchmark	Academic Language
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Pages 10 – 13 list all of the Grade 4 Nature of Science standards. These standards should be integrated and taught throughout the year to be mastered by the end of week 38.  
The first 2 weeks of instruction focused on the Nature of Science standards are meant to be an introduction to science. See pages 14, 15, and Canvas for resources specific to instruction during the first two weeks of school.

<p><b>Weeks 1-38</b></p> <p><b>Nature of Science</b></p> <p>This topic is continued on the next page.</p>	<p><b>Note:</b> Learning Targets beginning with “review” indicate instruction from previous grades.</p> <p><i>Raise questions about the natural world, use appropriate reference materials that support understanding to obtain information (identifying the source), conduct both individual and team investigations through free exploration and systematic investigations and generate appropriate explanations based on those explorations.</i></p> <p><b>Students will:</b></p> <ul style="list-style-type: none"> <li>• <b>generate</b> a student-driven list of testable questions about the world that can be answered through observation and investigation.</li> <li>• <b>research</b> topics related to the questions they generate (e.g., internet, leveled-readers, non-fiction resources, newspaper).</li> <li>• <b>form</b> a hypothesis (a scientist’s thinking prior to investigation) based on research.</li> <li>• <b>investigate</b> student-generated questions, individually and in teams, through free exploration, experimentation (scientific method), or other types of investigations using appropriate science tools (metric measurement).</li> <li>• <b>form</b> conclusions based on data obtained during investigations.</li> <li>• <b>identify</b> any flaw(s) in the experimental design that may have affected the outcome.</li> </ul>	<p><b>SC.4.N.1.1</b> (Demand of Standard or DOS – Level 3)</p>	<p><b>scientific method</b></p> <ul style="list-style-type: none"> <li>○ question</li> <li>○ research</li> <li>○ hypothesis</li> <li>○ experiment <ul style="list-style-type: none"> <li>▪ materials</li> <li>▪ procedure</li> </ul> </li> <li>○ data</li> <li>○ results</li> <li>○ conclusion</li> </ul> <p><b>scientific processes</b></p>
	<p><i>Compare the observations made by different groups using multiple tools and seek reasons to explain the differences across groups.</i></p> <p><b>Students will:</b></p> <ul style="list-style-type: none"> <li>• <b>identify</b> appropriate tools to use when making measurements.</li> <li>• <b>demonstrate</b> proper use of scientific tools to ensure accuracy of measurements.</li> <li>• <b>engage</b> in a common team investigation using metric measurement tools (e.g., beakers, graduated cylinders, ruler, meter stick, tape measure, thermometer, scale, gram weights).</li> <li>• <b>compare</b> the methods and results of other team investigations.</li> <li>• <b>formulate</b> opinions, new ideas, and conclusions based on team comparisons.</li> <li>• <b>seek</b> reasons to explain any differences that may have occurred.</li> <li>• <b>critique</b> others’ work in a written manner to make recommendations of how to improve future investigations.</li> </ul>		<p><b>SC.4.N.1.2</b> (DOS – Level 3)</p>

<p><b>Weeks 1-38</b></p> <p><b>Nature of Science</b></p> <p>This topic is continued on the next page AND continued from the previous page.</p>	<p><i>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.</i></p> <p><b>Students will:</b></p> <ul style="list-style-type: none"> <li>• <b>set up a science notebook</b> that will be used all year by students.</li> <li>• <b>explore</b> various fields of science realizing that not all scientists follow <i>the</i> scientific method for experimental investigations (e.g., biologist vs. paleontologist or astronomer vs. botanist).</li> <li>• <b>explain</b> the role of a scientist (ask questions and find answers based on evidence).</li> <li>• <b>explain</b> that science involves the use of observations and evidence.</li> <li>• <b>define</b> science (study of the natural world through observation and evidence).</li> </ul>	<p><b>SC.4.N.1.3</b> (DOS – Level 2)</p>	<p>evidence experiment investigation observation science scientist</p>
	<p><i>Attempt reasonable answers to scientific questions and cite evidence in support.</i></p> <p><b>Students will:</b></p> <ul style="list-style-type: none"> <li>• <b>define</b> data and evidence (a collection of observable and measurable information gathered during an investigation).</li> <li>• <b>discuss</b> previously acquired data/evidence to form a conclusion (a statement that explains whether the data does or does not support the hypothesis including an explanation of why). <i>See Canvas resources for a collection of data tables.</i></li> <li>• <b>compare</b> conclusions.</li> <li>• <b>recognize</b> that sharing ideas and conclusions is a source of new information and knowledge for a scientist.</li> <li>• <b>explain</b> that scientists base their explanations on data and evidence.</li> </ul>	<p><b>SC.4.N.1.4</b> (DOS – Level 3)</p>	<p>conclusions data measurable observable</p>
	<p><i>Compare the methods and results of investigations done by other classmates.</i></p> <p><b>Students will:</b></p> <ul style="list-style-type: none"> <li>• <b>demonstrate</b> proper use of scientific tools to ensure accuracy of measurements.</li> <li>• <b>engage</b> in a common team investigation using metric measurement tools (e.g., beakers, graduated cylinders, ruler, meter stick, tape measure, thermometer, scale, gram weights).</li> <li>• <b>compare</b> the methods and results of other team investigations.</li> <li>• <b>formulate</b> opinions, new ideas, and conclusions based on team comparisons.</li> <li>• <b>seek</b> reasons to explain any differences that may have occurred.</li> <li>• <b>critique</b> others’ work in a written manner to make recommendations of how to improve future investigations.</li> </ul>	<p><b>SC.4.N.1.5</b> (DOS – Level 2)</p>	<p>accuracy communication evidence flaw interpretation investigation</p>

<p><b>Weeks 1-38</b></p> <p><b>Nature of Science</b></p> <p>This topic is continued on the next page AND continued from the previous page.</p>	<p><i>Keep records that describe observations made, carefully distinguishing actual observations from ideas and inferences about the observations.</i></p> <p><b>Students will:</b></p> <ul style="list-style-type: none"> <li>• <b>record</b> observations of an object and/or an event in a science notebook using a variety of data collection tools (e.g., diagrams, charts, graphs).</li> <li>• <b>make inferences</b> based on observations.</li> <li>• <b>distinguish</b> observations from inferences.</li> <li>• <b>communicate</b> observations and inferences with others in the classroom.</li> <li>• <b>critique</b> each other’s findings through engaging discussions.</li> </ul>	<p><b>SC.4.N.1.6</b> (DOS – Level 3)</p>	<p><b>infer/inference</b> <b>observe/observation</b> <b>predict/prediction</b></p>
	<p><i>Recognize and explain that scientists base their explanations on evidence.</i></p> <p><b>Students will:</b></p> <ul style="list-style-type: none"> <li>• <b>define</b> data and evidence (a collection of observable and measurable information gathered during an investigation).</li> <li>• <b>discuss</b> previously acquired data/evidence to form a conclusion (a statement that explains whether the data does or does not support the hypothesis including an explanation of why). <i>See Canvas resources for a collection of data tables.</i></li> <li>• <b>compare</b> conclusions.</li> <li>• <b>recognize</b> that sharing ideas and conclusions is a source of new information and knowledge for a scientist.</li> <li>• <b>explain</b> that scientists base their explanations on data and evidence.</li> </ul>	<p><b>SC.4.N.1.7</b> (DOS – Level 2)</p>	<p><b>communication</b> <b>evidence</b> <b>flaw</b> <b>interpretation</b> <b>investigation</b></p>
	<p><i>Recognize that science involves creativity in designing experiments.</i></p> <p><b>Students will:</b></p> <ul style="list-style-type: none"> <li>• <b>generate</b> a student-driven list of testable questions about the world that can be answered through observation and investigation.</li> <li>• <b>research</b> topics related to the questions they generate (e.g., internet, leveled-readers, non-fiction resources, newspaper).</li> <li>• <b>form</b> a hypothesis (a scientist’s thinking prior to investigation) based on research.</li> <li>• <b>investigate</b> student-generated questions, individually and in teams, through free exploration, experimentation (scientific method), or other types of investigations using appropriate science tools (metric measurement).</li> <li>• <b>form</b> conclusions based on data obtained during investigations.</li> <li>• <b>identify</b> any flaw(s) in the experimental design that may have affected the outcome.</li> </ul>	<p><b>SC.4.N.1.8</b> (DOS – Level 2)</p>	<p><b>hypothesis</b> <b>research</b></p>

<p><b>Weeks 1-38</b></p> <p><b>Nature of Science</b></p> <p>This topic is continued from the previous page.</p>	<p><i>Explain that science focuses solely on the natural world.</i></p> <p><b>Students will:</b></p> <ul style="list-style-type: none"> <li>• <b>set up a science notebook</b> that will be used all year by students.</li> <li>• <b>explore</b> various fields of science realizing that not all scientists follow a scientific method for experimental investigations (e.g., biologist vs. paleontologist or astronomer vs. botanist).</li> <li>• <b>explain</b> the role of a scientist (ask questions and find answers based on evidence).</li> <li>• <b>explain</b> that science does involve the use of observations and evidence.</li> <li>• <b>define</b> science (study of the natural world through observation and evidence).</li> </ul>	<p><b>SC.4.N.2.1</b> (DOS – Level 2)</p>	
	<p><i>Explain that models can be three-dimensional, two-dimensional, an explanation in your mind, or a computer model.</i></p> <p><b>Students will:</b></p> <ul style="list-style-type: none"> <li>• <b>explain</b> that models can be three-dimensional, two-dimensional, a mental model (a picture in your mind), or a computer model.</li> </ul>	<p><b>SC.4.N.3.1</b> (DOS – Level 2)</p>	<p><b>models</b></p>

