2018 - 2019

Second Grade
SCIENCE
Curriculum Map

Volusia County Schools

Next Generation Sunshine State Standards

Questions regarding use of this publication should be sent to the following:
Volusia County Schools Elementary Science Department
Becki Lucas
Elementary Science Specialist
rjlucas@volusia.k12.fl.us
DeLand, Florida

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, Life Science, Earth and Space Science, and Physical Science).

Second Grade Overview

Second Grade focuses instructional delivery for science within the following ten (10) Big Ideas/Standards:

Nature of Science
- Big Idea 1 – The Practice of Science

Earth and Space Science
- Big Idea 6 – Earth Structures
- Big Idea 7 – Earth Systems and Patterns

Physical Science
- Big Idea 8 – Properties of Matter
- Big Idea 9 – Changes in Matter
- Big Idea 10 – Forms of Energy
- Big Idea 13 – Forces and Changes in Motion

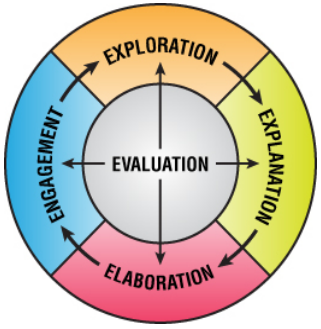
Life Science
- Big Idea 14 – Organization and Development of Living Organisms
- Big Idea 16 – Heredity and Reproduction
- Big Idea 17 – Interdependence

Second Grade
Instructional Scope and Sequence

Weeks of Instruction	Instructional Scope	Instructional Sequence	Body of Knowledge
Weeks 1 – 3	Introduction to Practice of Science	August 13 – August 31	Nature of Science
Weeks 4 – 7	Earth	September 4 – September 28	Earth and Space Science
Weeks 8 – 12	Weather	October 1 – November 2	
Weeks 13 – 18	Properties of Matter	November 5 – December 19	Physical Science
Weeks 19 – 23	Changes in Matter	January 7 – February 8	
Weeks 24 – 28	Energy & Motion	February 11 – March 14	
Weeks 29 – 35	Life	March 25 – May 10	Life Science
Weeks 36 – 37	Basic Needs	May 13 – May 24	
Weeks 38	Enrichment	May 27 – May 31	Nature of Science

Depth of Knowledge, Formative Assessment Strategies, and Digital Program Access documents are now available on the Science Canvas site under the Curriculum Maps button.