**Teacher Hints for “Nature of Science”:**

- There is no unit of study for the Nature of Science standards, rather students are encouraged to engage in these standards throughout the school year.
- Students are expected to realize that investigations do not always follow the scientific method (step-by-step experiments). Scientific investigations sometimes only involve observations, comparisons, or research (e.g., record observations of rocks and/or minerals, comparison of a solid and a liquid).
- Throughout the school year, metric units of measure should be used in science.
- Students could prepare for the Earth’s Movements (Weeks 4-6) learning targets by beginning each morning with work routines which include collecting data on seasons, star patterns, and moon phases. Students could take turns collecting different types of data during different times of the year.
- During this time, teachers have the opportunity to select and use a variety of science tools to explore the scientific process.
- Students should practice making and recording observations daily. Students naturally make observations with their eyes but may need to be reminded that observations should utilize all of their senses (e.g., “I see bubbles forming when vinegar is mixed with baking soda. I hear bubbles fizzing when vinegar is mixed with baking soda.”).
- An inference is a logical guess based on observations. It is arrived at based on the face value of the observations alone and is not the result of a systematic analysis or testing of the evidence.
- Students need to make inferences based on evidence gathered during observations. Considerations should be made to practice this skill with each benchmark throughout the year to support student understanding. Connections to other core subjects may be referenced.
- Teachers should lead students in the understanding that scientists do not only learn from doing hands-on investigations but also from reading non-fiction reference materials, such as, journals, newspapers, reference books etc.
- Teachers should discuss the importance of researching a topic before forming a hypothesis or conducting an investigation.
- Teachers need to engage students in a discussion about the importance of multiple trials and large experimental groups when conducting experiments.
- Teachers should continue to model controlling variables and testing a control group for comparison purposes.
- Teachers should organize common investigations/experiments so that students will be able to compare their results with the results of other groups. When differences arise, students should compare the tools and different methods that were used by each group to possibly explain the differences.
- Teachers need to avoid referring to a hypothesis as being right or wrong when forming a conclusion. Instead, guide students to articulate that a hypothesis is either supported or not supported by the evidence (data) gathered. My hypothesis was supported by the evidence I collected. I thought \_\_\_\_ would occur as a result of my experimentation. I now know \_\_\_\_\_. My hypothesis was not supported by the evidence I collected. I thought \_\_\_\_ would occur, but it did not. Instead my evidence supports \_\_\_\_\_).
- Science block offers students an opportunity to collect authentic data that could be accessed for instructional purposes during the Language Arts and Mathematics blocks as appropriate throughout the school year.

NGSSS BODY OF KNOWLEDGE: NATURE OF SCIENCE		PACING: Weeks 1 and 2	
BIG IDEA: Introduction to Practice of Science		August 13 – August 24	
Prerequisite Learning		Kindergarten – SC.K.N.1.1, SC.K.N.1.2, SC.K.N.1.3, SC.K.N.1.4, SC.K.N.1.5	
		First Grade – SC.1.N.1.1, SC.1.N.1.2, SC.1.N.1.3, SC.1.N.1.4, SC.1.E.5.3	
		Second Grade – SC.2.N.1.1, SC.2.N.1.2, SC.2.N.1.3, SC.2.N.1.4, SC.2.N.1.5, SC.2.N.1.6	
		Third Grade – SC.3.N.1.1, SC.3.N.1.2, SC.3.N.1.3, SC.3.N.1.4, SC.3.N.1.5, SC.3.N.1.6, SC.3.N.1.7	
Topic	Learning Targets/Skills	Benchmark	Academic Language
<b>Weeks 1-2</b> <b>Introduction to Science</b> This topic is continued on the next page.	<p><b>Note:</b> Learning Targets beginning with “review” indicate instruction from previous grades.</p> <p><i>Raise questions about the natural world, use appropriate reference materials that support understanding to obtain information (identifying the source), conduct both individual and team investigations through free exploration and systematic investigations and generate appropriate explanations based on those explorations.</i></p> <p><i>Recognize that science involves creativity in designing experiments.</i></p> <p><b>Students will:</b></p> <ul style="list-style-type: none"> <li>• <b>generate</b> a student-driven list of testable questions about the world that can be answered through observation and investigation.</li> <li>• <b>research</b> topics related to the questions they generate (e.g., internet, leveled-readers, non-fiction resources, newspaper).</li> <li>• <b>form</b> a hypothesis (a scientist’s thinking prior to investigation) based on research.</li> <li>• <b>investigate</b> student-generated questions, individually and in teams, through free exploration, experimentation (scientific method), or other types of investigations using appropriate science tools (metric measurement).</li> <li>• <b>form</b> conclusions based on data obtained during investigations.</li> <li>• <b>identify</b> any flaw(s) in the experimental design that may have affected the outcome.</li> </ul>	<p><b>SC.4.N.1.1</b> (DOS – Level 3)</p> <p><b>SC.4.N.1.8</b> (DOS – Level 3)</p>	<p><b>scientific method</b></p> <ul style="list-style-type: none"> <li>○ question</li> <li>○ research</li> <li>○ hypothesis</li> <li>○ experiment               <ul style="list-style-type: none"> <li>▪ materials</li> <li>▪ procedure</li> </ul> </li> <li>○ data</li> <li>○ results</li> <li>○ conclusion</li> </ul> <p><b>variable</b></p>
	<p><i>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.</i></p> <p><i>Explain that science focuses solely on the natural world.</i></p> <p><b>Students will:</b></p> <ul style="list-style-type: none"> <li>• <b>set up a science notebook</b> that will be used all year by students.</li> <li>• <b>explore</b> various fields of science realizing that not all scientists follow the scientific method for experimental investigations (e.g., biologist vs. paleontologist or astronomer vs. botanist).</li> <li>• <b>explain</b> the role of a scientist (ask questions and find answers based on evidence).</li> <li>• <b>explain</b> that science does involve the use of observations and evidence.</li> <li>• <b>define</b> science (study of the natural world through observation and evidence).</li> </ul>	<p><b>SC.4.N.1.3</b> (DOS – Level 3)</p> <p><b>SC.4.N.2.1</b> (DOS – Level 3)</p>	<p><b>evidence</b></p> <p><b>experiment</b></p> <p><b>investigation</b></p> <p><b>observation</b></p> <p><b>science</b></p> <p><b>science notebook</b></p> <p><b>scientific method</b></p> <p><b>scientist</b></p>

	<p><i>Keep records that describe observations made, carefully distinguishing actual observations from ideas and inferences about the observations.</i></p> <p><b>NOTE:</b> Begin recording observations of the moon’s visible shape for the next unit. <i>On August 19, 2019 begin daily observations of the moon’s progression towards a full moon.</i></p> <p><b>Students will:</b></p> <ul style="list-style-type: none"> <li>• <b>record</b> observations of an object and/or an event in a science notebook using a variety of data collection tools (e.g., diagrams, charts, graphs).</li> <li>• <b>make inferences</b> based on observations.</li> <li>• <b>distinguish</b> observations from inferences.</li> <li>• <b>communicate</b> observations and inferences with others in the classroom.</li> <li>• <b>critique</b> each other’s findings through engaging discussions.</li> </ul>	<p><b>SC.4.N.1.6</b> (DOS – Level 3)</p>	<p><b>chart/data table</b> <b>diagrams</b> <b>graph</b> <b>inference</b> <b>observation</b></p>
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**The first 2 weeks of instruction are meant to be an introduction to scientific thinking. These standards continue to be instructed throughout the year to be mastered by week 38.**

<p><b>Teacher Hints for “Introduction to Science”:</b></p> <ul style="list-style-type: none"> <li>• There is no unit of study for the Nature of Science standards, rather students are encouraged to engage in these standards throughout the school year.</li> <li>• Digital textbook resources can be accessed through V-Portal. Click the Curriculum Maps button on the Grade 4 Canvas home page for the Digital Programs Access information.</li> <li>• <i>The State Science Safety Manual (Animals in the Classroom Guidelines)</i> can be accessed at <a href="http://www.fldoe.org/contact-us/search.stml?q=Animal+in+the+Classroom">http://www.fldoe.org/contact-us/search.stml?q=Animal+in+the+Classroom</a>.</li> <li>• An interactive student notebook (ISN) is a compilation of student learning that provides a partial record of the instructional experiences a student has in the classroom. Some teachers use spiral-bound notebooks or composition books, while others use 3-ring binders to organize information. Since pages should not be taken out of the science notebook, careful consideration should be given to the type of notebook that is used.</li> </ul>
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# Teacher Notes

All curriculum resources can be found on the 4<sup>th</sup> Grade Science Canvas Site

NGSSS BODY OF KNOWLEDGE: NATURE OF SCIENCE/EARTH AND SPACE SCIENCE

BIG IDEA: Earth in Space and Time

PACING: Weeks 3-6

August 26 – September 20

Prerequisite Learning	Kindergarten – <u>SC.K.N.1.2, SC.K.N.1.4, SC.K.E.5.2, SC.K.E.5.3, SC.K.E.5.4</u> Second Grade – none	First Grade – <u>SC.1.N.1.2</u> Third Grade – <u>SC.3.N.3.2</u>	
Topic	Learning Targets/Skills	Benchmark	Academic Language
<p><b>Weeks 3-6</b></p> <p><b>Earth’s Patterns and Space</b></p> <p>This topic is continued on the next page.</p>	<p><i>Recognize that Earth revolves around the Sun in a year and rotates on its axis in a 24-hour day.</i></p> <p><b>Students will:</b></p> <ul style="list-style-type: none"> <li>• <b>use a model</b> to demonstrate the difference between Earth’s rotation and Earth’s revolution.</li> <li>• <b>explain</b> that Earth rotates once on its axis in approximately a 24-hour period (day and night).</li> <li>• <b>explain</b> that Earth revolves (orbits) around the sun once in a year (approximately 365 days).</li> </ul>	<p><b>SC.4.E.5.3</b> (DOS – Level 2) Embedded Nature of Science SC.4.N.1.1 SC.4.N.1.7 SC.4.N.3.1</p>	<p><b>Appear/apparent axis constellations day earth model</b></p> <ul style="list-style-type: none"> <li>○ 2-dimensional</li> <li>○ 3-dimensional</li> <li>○ mental</li> <li>○ computer</li> </ul>
	<p><i>Relate that the rotation of Earth (day and night) and apparent movements of the sun, moon, and stars are connected.</i></p> <p><b>Students will:</b></p> <ul style="list-style-type: none"> <li>• <b>review</b> that the sun is the closest star to Earth.</li> <li>• <b>explain</b> how the Earth’s movement causes the appearance of sun and star movement (tracking) across the sky.</li> <li>• <b>explain</b> that Earth’s rotation on its axis causes the sun/stars to appear as though they are moving across the sky.</li> </ul>	<p><b>SC.4.E.5.4</b> (DOS – Level 3)</p> <p>Embedded Nature of Science SC.4.N.1.1 SC.4.N.1.6 SC.4.N.3.1</p>	<p><b>night orbit revolution rotation seasons star pattern stars sun year</b></p>
	<p><i>Investigate and report the effects of space research and exploration on the economy and culture of Florida.</i></p> <p><b>Students will:</b></p> <ul style="list-style-type: none"> <li>• <b>read and discuss</b> how the effects of space research and exploration has created advances in science that have impacted the economy and culture of Florida (e.g., medical technology, transportation, agriculture, and industrial productivity).</li> <li>• <b>research</b> products that were generated specifically for space but have now found purpose for public use (e.g., freeze-dried food, memory foam, Velcro, Mylar blanket).</li> </ul>	<p><b>SC.4.E.5.5</b> (DOS – Level 3)</p> <p>Embedded Nature of Science SC.4.N.1.1</p>	