5E Learning Cycle: An Instructional Model

ENGAGEMENT	EXPLORATION	EXPLANATION	ELABORATION	EVALUATION
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. During the engagement phase, the teacher is on center stage.	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. During the exploration phase, the students come to center stage.	The explanation phase of the model is intended to grow students' understanding of the concept, process, or skill and its associated academic language. During the explanation phase, the teacher and students share center stage.	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. During the elaboration phase, the teacher and students share center stage.	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. During the evaluation phase, the teacher and students share center stage.
What does the teacher do? • **create** interest/curiosity • **raise** questions • **elicit** responses that uncover student thinking/prior knowledge (preview/process) • **remind** students of previously taught concepts that will play a role in new learning • **familiarize** students with the unit	**What does the teacher do?** • **provide** necessary materials/tools • **pose** a hands-on/minds-on problem for students to explore • **provide** time for students to "puzzle" through the problem • **encourage** students to work together • **observe** students while working • **ask** probing questions to redirect student thinking as needed	**What does the teacher do?** • **ask** for justification/clarification of newly acquired understanding • **use** a variety of instructional strategies • **use** common student experiences to: o develop academic language o explain the concept • **use** a variety of instructional strategies to grow understanding • **use** a variety of assessment strategies to gauge understanding	**What does the teacher do?** • **provide** new information that extends what has been learned • **provide** related ideas to explore • **pose** opportunities (examples and non-examples) to apply the concept in unique situations • **remind** students of alternate ways to solve problems • **encourage** students to persevere in solving problems	**What does the teacher do?** • **observe** students during all phases of the learning cycle • **assess** students' knowledge and skills • **look** for evidence that students are challenging their own thinking • **present** opportunities for students to assess their learning • **ask** open-ended questions: o What do you think? o What evidence do you have? o How would you explain it?
What does the student do? • **show** interest in the topic • **reflect and respond** to questions • **ask** self-reflection questions: o What do I already know? o What do I want to know? o How will I know I have learned the concept, process, or skill? • **make** connections to past learning experiences	**What does the student do?** • **manipulate** materials/tools to explore a problem • **work** with peers to make sense of the problem • **articulate** understanding of the problem to peers • **discuss** procedures for finding a solution to the problem • **listen** to the viewpoint of others	**What does the student do?** • **record** procedures taken towards the solution to the problem • **explain** the solution to a problem • **communicate** understanding of a concept orally and in writing • **critique** the solution of others • **comprehend** academic language and explanations of the concept provided by the teacher • **assess** own understanding through the practice of self-reflection	**What does the student do?** • **generate** interest in new learning • **explore** related concepts • **apply** thinking from previous learning and experiences • **interact** with peers to broaden one's thinking • **explain** using information and experiences accumulated so far	**What does the student do?** • **participate** actively in all phases of the learning cycle • **demonstrate** an understanding of the concept • **solve** problems • **evaluate** own progress • **answer** open-ended questions with precision • **ask** questions
Evaluation of Engagement The role of evaluation during the engagement phase is to gain access to students' thinking during the pre-assessment event/activity. Conceptions and misconceptions currently held by students are uncovered during this phase. These outcomes determine the concept, process, or skill to be explored in the next phase of the learning cycle.	**Evaluation of Exploration** 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. Strategies and procedures used by students during this phase are highlighted during explicit instruction in the next phase. The concept, process, or skill is formally explained in the next phase of the learning cycle.	**Evaluation of Explanation** The role of evaluation during the explanation phase is to determine the students' degree of fluency (accuracy and efficiency) when solving problems. Conceptual understanding, skill refinement, and vocabulary acquisition during this phase are enhanced through new explorations. The concept, process, or skill is elaborated in the next phase of the learning cycle.	**Evaluation of Elaboration** 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. Application of new knowledge in unique problem solving situations during this phase constructs a deeper and broader understanding. The concept, process, or skill has been and will be evaluated as part of all phases of the learning cycle.	

NGSSS BODY OF KNOWLEDGE: NATURE OF SCIENCE Unit of Study: Practice of Science			PACING: Weeks 1 – 3 August 13 – August 31
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**		
Topics	**Learning Targets/Skills**	**Benchmarks**	**Academic Language**
Week 1-3 **Science**	**Note:** Learning targets beginning with **"review"** indicate instruction from previous grades. *Explain how scientists alone or in groups are always investigating new ways to solve problems.* ***Students will:*** • **discuss** as a class their understanding of science (e.g., "What does science look like? Smell like? Feel like? Sound like? Taste like?...MAYBE"). • **develop** science notebooks that will be used all year long to document new learning that results from investigations (how scientists document their work in the real-world). • **explore** how science is used every day (e.g., sharpening a pencil, riding a bicycle, observing a dead bug, selecting food for energy) • **explore** different types of scientists (e.g., astronomer, botanist, meteorologist, doctor, archaeologist, chef, student, teacher, principal, mom, dad). • **explain** that scientists: o **solve** problems by first asking questions. o **work** alone or in groups to find dependable solutions to problems. o **seek** new solutions that are simpler, faster, and more efficient.	**SC.2.N.1.6**	**explore** **inquire** **problem** **question** **science** **science notebooks** **scientists** **senses** **solve**
Teacher Hints for "Science": • *The State Science Safety Manual (Animals in the Classroom Guidelines)* can be accessed at http://www.fldoe.org/contact-us/search.stml?q=Animal+in+the+Classroom. • Digital textbook resources can be accessed through V-Portal. See the 2nd Grade Science Canvas site for Digital Program Access information and resources. • Science is everything; everything is science. Science is all around us all the time. We are scientists every moment of our lives. • A science notebook is a compilation of student learning that provides a partial record of the instructional experiences a student has in the classroom. Stapled paper, composition books, spiral notebooks, or 3-ring binders could be used to organize student work.			
Weeks 1-3 **Science Tools** Teacher Hints for this topic are on the next page.	*Compare the observations made by different groups using the same tools.* ***Students will:*** • **know** that scientists use tools to collect information. • **explore** tools that are used to make more detailed observations (e.g., pan balance/scale, hand lens, thermometer, beaker, measuring cup, graduated cylinder, metric ruler, magnet, stopwatch, tape measure). • **record** observations and measurements of objects/substances using the same scientific tools while working in teams. • **compare** observations and measurements with other teams. • **discuss** differences in observations and measurements that may have occurred and why results of teams are not always exactly the same. • **match** scientific tools to their use and corresponding units of measure (metric).	**SC.2.N.1.2** Embedded Nature of Science SC.2.N.1.6	**centimeter/meter** **gram** **length** **measurement** (metric) **observation** **scientific tools** o beaker o graduated cylinder o hand lens o magnet o measuring cup o meter stick o pan balance o ruler (metric) o scale o stopwatch o tape measure o thermometer **temperature** **weight**

<table>
<tr><td colspan="4">Teacher Hints for “Science Tools”:
Students will have some experience with scientific tools. This year is spent developing proficient use of scientific tools to improve accuracy.
Linear measurement (inches and centimeters) has been introduced in previous years.
Expose students to tools as they are used. Students should not be required to memorize a list of scientific tools by the end of week 3.</td></tr>
<tr><td>Week 1-3

Inquiry Skills</td><td>Raise questions about the natural world, investigate them in teams through free exploration and systematic observations, and generate appropriate explanations based on those explorations.

Distinguish between empirical observation (what you see, hear, feel, smell, or taste) and ideas or inferences (what you think).

Students will:
generate questions about the world around them.
predict what may happen prior to engaging in an exploration activity based on one of their questions.
record data in the form of observations using the five senses during the activity in a science notebook.
record data in the form of measurements using science tools (e.g., beakers, graduated cylinders, rulers, thermometers) made during the activity in a science notebook.
make inferences (assumptions or possible explanations) using observable and measureable data collected during the exploration activity.
distinguish between observations and inferences that have been recorded in a science notebook during the exploration activity.</td><td>SC.2.N.1.1

SC.2.N.1.5

Embedded
Nature of Science
SC.2.N.1.2
SC.2.N.1.6</td><td>classify
collect
compare
data
draw
estimate
infer
inference
inquiry
measure
model
predict
record
sort</td></tr>
<tr><td colspan="4">Teacher Hints for “Inquiry Skills”:
Refer to page 29 in the Grade 2 Science Curriculum Map for an explanation of basic and integrated science process skills.
Consider using pictures to instruct the difference between an observation and an inference prior to engaging in an exploration activity.
Be creative when selecting an exploration activity (e.g., display unfamiliar objects/pictures, take a nature walk, sort a collection of objects).
In Grade 2, students will begin transitioning from customary units of measure (inches) to metric units of measure (centimeters, meters, and grams).
An enrichment opportunity for a class discussion would be to have students discuss and explain why is it more likely for an inference to be wrong than an observation (although it is possible for both to be wrong).</td></tr>
<tr><td>Week 1-3

Scientific Methods

This topic is continued on the next page.</td><td>Raise questions about the natural world, investigate them in teams through free exploration and systematic observations, and generate appropriate explanations based on those explorations.

Ask “how do you know?” in appropriate situations and attempt reasonable answers when asked the same question by others.

Students will:
raise questions about the world around them (e.g., “I wonder how…, I wonder what…, I wonder why…, I wonder if…”).
research a topic using a variety of resources to find answers to questions.
form a hypothesis about any of the “I wonder” questions.
investigate a problem alone or in teams using appropriate scientific tools.
record observations made during an investigation that includes at least 5 trials.
generate an explanation based on the results of an investigation.
ask “how do you know?” after listening to another student’s explanation of something observed during a scientific activity or investigation.
answer “how do you know” questions by providing details from recorded observations.</td><td>SC.2.N.1.1

SC.2.N.1.3

Embedded
Nature of Science
SC.2.N.1.2
SC.2.N.1.5
SC.2.N.1.6</td><td>conclusion
data
explanation
explore
hypothesis
investigate
question
record
results
scientific method
trials</td></tr>
</table>