<p><b>Weeks 3-6</b></p> <p><b>Earth's Patterns and Space</b></p> <p>This topic is continued from the previous page AND continued on the next page.</p>	<p><i>Describe the changes in the observable shape of the moon over the course of about a month.</i></p> <p><b>Students will:</b></p> <ul style="list-style-type: none"> <li>• <b>recognize</b> that the moon does not produce its own light; it reflects light from the sun.</li> <li>• <b>recognize</b> that the moon revolves around (orbits) Earth in about 28 days as Earth revolves around (orbits) the sun.</li> <li>• <b>describe</b> the changes (patterns) that occur to the observable shape of the moon over the course of about a month that have been recorded in a science notebook.</li> <li>• <b>predict</b> the changes in the observable shape of the moon starting at any point in the cycle.</li> <li>• <b>sequence</b> moon patterns.</li> <li>• <b>compare</b> observable shapes of the moon.</li> <li>• <b>explain</b> that the moon's physical shape does not actually change.</li> <li>• <b>explain</b> that Earth's rotation on its axis causes the moon to appear as though it moves across the sky in the day or night sky.</li> </ul>	<p><b>SC.4.E.5.2</b> (DOS – Level 2)</p>   <p>Embedded Nature of Science SC.4.N.1.1 SC.4.N.1.7 SC.4.N.3.1</p>			
	<p><i>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.</i></p> <p><b>Students will:</b></p> <ul style="list-style-type: none"> <li>• <b>demonstrate</b> that the star patterns (constellations) in the sky appear to shift across the sky nightly due to Earth's rotation.</li> <li>• <b>discuss</b> how different star patterns are high in the night sky in some seasons but dip below the horizon in other seasons (e.g., use models/ simulations of winter and summer skyline).</li> </ul>	<p><b>SC.4.E.5.1</b> (DOS – Level 3)</p>   <p>Embedded Nature of Science SC.4.N.1.2 SC.4.N.1.6 SC.4.N.3.1</p>			
<b>04 VST 1A</b>		<b>Space Science</b>		<b>September 16 – September 20</b>	

**Teacher Hints for “Earth’s Patterns and Space”:**

- Apparent movements refer to the movement we perceive. This movement may not reflect what is actually happening.
- Star patterns appear to translate (slide) across the sky nightly (and from season to season) without changing their shape or distance from one another.
- Students may have the misconception that seasons are caused by the distance between the sun and the Earth, when it is the tilt of the Earth that causes seasons.
- Waxing, waning, gibbous, and crescent moon terminology will not be assessed on the 5<sup>th</sup> grade SSA.
- Mental models can be taught by reading a descriptive paragraph about something vague or unfamiliar. Students listen first while forming a picture in their minds of what is being described. Next, they create a 2- or 3-dimensional representation of what they pictured. Share and compare with a partner.
- Students will not be required to recognize or name constellations.
- National Space Day is the first Friday in May. Try to plan activities for your class/school to recognize this day and use it as a form of review.
- Use varied materials (video, books, visuals) to help students understand that star patterns appear to shift in the sky when in reality it is Earth’s movements that cause it to look that way. Have students choose one star to look at each night (e.g., North Star) to observe it as it appears to shift in the sky.
- A free planetarium for your computer can be found at <http://www.stellarium.org/>.
- Emphasize that the moon does not actually change shape but only appears to. We see different amounts of the part that reflects the sun.
- Students will be required to recognize the motion of rotation (the spinning of Earth or the moon on its axis) and revolution (one complete trip of Earth around the sun).
- The following website will be helpful in tracking the shapes of the moon in a science notebook: [www.stardate.org/nightsky/moon](http://www.stardate.org/nightsky/moon) and <http://www.moongiant.com/>.
- In addition to determining a missing observable shape of the moon within a given pattern, consider asking students to predict the observable shape that will occur in 1 week, 2 weeks, 3 weeks, and 4 weeks.
- Connections may be made in science to patterning activities done in mathematics. For example, pattern changes of objects/numbers can be compared to pattern changes in observable shapes of the moon and patterns of stars/constellations.
- The effects of space research and exploration on the economy and culture of Florida is an opportunity for integrating Social Studies and ELA.

# Teacher Notes

All curriculum resources can be found on the 4<sup>th</sup> Grade Science Canvas Site

NGSSS BODY OF KNOWLEDGE: NATURE OF SCIENCE/EARTH AND SPACE SCIENCE

PACING: Weeks 7-12

BIG IDEA: Earth's Structure

September 23 – November 1

Prerequisite Learning	Kindergarten – SC.K.N.1.2, SC.K.P.8.1 Second Grade – SC.2.E.6.1, SC.2.E.6.2, SC.2.E.6.3, SC.2.P.8.1	First Grade – SC.1.N.1.2, SC.1.E.6.1, SC.1.E.6.2, SC.1.E.6.3, SC.1.P.8.1 Third Grade – none	
Topic	Learning Targets/Skills	Benchmark	Academic Language
<p><b>Weeks 7-12</b></p> <p><b>Earth's Features</b></p> <p>This topic is continued on the next page.</p>	<p><i>Investigate how technology and tools help to extend the ability of humans to observe very small things and very large things.</i></p> <p><b>Students will:</b></p> <ul style="list-style-type: none"> <li>○ <b>discuss</b> the types of investigations in which a webcam, telescope, microscope, or hand lens might be used.</li> <li>○ <b>research</b> the histories of the microscope and telescope reporting on what is learned.</li> <li>○ <b>identify</b> the telescope and satellite as tools that have allowed scientists to see very large things, such as the Earth, the solar system, and parts of the universe.</li> </ul>	<p><b>SC.4.E.6.5</b> (DOS – Level 3)</p> <p>Embedded Nature of Science SC.4.N.1.1</p>	<p>microscope technology telescope</p>
	<p><i>Identify the three categories of rocks: igneous, (formed from molten rock); sedimentary (pieces of other rocks and fossilized organisms); and metamorphic (formed from heat and pressure).</i></p> <p><b>Students will:</b></p> <ul style="list-style-type: none"> <li>• <b>use</b> technology and tools to study and investigate samples of rocks.</li> <li>• <b>observe and identify</b> examples for each of the three categories of rocks (igneous, sedimentary, and metamorphic).</li> <li>• <b>construct</b> models for each of the three categories of rocks to include major details.</li> <li>• <b>explain</b>, pictorially and in words, the different ways rocks are formed.</li> <li>• <b>describe</b> how each category of rock is formed.             <ul style="list-style-type: none"> <li>○ igneous – formed from molten rock</li> <li>○ sedimentary – formed with other pieces of rock and fossilized organisms</li> <li>○ metamorphic – formed from heat and pressure</li> </ul> </li> <li>• <b>differentiate</b> between the three different categories of rocks based on how each is formed and/or their physical properties.</li> </ul>	<p><b>SC.4.E.6.1</b> (DOS – Level 1)</p> <p>Embedded Nature of Science SC.4.N.1.6</p>	<p><b>classify</b> <b>rocks</b></p> <ul style="list-style-type: none"> <li>○ igneous</li> <li>○ metamorphic</li> <li>○ sedimentary</li> </ul> <p><b>technology</b> <b>tools</b></p>

<p><b>Weeks 7-12</b></p> <p><b>Earth's Features</b></p>	<p><i>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.</i></p> <p><b>Students will:</b></p> <ul style="list-style-type: none"> <li>• <b>identify</b> the physical properties of common earth-forming minerals, including hardness, color, luster, cleavage, and streak color.</li> <li>• <b>Investigate and record</b> the physical properties of minerals using technology and tools when appropriate (for hardness you may use a glass plate or other minerals; for streak color you may use a streak plate or unglazed tile).</li> <li>• <b>explain</b> that investigations of minerals do not always follow the scientific method but do involve the use of observations and evidence.</li> <li>• <b>compare</b> observations made by other classmates explaining any differences in data.</li> <li>• <b>compare</b> minerals based on physical properties.</li> <li>• <b>explain</b> the role of minerals (clay, quartz, feldspar, calcite, talc, pyrite, graphite, and mica) and their importance in rock formation (i.e.: 2 or more minerals make up a rock).</li> </ul>	<p><b>SC.4.E.6.2</b> (DOS – Level 2)</p> <p>Embedded Nature of Science SC.4.N.3.1 SC.4.N.1.6</p>	<p><b>classify mineral properties</b></p> <ul style="list-style-type: none"> <li>○ color</li> <li>○ cleavage/fracture</li> <li>○ hardness</li> <li>○ luster</li> <li>○ streak</li> </ul> <p><b>rock</b></p>
<p>This topic is continued on the next page AND continued from the previous page.</p>	<p><i>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).</i></p> <p><b>Students will:</b></p> <ul style="list-style-type: none"> <li>• <b>observe and record</b> evidence of physical weathering in nature (e.g., plant roots growing up through a sidewalk, cement cracking from weather changes).</li> <li>• <b>describe</b> causes of physical weathering occurs (wind, water, ice, temperature change, and plants).</li> <li>• <b>investigate</b> the processes of physical weathering (breaking down a rock) using a model.</li> <li>• <b>observe and record</b> evidence of erosion in a science notebook.</li> <li>• <b>describe</b> causes of erosion (gravity, wind, water, and ice).</li> <li>• <b>investigate</b> the processes of erosion (movement of rock) using a model.</li> <li>• <b>discuss</b> the cause/effect relationships for erosion and weathering.</li> <li>• <b>provide</b> examples of how physical weathering and the erosion processes change Earth's surface (constructive and destructive).</li> <li>• <b>explain</b> pictorially and in words, the steps of the rock cycle.</li> <li>• <b>describe</b> how each category of rock is formed within the rock cycle. <ul style="list-style-type: none"> <li>○ igneous – formed from molten rock</li> <li>○ sedimentary – formed with other pieces of rock and fossilized organisms</li> <li>○ metamorphic – formed from heat and pressure</li> </ul> </li> </ul>	<p><b>SC.4.E.6.4</b> (DOS – Level 2)</p> <p>Embedded Nature of Science SC.4.N.1.1 SC.4.N.3.1</p>	<p><b>constructive erosion processes weathering</b></p> <ul style="list-style-type: none"> <li>○ physical</li> </ul>

<p><b>Weeks 7-12</b></p> <p><b>Earth's Features</b></p> <p>This topic is continued on the next page AND continued from the previous page.</p>	<p><i>Recognize that humans need resources found on Earth and that these are either renewable or nonrenewable.</i></p> <p><b>Students will:</b></p> <ul style="list-style-type: none"> <li>• <b>define</b> <i>resources</i> as anything from the environment that meets our needs and wants.</li> <li>• <b>provide</b> examples of renewable resources (e.g., water, wind, solar, trees).</li> <li>• <b>provide</b> examples of nonrenewable resources (rocks, minerals, soil, and fossil fuels such as coal, oil, natural gas).</li> <li>• <b>identify</b> renewable and nonrenewable resources found on Earth that humans need and how they are used.</li> <li>• <b>distinguish</b> between renewable and nonrenewable resources found on Earth.</li> <li>• <b>explain</b> that nonrenewable resources exist in a fixed quantity in Earth and may be used up.</li> </ul>	<p><b>SC.4.E.6.3</b> (DOS – Level 2)</p> <p>Embedded Nature of Science SC.4.N.1.5</p>	<p><b>fossil fuels</b> <b>limestone</b> <b>oil</b> <b>phosphate resources</b> -nonrenewable -renewable <b>silicon</b> <b>solar</b> <b>water</b> <b>wind</b></p>		
	<p><i>Identify resources available in Florida (water, phosphate, oil, limestone, silicon, wind, and solar energy).</i></p> <p><b>Students will:</b></p> <ul style="list-style-type: none"> <li>• <b>identify</b> natural resources available in Florida (water, phosphate, oil, limestone, silicon, wind, and solar energy).</li> <li>• <b>distinguish</b> Florida's natural resources as renewable (water, wind, solar, trees) and nonrenewable (phosphate, oil, limestone, silicon).</li> </ul>	<p><b>SC.4.E.6.6</b> (DOS – Level 1)</p> <p>Embedded Nature of Science SC.4.N.1.5</p>			
<b>04 VST 1B</b>		<b>Earth Science</b>		<b>October 28 – November 1</b>	

### Teacher Hints for “Earth’s Features”:

#### The following information pertains to the mineral portion of this topic:

- Students should have multiple experiences with the physical properties (hardness, color, luster, cleavage, and streak color) used to identify minerals.
- Students will not be responsible for identifying the Mohs scale or cleavage criteria.
- Students will not be responsible for identifying minerals but will be responsible for identifying a physical property from its description.
- Students will not be responsible for identifying minerals.
- Students should use a hand lens to observe the minerals that comprise rocks (e.g., granite contains quartz, feldspar, and mica). Page 247 in the Student Edition comments on this.
- The following minerals may be used on the SSA and the Volusia Science Tests: quartz, feldspar, mica, calcite, talc, pyrite, and graphite.
- Students should be provided with scenarios that include natural rocks representing the various mineral properties.

#### The following information pertains to the rock portion of this topic:

- Students will NOT be assessed on the Rock Cycle, only the types of rocks and the way the ways rocks are formed.
- Rocks constantly change from one type to another.
- Students will need to understand the formation of rocks. ([http://www.windows2universe.org/earth/geology/rocks\\_intro.html](http://www.windows2universe.org/earth/geology/rocks_intro.html)).
- Igneous rocks are formed when hot melted rock, called magma, cools (e.g., granite, lava rock).
- Sedimentary rocks are formed when pieces of other rocks and fossilized organisms are squeezed together (i.e., limestone, chalk).
- Metamorphic rocks are formed from extreme heat and extreme pressure (e.g., slate, marble).
- Students will not be responsible for memorizing names of rocks (e.g., granite, slate, quartzite). They will be responsible for identifying categories of rocks (igneous, sedimentary, and metamorphic) according to how they are formed.
- Use of videos and animations by students to observe and then explain how igneous, sedimentary, and metamorphic rocks are formed is encouraged.
- Locations of available rock/mineral resources found in Florida can be discovered at <http://www.dep.state.fl.us/geology/geologictopics/minerals.htm#Mine>. Information on this website can be referenced during the following Unit of Study (Renewable/Nonrenewable Resources) as well.

#### ***This will be the first time students will learn weathering/erosion concepts. These concepts will not be repeated prior to taking the SSA in grade 5.***

- Students will not be responsible for understanding chemical weathering.
- Since students continue to confuse erosion and weathering, these concepts should be taught as two separate concepts.
- Provide various examples of scenarios in which allow students to identify examples of surface changes in nature and identify the process that caused them utilizing conditions from natural weather phenomenon either on school grounds or from the media.
- Consider the social studies implications of local landforms and bodies of salt and fresh water and impact of these and other resources on local and state economy.
- Examples of renewable resources may include: fresh water, fresh air, forests, agriculture (plants and animals), oils from seeds, sun (solar energy), wind (wind energy- turbines), water (hydro-powered), geothermal (heat from earth’s interior), etc.
- Examples of nonrenewable resources may include: fossil fuels, uranium, minerals.
- Note that some examples of nonrenewable resources such as minerals (e.g., iron, copper, aluminum) or fossil fuels (i.e., petroleum, coal, natural gas), while continuously formed in nature, will eventually be depleted and cannot be utilized by current consumers.
- Common Experiment #1 is a good way to apply the weathering standard.
- **Common Experiment #1 integrates the Nature of Science standards into this unit. Common Experiment #1 is suggested during Week 11 of instruction. See Canvas for lesson plans and resources.**

# Teacher Notes

All curriculum resources can be found on the 4<sup>th</sup> Grade Science Canvas Site

**NGSSS BODY OF KNOWLEDGE: NATURE OF SCIENCE/PHYSICAL SCIENCE**

**BIG IDEA: Properties of Matter/Changes in Matter**

**PACING: Weeks 13-17  
November 4 – December 13**

Prerequisite Learning	Kindergarten – SC.K.P.8.1, SC.K.P.9.1, SC.K.P.13.1, SC.K.E.5.1 First Grade – SC.1.P.8.1, SC.1.P.13.1, SC.1.E.5.2, SC.1.E.5.3 Second Grade – SC.2.P.8.1, SC.2.P.8.2, SC.2.P.8.3, SC.2.P.8.4, SC.2.P.8.6, SC.2.P.9.1, SC.2.P.13.1, SC.2.P.13.2, SC.2.P.13.3, SC.2.P.13.4 Third Grade – SC.3.P.8.1, SC.3.P.8.2, SC.3.P.8.3, SC.3.P.9.1, SC.3.E.5.4
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Topic	Learning Targets/Skills	Benchmark	Academic Language
<p><b>Weeks 13-17</b></p> <p><b>Matter</b></p> <p>This topic is continued on the next page.</p>	<p><i>Measure and compare objects and materials based on their physical properties including: mass, shape, volume, color, hardness, texture, odor, taste, attraction to magnets.</i></p> <p><b>Students will:</b></p> <ul style="list-style-type: none"> <li>• <b>compare</b> objects based on observable and measurable physical properties (shape, color, hardness, texture, odor, taste, attraction to magnets, mass, volume, temperature).</li> <li>• <b>investigate and explain</b> that all matter has the following measurable properties: volume (takes up space) and mass (weight).</li> <li>• <b>record and compare</b> the mass and volume of solid and liquid matter using metric units.</li> <li>• <b>record and compare</b> the volume of regular- and irregular-shaped solids using the water displacement method.</li> <li>• <b>display</b> data appropriately in charts, tables, and graphs.</li> <li>• <b>compare</b> measurement data with other lab groups checking for accuracy.</li> <li>○ <b>explain</b> any differences that may have occurred across groups.</li> </ul>	<p><b>SC.4.P.8.1</b> (DOS – Level 2)</p> <p>Embedded Nature of Science SC.4.N.1.1 SC.4.N.1.2 SC.4.N.1.7</p>	<p><b>mass</b> <b>matter</b> <b>physical properties</b></p> <ul style="list-style-type: none"> <li>○ observable</li> <li>○ measurable</li> </ul> <p><b>temperature</b> <b>volume</b></p>
	<p><i>Investigate and describe that magnets can attract magnetic materials and attract and repel other magnets.</i></p> <p><b>Students will:</b></p> <ul style="list-style-type: none"> <li>• <b>investigate and classify</b> objects that are attracted to magnets (paper clips, iron filings, scissors) and those that are not (bottle, penny, copper wire, eraser, foil, nickel, steel).</li> <li>• <b>investigate</b> that all magnets, regardless of shape, have a north pole (N) and a south pole (S) although they may not be marked.</li> <li>• <b>investigate</b> the presence of a magnetic field with different-shaped magnets.</li> <li>• <b>describe</b> the effects of the magnetic field of different-shaped magnets using iron filings.</li> <li>• <b>investigate</b> how magnets attract and repel other magnets based on the presence of a magnetic field.</li> </ul>	<p><b>SC.4.P.8.4</b> (DOS – Level 3)</p> <p>Embedded Nature of Science SC.4.N.1.1 SC.4.N.1.4 SC.4.N.1.5 SC.4.N.1.6 SC.4.N.1.7 SC.4.N.1.8</p>	<p><b>attract</b> <b>magnet</b> <b>magnetic</b> <b>magnetic field</b> <b>north pole (N)</b> <b>repel</b> <b>south pole (S)</b></p>
	<p><i>Identify properties and common uses of water in each of its states.</i></p> <p><b>Students will:</b></p> <ul style="list-style-type: none"> <li>• <b>investigate and describe</b> properties of <u>water</u> in all three states.</li> <li>• <b>identify</b> common uses of <u>water</u> in all three states.</li> <li>• <b>explain</b> the importance of <u>water</u> to life on Earth.</li> </ul>	<p><b>SC.4.P.8.2</b> (DOS – Level 1)</p> <p>Embedded Nature of Science SC.4.N.1.1 SC.4.N.1.7</p>	<p><b>states of matter</b></p> <ul style="list-style-type: none"> <li>○ solid</li> <li>○ liquid</li> <li>○ gas</li> </ul>