Week 1-3 **Scientific Methods**	*Explain how particular scientific investigations should yield similar conclusions when repeated.* ***Students will:*** • **compare** the results of each trial that has been conducted during an investigation. • **discuss** why differences and similarities sometimes occur. • **explain** that scientific investigations should yield similar conclusions when repeated. **Please note: Teachers may wish to begin growing plants in various types of soil for the next unit of study.**	**SC.2.N.1.4** Embedded Nature of Science SC.2.N.1.1 SC.2.N.1.2 SC.2.N.1.3 SC.2.N.1.5 SC.2.N.1.6	**repeated trials**

Teacher Hints for "Scientific Methods":

- Design a class investigation, collect data, and find results. This can happen several times throughout the school year, and not just within the first three weeks of school.
- Teachers may want to direct students' thinking to begin understanding why multiple trials are important to the experimental process (similar results increase reliability of data).
- When an investigation yields similar results, it does not mean that the results will be exactly the same for each trial. Results are considered similar when an acceptable range of data has been recorded for multiple trials conducted in the same manner.
- Developing a class investigation to share with others in the school is a great way to show that scientists communicate their results with other scienitsts.

The first 3 weeks of instruction are meant to be an introduction to science. Students are NOT expected to MASTER the Nature of Science standards during these 3 weeks. These standards continue to be instructed throughout the year to be mastered by week 38.

Teacher Notes

All optional curriculum resources can be found on the 2nd Grade Science Canvas Site

NGSSS BODY OF KNOWLEDGE: NATURE OF SCIENCE/EARTH AND SPACE SCIENCE Unit of Study: Earth			PACING: Weeks 4 – 7 September 4 – September 28
Prerequisite Learning	**Kindergarten – SC.K.P.8.1** **First Grade – SC.1.E.6.1, SC.1.E.6.3, SC.1.P.8.1**		
Topics	**Learning Targets/Skills**	**Benchmarks**	**Academic Language**
Weeks 4-7 **Rocks/Soil**	*Recognize that Earth is made up of rocks. Rocks come in many sizes and shapes.* ***Students will:*** • **observe** rocks using a hand lens. • **sort** rocks by observable traits (size, shape, color, texture) and measurable traits (weight/mass). • **record** data (observations and measurements) of rocks in their science notebooks. • **compare** observations as a group. • **discuss** the many uses of rocks (e.g., tile countertops, aquarium, jewelry, seawall). • **explain** how they know that Earth is made up of rocks.	**SC.2.E.6.1** Embedded Nature of Science SC.2.N.1.1 SC.2.N.1.2 SC.3.N.1.3	**boulders** **color** **Earth** **pebbles** **rocks** **shape** **size** **texture** **weight**
	Describe how small pieces of rock and dead plant and animal parts can be the basis of soil and explain the process by which soil is formed. ***Students will:*** • **record** observations of soil found on school campus as seen through a hand lens. • **compare** observations of soil made by different groups using the same tools. • **explain** the basis of soil composition (small pieces of rock/dead plant and animal parts). • **explain** how soil is formed (weathering of rock and the decomposition of dead plant and animal remains).	**SC.2.E.6.2** Embedded Nature of Science SC.2.N.1.2 SC.2.N.1.3	**clay** **decay** **humus** **sand** **soil** **weathering**
	Classify soil types based on color, texture (size of particles), the ability to retain water, and the ability to support the growth of plants. ***Students will:*** • **sort and classify** soil types (clay, sand, silt, and humus) based on color, texture, and size of particles. • **investigate** alone and/or in groups the ability of different soils to hold water. • **investigate** which soil types best support plant growth. • **record** observations and measurements collected during the soil investigation. • **compare** findings with classmates and record changes in thinking after listening to the ideas of classmates.	**SC.2.E.6.3** Embedded Nature of Science SC.2.N.1.1 SC.2.N.1.2 SC.2.N.1.4 SC.2.N.1.6	

Teacher Hints for "Rocks/Soil":

- Teachers should take the opportunity to discuss the vocabulary of physical properties (size, shape, color, texture) and how they relate to rocks and soil.
- Students do not need to know the three types of rock (igneous, sedimentary, and metamorphic). They only need to be able to describe different rocks and discuss how they differ.
- Following a comparison of rock observations with peers, students should be encouraged to re-evaluate their initial observations after listening to the thinking of their classmates. Students should be given the opportunity to make changes to their recorded observations in their student notebook.
- Rock weathers to make soil along with decaying plant and animal matter (http://www.geography4kids.com/files/land_soil2.htm.).
- Discussing composting is acceptable at this time. Caution: Compost contains bacteria that should NOT be handled by students.

Teacher Notes

All optional curriculum resources can be found on the 2nd Grade Science Canvas Site

NGSSS BODY OF KNOWLEDGE: NATURE OF SCIENCE/EARTH AND SPACE SCIENCE/PHYSICAL SCIENCE Unit of Study: Weather			PACING: Weeks 8 – 12 October 1 – November 2
Prerequisite Learning	**Kindergarten – none** **First Grade – none**		
Topics	**Learning Targets/Skills**	**Benchmarks**	**Academic Language**
Weeks 8-9 **Weather Patterns**	*Compare and describe changing patterns in nature that repeat themselves, such as weather conditions including temperature and precipitation, day to day and season to season.* *Measure and compare temperatures taken every day at the same time.* ***Students will:*** • **discuss** what weather is and how weather changes. • **explain** that a weather pattern occurs day to day. • **predict and record** a description of weather conditions each day for two weeks (e.g., hot, cold, windy, sunny, cloudy) • **predict and record** measurements of air temperature (thermometer) and precipitation (rain gauge) every day at the same time in science notebooks. • **compare** predictions of weather to actual results. • **organize** measurements in appropriate data displays (e.g., data tables, graphs). • **discuss** findings in small groups and as a class.	**SC.2.E.7.1** **SC.2.P.8.5** Embedded Nature of Science SC.2.N.1.1 SC.2.N.1.2 SC.2.N.1.6	**Celsius (ºC)** **Fahrenheit (ºF)** **fall** **precipitation** **rain gauge** **rainfall** **seasons** **spring** **summer** **temperature** **thermometer** **weather** **weather patterns** **winter**
	Students will: • **discuss and explain** what seasons are. • **sequence** seasons, using pictures, in the order they occur starting at any point in the cycle. • **sequence** seasons according to temperature. o coldest to hottest - winter, fall, spring, summer o hottest to coldest – summer, spring, fall, winter • **explain** that a weather pattern also occurs season to season.		
Teacher Hints for "Weather Patterns": • Temperature is a measure of how hot or cold something is. A thermometer is the tool that is typically used to measure temperature. • Precipitation is the form of water that falls from the sky (rain, snow, sleet, and hail). A rain gauge is the tool that is typically used to measure precipitation.			

<table>
<tr><td rowspan="2">Weeks 10-11

Sun’s Energy</td><td>Investigate by observing and measuring, that the Sun’s energy directly and indirectly warms the water, land, and air.

Students will:
investigate that heat from the sun causes an increase in temperature.
discuss and explain that more direct exposure to the sun causes a greater increase in temperature.
Investigate and record patterns of change as the sun directly and indirectly heats land (soil), air, and water.
direct – placing objects in sun’s direct rays
indirect – placing objects in containers that are not in sun’s direct rays (e.g., hot dog in a solar oven, chocolate in a paper bag, crayons in a pencil box, air in a sealed jar, vegetable oil in a plastic bag)
compare results with their peers.
answer “how do you know” questions to communicate own thinking.
ask “how do you know” questions to understanding peers’ thinking.</td><td>SC.2.E.7.2

Embedded
Nature of Science
SC.2.N.1.1
SC.2.N.1.2
SC.2.N.1.3
SC.2.N.1.4</td><td rowspan="2">air
disappear
evaporate
evaporation
land
liquid
sun’s energy
water
water vapor</td></tr>
<tr><td>Investigate, observe and describe how water left in an open container disappears (evaporates), but water in a closed container does not disappear (evaporate).