<p><b>Weeks 13-17</b></p> <p><b>Matter</b></p> <p>This topic is continued from the previous page.</p>	<p><i>Explore the Law of Conservation of Mass by demonstrating that the mass of a whole object is always the same as the sum of the masses of its parts.</i></p> <p><b>Students will:</b></p> <ul style="list-style-type: none"> <li>• <b>explore</b> the Law of Conservation of Mass (whole = sum of its parts) to obtain the mass of various objects using tools and technology.</li> <li>• <b>demonstrate</b> that the mass of a whole object is always equal to the sum of its parts.</li> </ul>	<p><b>SC.4.P.8.3</b> (DOS – Level 2)</p> <p>Embedded Nature of Science SC.4.N.1.1</p>			
	<p><i>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.</i></p> <p><b>Students will:</b></p> <ul style="list-style-type: none"> <li>• <b>review</b> the physical changes of water. Include reasoning why water changes state.</li> <li>• <b>identify</b> familiar physical changes in matter in which the objects’ properties are retained (e.g., cutting, tearing, crumpling, folding, melting, freezing, dissolving).</li> <li>• <b>identify</b> familiar chemical changes in matter that result in a new substance with new properties (e.g., burning, frying, rusting, grilling, toasting, decaying plant and animal matter).</li> <li>• <b>record</b> observations of physical and chemical changes in a science notebook.</li> <li>• <b>make inferences</b> about observations made of physical and chemical changes</li> <li>• <b>describe</b> observable signs that a chemical change may exhibit (smell, color, heat, fizzing sound, and substance given off).</li> </ul>	<p><b>SC.4.P.9.1</b> (DOS – Level 1)</p> <p>Embedded Nature of Science SC.4.N.1.1 SC.4.N.1.3 SC.4.N.1.6</p>	<p><b>chemical change</b> <b>physical change</b></p>		
<b>04 VST 2A</b>		<b>Matter</b>		<b>December 9 – 13</b>	

**Teacher Hints for “Matter”:**

- Explore contact and non-contact forces with the use of various magnets.
- Since some magnets do not label the north and south poles, this is an opportunity to explore the properties of magnets.
- Magnetism is a property of matter. Magnets are tools that help to determine an object’s magnetic property.
- Students should be given a few objects to explore whether the objects are magnetic or are magnets themselves.
- Earth’s magnetism will not be assessed.
- Physical properties of matter are observable and measurable.
- Density is no longer instructed at the elementary level.
- Students should have a good working knowledge of mass/weight and volume and be presented with various situations in which mass and volume have to be calculated.
- Mass is the amount of matter in an object. Weight is the measure of the pull of gravity on an object. At this grade level, mass and weight may be used interchangeably on science assessments.
- Water displacement is a technique used to measure the volume of an object by calculating how much water it displaces (pushes aside) when placed into a sample of water.
- Students should comfortably make the following associations:

Property	Tool	Unit of Measure
Mass (weight)	balance, digital scale	g, kg
Volume	beaker, graduated cylinder	mL, L
Temperature	thermometer	°C, °F

- Although students have had exposure to physical changes in previous grade levels, this is their first exposure to chemical changes (e.g., when baking soda (solid) is mixed with vinegar (liquid), carbon dioxide (gas) is produced in the form of bubbles. Carbon dioxide has different properties than either baking soda or vinegar).
- Another example of a chemical change is: iron nails exposed to oxygen forms rust. Rust is a completely different substance than iron or oxygen.
- Students should make comparative observations between original matter and that which has undergone a change (e.g., a new iron nail and a rusted iron nail, a new candle and one that is burning, fresh and decaying leaves, bread that is not toasted and toasted) and engage in discussions to share their observations and listen to the thinking of their classmates.
- Common Experiment #2 is a great way to start the Energy and Motion unit of study.
- **Common Experiment #2 integrates the Nature of Science standards into this unit. Common Experiment #2 is suggested during Week 17 of instruction. See Canvas for lesson plans and resources.**

# Teacher Notes

All curriculum resources can be found on the 4<sup>th</sup> Grade Science Canvas Site

NGSSS BODY OF KNOWLEDGE: NATURE OF SCIENCE/PHYSICAL SCIENCE		PACING: Weeks 18-27	
BIG IDEA: Forms of Energy/Energy Transformations		December 16 – March 6	
Prerequisite Learning			
Kindergarten – SC.K.P.10.1, SC.K.P.12.1, SC.K.P.13.1		First Grade – SC.1.P.12.1, SC.1.P.13.1	
Second Grade – SC.2.P.10.1, SC.2.P.13.1, SC.2.P.13.4		Third Grade – SC.3.P.10.1, SC.3.P.10.2, SC.3.P.10.3, SC.3.P.10.4, SC.3.P.11.1, SC.3.P.11.2	
Topic	Learning Targets/Skills	Benchmark	Academic Language
<b>Weeks 18-27</b>  <b>Energy &amp; Motion AND Human Uses of Energy</b>  This topic is continued on the next page.	<i>Observe and describe some basic forms of energy, including light, heat, sound, electrical, and the energy of motion.</i>  <b>Students will:</b> <ul style="list-style-type: none"> <li>○ <b>review</b> how light travels in a straight path until interrupted by an object.</li> <li>○ <b>review</b> how light passes through other objects (transparent, translucent, opaque).</li> <li>○ <b>review</b> how light reflects, bends, and absorbs</li> <li>○ <b>observe and describe</b> some basic forms of energy, including light, heat, sound, electrical, and the energy of motion (mechanical).</li> <li>○ <b>identify</b> examples of these energy forms in their life and in the natural world.</li> <li>○ <b>compare and contrast</b> these types of energy.</li> </ul>	<b>SC.4.P.10.1</b> (DOS – Level 2)  Embedded Nature of Science SC.4.N.1.1 SC.4.N.1.3 SC.4.N.1.5 SC.4.N.1.7 SC.4.N.1.8 SC.4.N.3.1	<b>absorbs</b> <b>bends</b> <b>electrical</b> <b>energy</b> <b>heat</b> <b>light</b> <b>mechanical</b> <b>motion</b> <b>opaque</b> <b>reflects</b> <b>sound</b> <b>translucent</b> <b>transparent</b>
	<i>Investigate and describe that energy has the ability to cause motion or create change.</i>  <b>Students will:</b> <ul style="list-style-type: none"> <li>● <b>investigate and describe</b> how energy can cause motion (e.g., moving water can turn a water wheel to make hydropower, wind can move sand across the beach or sail a model boat, solar energy can power a model car).</li> <li>● <b>investigate and describe</b> how energy can create change in matter (e.g., heat energy can melt ice, moving water can make rocks smooth, light can keep food warm).</li> <li>● <b>explain</b> the relationship between energy and motion.</li> </ul>	<b>SC.4.P.10.2</b> (DOS – Level 2)  Embedded Nature of Science SC.4.N.1.1 SC.4.N.3.1 SC.4.N.1.5 SC.4.N.1.7 SC.4.N.1.8	<b>change</b> <b>energy</b> <b>hydropower</b> <b>motion</b> <b>solar</b> <b>water</b> <b>wind</b>
	<i>Investigate and explain that sound is produced by vibrating objects and that pitch depends on how fast or slow the object vibrates.</i>  <b>Students will:</b> <ul style="list-style-type: none"> <li>● <b>describe</b> the requirements/components necessary for sound to be produced.</li> <li>● <b>Investigate</b> the production of sound (e.g., tuning forks, hollow tubes, vocal cords, or water bottles filled with different amounts of water).</li> <li>● <b>explain</b> that sound is produced by vibrating objects.</li> <li>● <b>investigate</b> variations in pitch (e.g., water bottle liquids, rulers, straws, stretched rubber bands).</li> <li>● <b>explain</b> that pitch depends on the speed (fast and slow) an object vibrates and the measurements (size and length) of the object.</li> </ul>	<b>SC.4.P.10.3</b> (DOS – Level 3)  Embedded Nature of Science SC.4.N.1.1 SC.4.N.3.1 SC.4.N.1.7	<b>pitch</b> <b>pluck</b> <b>sound</b> <b>vibration</b>