Students will:
investigate and record how water left in an open container seems to disappear (evaporate) and water in a closed container does not disappear (evaporate).
compare the results of the two investigations.
discuss the impact sun’s energy plays in evaporation.
explain that air/water are in constant motion as water changes from a liquid to water vapor.</td><td>SC.2.E.7.3

Embedded
Nature of Science
SC.2.N.1.1
SC.2.N.1.5</td></tr>
<tr><td colspan="4">Teacher Hints for “Sun’s Energy”:
Evaporation in an open system can be measured by tracking a change in volume or mass of water in a container.
Evaporation in a closed system is difficult to observe. We see evidence of evaporation occurring when we see tiny water droplets appear on the sides of the container. While this is actually the process of condensation, evaporation must have occurred in order for that to show up.
<u>The water cycle is not taught at this grade level.</u></td></tr>
<tr><td>Week 12

Wind/
Severe Weather

This topic is continued on the next page.</td><td>Investigate that air is all around us and that moving air is wind.

Students will:
explain that air is all around us even though it cannot be seen.
observe that air takes up space and has weight.
define wind as moving air.
investigate the effects of wind on various objects (e.g., leaves, pinwheels, sand, sailboats).
identify ways wind can be harnessed for human use (e.g., windmills, hand-held fans).
explain that wind can be a source of great power and can cause damage and dangerous storms (e.g., hurricane, tornado).</td><td>SC.2.E.7.4

Embedded
Nature of Science
SC.2.N.1.1
SC.2.N.1.6</td><td>air
wind</td></tr>
</table>

Week 12 **Wind/ Severe Weather** This topic is continued from the previous page.	*State the importance of preparing for severe weather, lightning, and other weather-related events.* ***Students will:*** • **identify and describe** severe conditions such as hail, lightning, floods, and fires associated with severe weather events specific to this area (e.g., thunderstorms, tornadoes, hurricanes). • **discuss** the procedures the school has in place to prepare students and staff for severe weather events (e.g., Code Green). • **discuss** the importance of having a plan at home and in the classroom for severe weather. • **generate** a list of items that would be good to have in a home or classroom emergency kit, making comparisons between them (e.g., water, food, bandages, flashlights, batteries).	**SC.2.E.7.5** Embedded Nature of Science SC.2.N.1.1 SC.2.N.1.3 SC.2.N.1.6	**blizzard** **hail** **hurricane/monsoon** **lightning** **severe weather** **snowstorm** **thunderstorm** **tornado**
Teacher Hints for "Wind/Severe Weather": • Weather tracking information can be found at www.noaa.org.			

Teacher Notes

All optional curriculum resources can be found on the 2nd Grade Science Canvas Site

NGSSS BODY OF KNOWLEDGE: NATURE OF SCIENCE/PHYSICAL SCIENCE Unit of Study: Properties of Matter			PACING: Weeks 13 – 18 November 5 – December 19
Prerequisite Learning	**Kindergarten – SC.K.P.8.1** **First Grade – SC.1.E.5.3, SC.1.E.6.1, SC.1.P.8.1**		
Topics	**Learning Targets/Skills**	**Benchmarks**	**Academic Language**
Weeks 13-18 **Properties of Matter**	*Observe and measure objects in terms of their properties, including size, shape, color, temperature, weight, texture, sinking or floating in water, and attraction and repulsion of magnets.* ***Students will:*** • **describe and record** an object's physical properties – observable and measurable characteristics (e.g., size, shape, color, texture, temperature, weight, length) in a science notebook. • **explain** that objects/substances are known as matter. • **discuss** that matter is anything that has weight and takes up space. • **measure and compare** the length of objects (matter) using a metric ruler. • **measure and compare** the weight of objects (matter) using a balance. • **measure and compare** the temperature of matter (solids, liquids, and gases) using a thermometer. • **predict and investigate** whether various objects will sink or float in water. • **draw conclusions** about objects that sink and objects that float. • **investigate** the effect a magnet has on magnetic (including other magnets) and non-magnetic objects (push/repel, pull/attract, no effect). • **compare** their data with other groups' findings.	**SC.2.P.8.1** Embedded Nature of Science SC.2.N.1.1 SC.2.N.1.2 SC.2.N.1.4 SC.2.N.1.6 Embedded Physical Science SC.2.P.8.5	**attract** **centimeter** **Fahrenheit (ºF)** **float** **gram** **length** **magnets** **matter** **measure** **meter** **physical property** **pull** **push** **repel** **sink** **temperature** **texture** **thermometer** **weight**
Teacher Hints for "Properties of Matter": • As an extension to sink/float activities, consider measuring sink/float by timing how long it takes different objects to sink in different liquids. • Grade 2 students are expected to use standard units of metric measure (centimeters and meters) at this time.			

Teacher Notes

All optional curriculum resources can be found on the 2nd Grade Science Canvas Site

NGSSS BODY OF KNOWLEDGE: NATURE OF SCIENCE/PHYSICAL SCIENCE Unit of Study: Changes in Matter			PACING: Weeks 19 – 23 January 7 – February 8
Prerequisite Learning	**Kindergarten – SC.K.P.8.1, SC.K.P.9.1** **First Grade – SC.1.E.5.3, SC.1.P.8.1**		
Topics	**Learning Targets/Skills**	**Benchmarks**	**Academic Language**
Weeks 19-21 **States of Matter**	*Identify objects and materials as solid, liquid, or gas.* ***Students will:*** • **sort** objects (matter) and materials into three categories (solid, liquid or gas) based on similar physical characteristics. • **explain** the reasons objects/materials were put into each category. • **explain** that scientists classify things into groups according to common or similar properties (characteristics).	**SC.2.P.8.2** Embedded Nature of Science SC.2.N.1.3	**boiling** **cooling** **definite shape** **evaporation** **freezing** **gas** **heating** **liquid** **solid** **water vapor**
	Recognize that solids have a definite shape and that liquids and gases take the shape of their container. ***Students will:*** • **explain** that one physical characteristic of a solid is that it has a definite shape. • **investigate** how the shape of a solid can be changed by applying energy or a force to it (e.g., fold, cut, hammer, slice, twist, heat). • **explain** that one physical characteristic of a liquid is that it takes the shape of its container. • **investigate** how a liquid flows from one place to another when it is not contained. • **explain** that one physical characteristic of a gas is that it takes the shape of its container. • **compare** any two forms of matter.	**SC.2.P.8.3** Embedded Nature of Science SC.2.N.1.1	
	Observe and describe water in its solid, liquid, and gaseous states. ***Students will:*** • **observe and describe** water in its solid, liquid and gaseous state. • **investigate** how a change in temperature changes the physical properties of water (heating, cooling, freezing, boiling, melting, evaporating). • **explain** that water is still water even when it changes from a solid to a liquid to a gas and vice versa.	**SC.2.P.8.4** Embedded Nature of Science SC.2.N.1.1 Embedded Earth Science SC.2.E.7.3	
Teacher Hints for "States of Matter": • Students do not need to know about the particle arrangement of each state of matter.			

Week 22 **Volume**	*Measure and compare the volume of liquids using containers of various shapes and sizes.* ***Students will:*** • **define** volume as the amount of space a substance (solid, liquid, or gas) takes up. • **recognize** volume as a physical characteristic of all forms of matter (solid, liquid, gas) that can be measured. • **measure** the volume of liquids using a variety of scientific tools (e.g., beakers, graduated cylinders). • **compare** equal volumes of liquids using containers of various shapes and sizes. • **discuss** how the shape of a liquid may change when placed in different containers even though the volume of the liquid does not.	**SC.2.P.8.6** Embedded Nature of Science SC.2.N.1.1 SC.2.N.1.2	**beaker** **graduated cylinder** **measuring cup** **measuring spoon** **volume**
Teacher Hints for "Volume": • Volume is another measurable property of matter. It is introduced here in conjunction with learning about the states of matter. All matter has weight (mass) and takes up space (volume). • Foldables, Thinking Maps®, and other graphic organizers are great tools to use when helping students organize their thinking on this topic.			
Weeks 23 **Changes in Matter**	*Investigate that materials can be altered to change some of their properties, but not all materials respond the same way to any one alteration.* ***Students will:*** • **investigate** ways to change solid and liquid materials (e.g., cut, break, bend, cook, tear, freeze, melt, burn, soak, dissolve, evaporate, heat, rust). • **explain** that not all materials change the same way when undergoing the same change.	**SC.2.P.9.1** Embedded Nature of Science SC.2.N.1.1	**burn** **change** **dissolve** **evaporate** **freeze** **heat** **melt** **rust**
Teacher Hints for "Changes in Matter": • At this grade level, students do not need grapple with differentiating between physical and chemical changes. The expectation is that students are able to make observations of changes and communicate their observations clearly and efficiently with their teacher and classmates. • Water is an example of matter that can exist as a solid, liquid, or gas.			