<p><b>Weeks 18-27</b></p> <p><b>Energy &amp; Motion AND Human Uses of Energy</b></p> <p>This topic is continued from the previous page AND continued on the next page.</p>	<p><i>Recognize that an object in motion always changes its position and may change its direction.</i></p> <p><b>Students will:</b></p> <ul style="list-style-type: none"> <li>• <b>describe</b> an object’s position and motion in space.</li> <li>• <b>explain</b> that motion is a change of an object’s position.</li> <li>• <b>demonstrate</b> that moving objects <u>always</u> change position.</li> <li>• <b>demonstrate</b> that moving objects <u>may</u> change direction.</li> </ul> <p><b><i>STEM Lesson #1 addresses SC.4.P.12.1 while integrating Nature of Science standards.</i></b></p> <p><b><i>STEM Lesson #1 is suggested during Week 21 of instruction. See Canvas for lesson plans and resources.</i></b></p>	<p><b>SC.4.P.12.1</b> (DOS – Level 1)</p> <p>Embedded Nature of Science SC.4.N.1.1</p>	<p><b>direction</b> <b>distance</b> <b>motion</b> <b>position</b> <b>speed</b> <b>time</b></p>
	<p><i>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.</i></p> <p><b>Students will:</b></p> <ul style="list-style-type: none"> <li>• <b>explain</b> that the speed of an object is determined by the distance it travels within a unit of time.</li> <li>• <b>investigate and compare</b> the speeds of different objects by measuring the distance each object travels during a set amount of time using tools and technology.</li> <li>• <b>investigate and compare</b> the speeds of different objects by measuring the amount of time it takes each object to travel a set amount of distance using tools and technology.</li> <li>• <b>display</b> obtained speeds in chart, table and graph format.</li> </ul>	<p><b>SC.4.P.12.2</b> (DOS – Level 2)</p> <p>Embedded Nature of Science SC.4.N.1.1 SC.4.N.3.1 SC.4.N.1.7</p>	
	<p><i>Recognize that heat flows from a hot object to a cold object and that heat flow may cause materials to change temperature.</i></p> <p><b>Students will:</b></p> <ul style="list-style-type: none"> <li>• <b>investigate and diagram</b> the direction of heat flow (hot → cold).</li> <li>• <b>record observations</b> of heat transfer (in the form of temperature changes) within tables, charts, and graphs.</li> <li>• <b>analyze and form conclusions</b> based on their recorded observations and data.</li> </ul>	<p><b>SC.4.P.11.1</b> (DOS – Level 1)</p> <p>Embedded Nature of Science SC.4.N.1.1</p>	<p><b>conductor</b> <b>heat</b> <b>heat flow/transfer</b> <b>insulator</b> <b>temperature</b></p>
	<p><i>Identify common materials that conduct heat well or poorly.</i></p> <p><b>Students will:</b></p> <ul style="list-style-type: none"> <li>• <b>review</b> how things that give off light often give off heat.</li> <li>• <b>review</b> how heat is produced when two objects rub against each other.</li> <li>• <b>investigate</b> heat energy by measuring temperature changes in a liquid.</li> <li>• <b>compare</b> observations with classmates explaining any differences that occur.</li> <li>• <b>collect and record</b> temperature readings during investigations in charts, tables, and graphs.</li> <li>• <b>investigate</b> which materials are the best conductors of heat (e.g., clay, metal, and glass).</li> <li>• <b>investigate</b> which materials are non-conductors/insulators of heat (e.g., plastic, wood, Styrofoam).</li> <li>• <b>make inferences</b> about observations made during conductivity investigations.</li> <li>• <b>form</b> conclusions about which materials conduct heat well or poorly based on investigations.</li> </ul>	<p><b>SC.4.P.11.2</b> (DOS – Level 1)</p> <p>Embedded Nature of Science SC.4.N.1.1</p>	

<p><b>Weeks 18-27</b></p> <p><b>Energy &amp; Motion AND Human Uses of Energy</b></p> <p>This topic is continued from the previous page.</p>	<p><i>Describe how moving water and air are sources of energy and can be used to move things.</i></p> <p><b>Students will:</b></p> <ul style="list-style-type: none"> <li>• <b>investigate and describe</b> how energy can cause motion (e.g., moving water can turn a water wheel to make hydropower, wind can move sand across the beach or sail a model boat, solar energy can power a model car).</li> <li>• <b>investigate and describe</b> how energy can create change in matter (e.g., heat energy can melt ice, moving water can make rocks smooth, light can keep food warm).</li> <li>• <b>explain</b> the relationship between energy and motion.</li> </ul>	<p><b>SC.4.P.10.4</b> (DOS – Level 2)</p> <p>Embedded Nature of Science SC.4.N.1.1 SC.4.N.2.1 SC.4.N.3.1</p>	
<b>04 VST 2B</b>	<b>Energy</b>	<b>March 2 – March 6</b>	

<p><b>Teacher Hints for “Energy &amp; Motion AND Human Uses of Energy”:</b></p> <ul style="list-style-type: none"> <li>• Common Experiment #2 is a great way to start the Energy and Motion unit of study.</li> <li>• <b>Common Experiment #2 integrates the Nature of Science standards into this unit. Common Experiment #2 is suggested during Week 17 of instruction. See Canvas for lesson plans and resources.</b></li> <li>• Some additional examples of how energy causes motion and change are as follows: sun’s energy causes plants to grow, heat energy causes a volcano to erupt, and electrical energy causes a city to light up at night.</li> <li>• The Pearson Elevate textbook does not address the Fair Game standard - SC.4.P.12.1.</li> <li>• <b><u>The STEM Lesson #1 addresses SC.4.P.12.1 while integrating Nature of Science standards. STEM Lesson #1 is suggested during Week 21 of instruction. See Canvas for lesson plans and resources.</u></b></li> <li>• A change of position is called motion.</li> <li>• A change in motion means starting or stopping, speeding up or slowing down, or moving in a different direction.</li> <li>• Speed is a change in position over a period of time.</li> <li>• Temperature is a measure of heat energy. Ice water has heat energy. Try the following investigation: Take the temperature of ice water. Add more ice. Take the temperature again. Discuss the findings.</li> <li>• The NGSS do not contain insulators/insulation in the wording of the benchmark language. However, it does show up in the SSA Item Writer glossary making it fair game vocabulary. During heat conduction investigations, refer to objects as good or poor conductors of heat energy as well as conductors and insulators.</li> <li>• Allow students to experience simple conduction investigations placing a plastic, metal, and wooden spoon in hot water. Record observations.</li> <li>• In 3<sup>rd</sup> grade, students are expected to <i>identify</i> basic forms of energy. In 4<sup>th</sup> grade, students are expected to be able to <i>observe and describe</i> basic forms of energy.</li> <li>• Students will no longer need to know potential and kinetic energy.</li> <li>• The 4<sup>th</sup> grade sound energy standard (SC.4.P.10.4) is a Fair Game standard assessed in 5<sup>th</sup> grade.</li> <li>• Sound activities should focus on vibration and pitch. Students can make their own musical instruments to demonstrate knowledge of the sound standard.</li> <li>• Please note that resources such as ScienceSaurus will showcase several different forms of energy that students may recognize as examples in their life. Students only need to identify electrical sources but not explain how they work (This will be taught as a 5<sup>th</sup> grade benchmark).</li> <li>• Common Experiment #3 is a great way to apply how energy flows.</li> <li>• <b>Common Experiment #3 integrates the Nature of Science standards into this unit. Common Experiment #3 is suggested during Week 27 of instruction. See Canvas for lesson plans and resources.</b></li> </ul>
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# Teacher Notes

All curriculum resources can be found on the 4<sup>th</sup> Grade Science Canvas Site

NGSSS BODY OF KNOWLEDGE: NATURE OF SCIENCE/LIFE SCIENCE

PACING: Weeks 28-31

BIG IDEA: Heredity and Reproduction

March 9 – April 10

Prerequisite Learning	Kindergarten – SC.K.L.14.3 Second Grade – SC.2.L.17.1, SC.2.L.17.2	First Grade – SC.1.L.14.1, SC.1.L.14.2, SC.1.L.14.3, SC.1.L.16.1 Third Grade – SC.3.L.14.1, SC.3.L.14.2, SC.3.L.17.1	
Topic	Learning Targets/Skills	Benchmark	Academic Language
<p><b>Weeks 28-31</b></p> <p><b>Plants and Animals</b></p> <p>This topic is continued on the next page.</p>	<p><i>Identify processes of sexual reproduction in flowering plants, including pollination, fertilization (seed production), seed dispersal, and germination.</i></p> <p><b>Students will:</b></p> <ul style="list-style-type: none"> <li>• <b>identify</b> the reproductive structures of a flower and their functions.                             <ul style="list-style-type: none"> <li>○ stamen/anther (male parts) – makes pollen</li> <li>○ pistil/carpel (female parts) – produces ovules</li> <li>○ ovule – becomes a seed</li> <li>○ ovary – becomes a fruit</li> </ul> </li> <li>• <b>identify and describe</b> processes of reproduction (sexual) in flowering plants.                             <ul style="list-style-type: none"> <li>○ pollination – the transfer of pollen from the male parts (stamens) to the female parts (pistils) of a flower</li> <li>○ fertilization (seed production) – the joining of an egg cell and a sperm cell</li> <li>○ seed dispersal – the transport of seed from one location to another</li> <li>○ germination – the sprouting of a plant from a seed</li> </ul> </li> </ul>	<p><b>SC.4.L.16.1</b> (DOS – Level 2)</p> <p>Embedded Nature of Science SC.4.N.3.1</p>	<p>anther carpel fertilization function germination ovary ovule pistil plant responses pollination reproduction seed dispersal stamen structure</p>
	<p><i>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.</i></p> <p><b>Students will:</b></p> <ul style="list-style-type: none"> <li>• <b>review</b> that all living things have a life cycle.</li> <li>• <b>review</b> the ways plants can reproduce: flowering and non-flowering with cones and spores</li> <li>• <b>explore</b> life cycles of various plants found in Florida (e.g., orange tree, pine tree, hibiscus).</li> <li>• <b>diagram</b> the major stages in the life cycles of plants. (seed → seedling → mature plant → flower or cone).</li> <li>• <b>compare</b> the major stages in the life cycles of Florida plants, both flowering and nonflowering seed-bearing plants (e.g., daisies and pine trees).</li> <li>• <b>explore</b> life cycles of various animals living in Florida.</li> <li>• <b>describe</b> complete metamorphosis (4 stages) using animals that undergo this change (e.g., butterflies, frogs, flies, ants).</li> <li>• <b>describe</b> incomplete metamorphosis (3 stages) using animals that undergo this change (e.g., grasshoppers, cockroaches, dragonflies).</li> <li>• <b>compare and contrast</b> differences in body structures of the different stages (egg, larva, pupa, adult, nymph).</li> <li>• <b>differentiate</b> between the major stages in life cycles of Florida animals including, but not limited to, those that undergo incomplete and complete metamorphosis.</li> </ul>	<p><b>SC.4.L.16.4</b> (DOS – Level 2)</p> <p>Embedded Nature of Science SC.4.N.1.4 SC.4.N.3.1</p>	<p>adult egg flowering larva life cycle living metamorphosis - complete - incomplete non-flowering nymph pupa seed-bearing</p>

<p><b>Weeks 28-31</b></p> <p><b>Plants and Animals</b></p> <p>This topic is continued from the previous page.</p>	<p><i>Explain that although characteristics of plants and animals are inherited, some characteristics can be affected by the environment.</i></p> <p><b>Students will:</b></p> <ul style="list-style-type: none"> <li>• <b>explain</b> that some characteristics (traits) of plants are inherited by offspring from parents (e.g., type of plant, color of flower, leaf shape, size).</li> <li>• <b>explain</b> that some characteristics (traits) of plants are affected by the environment in both positive and negative ways (e.g., fires, humans, pollution).</li> <li>• <b>explain</b> that some characteristics (traits) of animals are inherited by offspring from parents (e.g., freckles, height, dimples, eye color).</li> <li>• <b>explain</b> that some characteristics (traits) of animals are learned/acquired by the environment (e.g., hair color and length, playing an instrument, reading).</li> <li>• <b>explain</b> that environmental factors such as climate, disease, light, temperature, predator-prey relationships, and food supply, can affect some characteristics of organisms.</li> </ul>	<p><b>SC.4.L.16.2</b> (DOS – Level 3)</p> <p>Embedded Nature of Science SC.4.N.1.5</p>	<p><b>acquired traits</b> <b>animal behaviors</b> <b>characteristics</b> <b>courtship</b> <b>grooming</b> <b>heredity</b> <b>inherited traits</b></p>
	<p><i>Recognize that animal behaviors may be shaped by heredity and learning.</i></p> <p><b>Students will:</b></p> <ul style="list-style-type: none"> <li>• <b>give examples</b> of how animal behaviors may be shaped by heredity or learning. <ul style="list-style-type: none"> <li>○ instinctive/inherited behaviors: hibernation, migration, hunting, protecting young, courtship, grooming, verbal communication, fighting, etc.</li> <li>○ learned behaviors: using tools, language, hunting, playing sports, writing, etc.</li> </ul> </li> <li>• <b>form conclusions</b> that many animal behaviors are a combination of both heredity and learning.</li> <li>• <b>differentiate</b> between learned/acquired behaviors and inherited/innate behaviors.</li> </ul>	<p><b>SC.4.L.16.3</b> (DOS – Level 3)</p> <p>Embedded Nature of Science SC.4.N.1.4</p>	<p><b>inherited behavior</b> <b>instincts</b> <b>learned behavior</b></p>

**Teacher Hints for “Plants and Animals”:**

- All living things have a life cycle (plants and animals).
- Items assessing the structures and functions of major parts of plants should be limited to the stem (nutrient transport and support), leaf/needle (food production), root (water and nutrient transport), flower (reproduction), seed (reproduction), and fruit (reproduction).
- Students need to understand and be exposed to the life cycles of various plant organisms (i.e., radishes, oak tree, grass).
- Many students confuse *dead* and *nonliving*. Something that is dead (a leaf that has fallen off of a tree) is considered living because it was once living. Something that is nonliving (metal and plastic) was never living.
- Germination and pollination are introduced in 3<sup>rd</sup> grade. Fertilization and seed dispersal are introduced in 4<sup>th</sup> grade.
- Additional information about the biology of plants can be found at <http://www.mbgnet.net/bioplants/main.html>.
- Caution: Germinating seeds in a window creates the misconception that seeds require light to grow.
- Students are to be comfortable with classifying animals into major groups according to physical characteristics and behaviors (e.g., mammals, birds, reptiles, amphibians, fish, or arthropods (insects, spiders, lobsters, shrimp, crab, crayfish); vertebrate or invertebrate; live birth or egg laying; scales, feathers, or fur).
- Students need to understand and be exposed to the life cycles of various animals (e.g., human, chicken, butterfly, frog).
- Students need to understand the difference between complete metamorphosis (development through four stages: egg, larva, pupa, adult) and incomplete metamorphosis (development through three stages: egg, nymph, adult).
- Some animals that go through complete metamorphosis are butterflies, bees, flies, and beetles. Some animals that go through incomplete metamorphosis are dragonflies, cockroaches, and grasshoppers.
- Additional incomplete/complete metamorphosis examples can be found at <http://www.mrsscienceteacher.com/Metamorphosis/Metamorphosis.html>.
- Stress with students that both humans and invertebrates are animals.
- The term *characteristics* should be used in conjunction with the term *traits*. For assessment purposes, the term *characteristics* will be used instead of the term *traits*.

# Teacher Notes

All curriculum resources can be found on the [4<sup>th</sup> Grade Science Canvas Site](#)

NGSSS BODY OF KNOWLEDGE: NATURE OF SCIENCE/LIFE SCIENCE

PACING: Weeks 32-38

BIG IDEA: Interdependence

April 13 – May 29

Prerequisite Learning	Kindergarten – none Second Grade – SC.2.L.17.1, SC.2.L.17.2	First Grade – SC.1.L.16.1, SC.1.L.17.1 Third Grade – SC.3.L.17.1, SC.3.L.17.2	
Topic	Learning Targets/Skills	Benchmark	Academic Language
<p><b>Weeks 32-38</b></p> <p><b>Living Things and the Environment</b></p> <p>This topic is continued on the next page.</p>	<p><i>Compare the seasonal changes in Florida plants and animals to those in other regions of the country.</i></p> <p><b>Students will:</b></p> <ul style="list-style-type: none"> <li>• <b>review</b> how plants respond to different stimuli (heat, light, and gravity).</li> <li>• <b>compare</b> ecosystems in Florida to ones found in other regions of the country (e.g., deciduous forest, ocean, grassland, wetland).</li> <li>• <b>discuss</b> environmental and biological triggers that initiate an organism’s response to seasonal change both in Florida and in different regions of the country (e.g., temperature, precipitation, dormancy, molting, breeding, camouflaging).</li> <li>• <b>differentiate</b> the seasonal changes of Florida plants to those in other regions of the country (e.g., dormancy, leaves changing color and falling off, flowering season).</li> <li>○ <b>differentiate</b> the seasonal changes of Florida animals to those in other regions of the country (e.g., color change, body covering change, hibernation, migration, camouflage).</li> </ul>	<p><b>SC.4.L.17.1</b> (DOS – Level 2)</p> <p>Embedded Nature of Science SC.4.N.1.1 SC.4.N.1.4 SC.4.N.1.7</p>	<p><b>dormancy</b> <b>hibernation</b> <b>migration</b> <b>seasonal changes</b></p>
	<p><i>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 to them.</i></p> <p><b>Students will:</b></p> <ul style="list-style-type: none"> <li>• <b>review</b> that all living things need energy to survive.</li> <li>• <b>explain</b> that plants make their own food (photosynthesis) and are called producers.</li> <li>• <b>explain</b> that animals, including humans, cannot make their own food and are called consumers.</li> <li>• <b>explain</b> that when animals eat plants or other animals, the energy stored in the food source is passed to them.</li> </ul>	<p><b>SC.4.L.17.2</b> (DOS – Level 2)</p> <p>Embedded Nature of Science SC.4.N.1.1</p>	<p><b>carnivore</b> <b>consumers</b> <b>flow of energy</b> <b>food chain</b> <b>herbivore</b> <b>omnivore</b> <b>producers</b></p>
	<p><i>Trace the flow of energy from the Sun as it is transferred along the food chain through the producers to the consumers.</i></p> <p><b>Students will:</b></p> <ul style="list-style-type: none"> <li>• <b>describe</b> that all life on Earth is dependent upon the sun.</li> <li>• <b>trace</b> the flow of energy from the sun as it is transferred along the food chain through the producers to the consumers (e.g., sun → grass → rabbit → fox).</li> <li>• <b>explain</b> that some energy is lost from one organism to the next in the form of heat.</li> <li>• <b>classify</b> consumers as herbivores, carnivores, or omnivores.</li> <li>• <b>describe</b> the relationship between plants as producers and animals as consumers.</li> </ul>	<p><b>SC.4.L.17.3</b> (DOS – Level 2)</p> <p>Embedded Nature of Science SC.4.N.1.1 SC.4.N.3.1</p>	

<p><b>Weeks 32-38</b></p> <p><b>Living Things and the Environment</b></p> <p>This topic is continued from the previous page.</p>	<p><i>Recognize ways plants and animals, including humans, can impact the environment.</i></p> <p><b>Students will:</b></p> <ul style="list-style-type: none"> <li>• <b>describe</b> the positive (helpful) and negative (harmful) impact plants may have on the environment. <ul style="list-style-type: none"> <li>○ positive – decor, medicine, oxygen, erosion control, food source</li> <li>○ negative – invasive species, poisonous plants, reduction in diversity</li> </ul> </li> <li>• <b>describe</b> the positive (helpful) and negative (harmful) impact animals may have on the environment. <ul style="list-style-type: none"> <li>○ positive – migration, predator-prey, pets, food source</li> <li>○ negative – overpopulation, poisonous/dangerous animals, destruction)</li> </ul> </li> <li>• <b>describe</b> ways that humans help and harm the environment. <ul style="list-style-type: none"> <li>○ positive – planting trees, gardening, protected areas (parks)</li> <li>○ negative – loss of habitat, excessive use of natural resources, pollution</li> </ul> </li> </ul>	<p><b>SC.4.L.17.4</b> (DOS – Level 3)</p> <p>Embedded Nature of Science SC.4.N.1.1</p>	<p><b>environment</b> <b>invasive species</b> <b>negative/harmful</b> <b>overpopulation</b> <b>positive/helpful</b> <b>predator</b> <b>prey</b></p>
<p><b>04 VST 3</b></p>	<p><b>Life Science</b></p>	<p><b>May 11 – May 29</b></p>	
<p><b>Teacher Hints for “Living things and The Environment”:</b></p> <ul style="list-style-type: none"> <li>• Compare seasonal changes of plants and animals in Florida with the seasonal changes in plants and animals from various regions of the United States.</li> <li>• Living organisms have regular patterns and routines that involve obtaining food and carrying out life history stages such as breeding, migrating, molting, and hibernating.</li> <li>• The acquisition, utilization, and storage of energy reserves (and other resources) are critical to lifetime reproductive success.</li> <li>• Plants and animals are adapted to survive and reproduce within the ever-changing environments.</li> <li>• Although photosynthesis is taught in 3<sup>rd</sup> grade, a review of this concept is recommended.</li> <li>• Students should understand that the arrows in a food chain diagram represent the direction in which energy is transferred (e.g., the sun’s energy is used by grass for photosynthesis. This energy is transferred to the rabbit when it eats the grass. The energy then transfers to the fox when it eats the rabbit.).</li> <li>• Decomposers are no longer part of the science curriculum in the elementary grades.</li> <li>• Food webs and food pyramids are no longer part of the science curriculum in the elementary grades.</li> <li>• It is recommended that human and animal discussions on the helpful and harmful impacts that each of on the environment be conducted separately.</li> <li>• <b>Common Experiment #4 integrates the Nature of Science standards into this unit. Common Experiment #4 is suggested during Week 37 of instruction. See Canvas for lesson plans and resources.</b></li> <li>• <b>The STEM Lesson #2 integrates Nature of Science standards. STEM Lesson #2 is suggested during Week 38 of instruction. See Canvas for lesson plans and resources.</b></li> </ul>			

# Teacher Notes

All curriculum resources can be found on the 4<sup>th</sup> Grade Science Canvas Site

# Science Process Skills: Basic and Integrated

## BASIC

**Observing:** using your senses to gather information about an object or event; a description of what is perceived; information that is qualitative data

**Measuring:** using standard measures or estimations to describe specific dimensions of an object or event; information considered to be quantitative data

**Inferring:** formulating assumptions or possible explanations based upon observations

**Classifying:** grouping or ordering objects or events into categories based upon characteristics or defined criteria

**Predicting:** guessing the most likely outcome of a future event based upon a pattern of evidence

**Communicating:** using words, symbols, or graphics to describe an object, action, or event

## INTEGRATED

**Formulating Hypotheses:** stating the proposed solutions or expected outcomes for experiments; proposed solutions to a problem must be testable

**Identifying Variables:** stating the changeable factors that can affect an experiment; important to change only the variable being tested and keep the rest constant

**Defining Variables:** explaining how to measure a variable in an experiment

**Designing Investigations:** designing an experiment by identifying materials and describing appropriate steps in a procedure to test a hypothesis

**Experimenting:** carrying out an experiment by carefully following directions of the procedure so the results can be verified by repeating the procedure several times

**Acquiring Data:** collecting qualitative and quantitative data as observations and measurements

**Organizing Data:** making data tables and graphs for data collected

**Analyzing Investigations:** interpreting data, identifying errors, evaluating the hypothesis, formulating conclusions, and recommending further testing when necessary

# MAKING CONNECTIONS

Health (NGSSS) / Language Arts (LAFS) / Mathematics (MAFS) / Technology (ISTE)

<p><b>HEALTH - HE.1.C.1.6</b></p>	<p><b>Students will:</b> Emphasize the correct names of human body parts.</p>
<p><b>LANGUAGE ARTS</b></p> <p>LAFS.1.RI.1.1</p> <p>LAFS.1.RI.2.4</p> <p>LAFS.1.RI.4.10</p> <p>LAFS.1.SL.1.1</p> <p>LAFS.1.W.3.8</p>	<p><b>Students will:</b></p> <p>Ask and answer questions about key details in a text.</p> <p>Ask and answer questions to help determine or clarify the meaning of words and phrases in a text.</p> <p>With prompting and support, read informational texts appropriately complex for grade 1.</p> <p>Participate in collaborative conversations with diverse partners about grade 1 topics and texts with peers and adults in small and larger groups.</p> <ol style="list-style-type: none"> <li>Follow agreed-upon rules for discussions (e.g., listening to others with care, speaking one at a time about the topics and texts under discussion).</li> <li>Build on others' talk in conversations by responding to the comments of others through multiple exchanges.</li> <li>Ask questions to clear up any confusion about the topics and texts under discussion.</li> </ol> <p>With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question.</p>
<p><b>MATHEMATICS</b></p> <p>MAFS.1.MD.1.a</p> <p>MAFS.1.MD.3.4</p>	<p><b>Students will:</b></p> <p>Understand how to use a ruler to measure length to the nearest inch.</p> <ol style="list-style-type: none"> <li>Recognize that the ruler is a tool that can be used to measure the attribute of length.</li> <li>Understand the importance of the zero point and end point and that the length measure is the span between two points.</li> <li>Recognize that the units marked on a ruler have equal length intervals and fit together with no gaps or overlaps. These equal interval distances can be counted to determine the overall length of an object.</li> </ol> <p>Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another.</p>
<p><b>TECHNOLOGY</b></p> <p>Creativity and innovation</p> <p>Communication and collaboration</p> <p>Research and informational fluency</p> <p>Critical thinking, problem solving, and decision making</p> <p>Digital Citizenship</p> <p>Technology operations and concepts</p>	<p><b>Students will:</b></p> <p>Demonstrate creative thinking, construct knowledge, and develop innovative products and processes using technology.</p> <p>Use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others.</p> <p>Apply digital tools to gather, evaluate, and use information.</p> <p>Use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.</p> <p>Understand human, cultural, and societal issues related to technology and practice legal and ethical behavior.</p> <p>Demonstrate a sound understanding of technology concepts, systems, and operations.</p>

# MAKING CONNECTIONS

## Standards for Mathematical Practice

### Students will:

#### **Make sense of problems and persevere in solving them. (SMP.1)**

Solving a mathematical problem involves making sense of what is known and applying a thoughtful and logical process which sometimes requires perseverance, flexibility, and a bit of ingenuity.

#### **Reason abstractly and quantitatively. (SMP.2)**

The concrete and the abstract can complement each other in the development of mathematical understanding: representing a concrete situation with symbols can make the solution process more efficient, while reverting to a concrete context can help make sense of abstract symbols.

#### **Construct viable arguments and critique the reasoning of others. (SMP.3)**

A well-crafted argument/critique requires a thoughtful and logical progression of mathematically sound statements and supporting evidence.

#### **Model with mathematics. (SMP.4)**

Many everyday problems can be solved by modeling the situation with mathematics.

#### **Use appropriate tools strategically. (SMP.5)**

Strategic choice and use of tools can increase reliability and precision of results, enhance arguments, and deepen mathematical understanding.

#### **Attend to precision. (SMP.6)**

Attending to precise detail increases reliability of mathematical results and minimizes miscommunication of mathematical explanations.

#### **Look for and make use of structure. (SMP.7)**

Recognizing a structure or pattern can be the key to solving a problem or making sense of a mathematical idea.

# GLOSSARY OF TERMS

**The Science Curriculum Map has been developed by teachers for ease of use during instructional planning. Terminology found within the framework of the curriculum map is defined below.**

**Next Generation Sunshine State Standards (NGSSS):** a set of content and process science standards that define with specificity what teachers should teach and students should know and be able to do; adopted by the Florida State Board of Education in 2008

**NGSSS Body of Knowledge:** the broadest organizational structure used to group content and concepts within the curriculum map and include the following: Nature of Science, Earth Science, Physical Science and Life Science (also known as *Reporting Category*)

**Big Idea:** an overarching organizational structure used to describe the scope of a selected group of benchmarks; *for example, The Characteristics of Science Knowledge, Earth Systems and Patterns, Forms of Energy, and Interdependence*

**Topic:** a grouping of standards, curriculum, and skills that form a subset of scientific concepts covered in each unit of study

**Lesson:** the division of course instruction

**Benchmark:** the required NGSSS expectations presented in the course descriptions posted on CPALMS by FLDOE

**Learning Targets/Skills:** the content knowledge, processes, and enabling skills that will ensure successful mastery of the standards

**Academic Language:** the content terminology and other vocabulary and phrases that support mastery of the learning targets and skills; for teacher- and student-use alike

**Prerequisite Learning:** the standards assigned to previous grade levels that support learning within the current grade level

**Pacing:** a recommended time frame for initial delivery of instruction and assessment in preparation for K-5 content that occurs on the grade 5 Statewide Science Assessment (SSA) including “fair game” content review

**Teacher Hints:** a listing of considerations when planning for instruction; may include suggestions or ideas for review  
Teacher Hints are available for each Topic on Canvas.

**Resource Alignment:** a listing of available, high quality and benchmark-aligned materials including: activities, strategies, lessons, websites, and videos from textbook and other media sources

All adopted and aligned resources may be accessed in Canvas under the Curriculum Resources button.

**Formative Assessment Strategies:** techniques that can be used before, during, and after instruction to evaluate student learning  
The Formative Assessment Strategies document may be accessed in Canvas under the Curriculum Maps and Instructional Tools button.

**The District Science Office recommends that all students engage in hands-on, minds-on science experiences DAILY.**