Teacher Notes

All optional curriculum resources can be found on the 2nd Grade Science Canvas Site

NGSSS BODY OF KNOWLEDGE: NATURE OF SCIENCE/PHYSICAL SCIENCE Unit of Study: Energy & Motion			PACING: Weeks 24 – 28 February 11 – March 14
Prerequisite Learning	**Kindergarten – SC.K.E.5.1, SC.K.P.10.1, SC.K.P.12.1, SC.K.P.13.1** **First Grade – SC.1.E.5.2, SC.1.P.12.1, SC.1.P.13.1**		
Topics	**Learning Targets/Skills**	**Benchmarks**	**Academic Language**
Weeks 24-25 **Forms of Energy**	*Discuss that people use electricity or other forms of energy to cook their food, cool or warm their homes, and power their cars.* ***Students will:*** • **identify** ways people use the energy from the sun, wind, and water. • **match** an object with its energy source (e.g., hair dryer-electricity, animals-food, car-gas, calculator-sun). • **explain** various ways people need and use energy (e.g., cooking food, heating/cooling homes, powering cars, cooling off).	**SC.2.P.10.1** Embedded Nature of Science SC.2.N.1.1 SC.2.N.1.6	**electricity** **energy** **energy sources** **heat** **light** **solar** **sound**
Teacher Hints for "Forms of Energy": • Grade 2 students focus on the ways energy impacts our lives (electrical energy, solar energy, light energy, heat energy, and sound energy). • Energy is the ability to do work. Energy causes motion and causes change.			
Weeks 26-27 **Forces and Changes in Motion** This topic is continued on the next page.	*Investigate the effect of applying various pushes and pulls on different objects.* ***Students will:*** • **identify** pushes and pulls that occur in pictures or nature walk. • **predict and investigate** how a push or pull will affect the motion of an object (speed and direction). • **record** observations of motion investigations in a science notebook. • **discuss** that energy is required for a push or pull to occur.	**SC.2.P.13.1** Embedded Nature of Science SC.2.N.1.1	**direction** **distance** **farther** **faster** **float** **force** **gravity** **motion** **pull** **push** **sink** **slower**
	Demonstrate that the greater the force (push or pull) applied to an object, the greater the change in motion of the object. ***Students will:*** • **explain** that force is a push or pull on an object that causes it to stop, change speed, or change direction. • **demonstrate** that the greater the force (push or pull) applied to an object, the greater the change in motion of the object. • **observe and explain** that it takes more force (push or pull) to change the motion of an object with more weight. • **compare** findings with others.	**SC.2.P.13.4** Embedded Nature of Science SC.2.N.1.1	

Weeks 26-27 **Forces and Changes in Motion** This topic is continued from the previous page.	*Recognize that objects are pulled toward the ground unless something holds them up.* ***Students will:*** • **demonstrate and explain** gravity's effect on objects when dropped (when something is falling it is actually being pulled to Earth by a force called gravity). • **demonstrate and explain** how to overcome gravity (e.g., student sitting in a chair, pencil on a desk, helium-filled balloon on a string, grasshopper jumping, raft floating on water).	**SC.2.P.13.3** Embedded Nature of Science SC.2.N.1.3	
Teacher Hints for "Forces and Changes in Motion": • A force is a push or a pull. Forces are acting upon you all day. • Gravity, mass/weight, buoyancy, magnetism, and friction are common forces that can act upon us.			
Week 28 **Magnets**	*Demonstrate that magnets can be used to make some things move without touching them.* ***Students will:*** • **investigate** how magnets work (attract vs. repel). • **investigate and classify** objects that are attracted/not attracted to magnets (wood, plastic, metal). • **demonstrate** how to move objects (including magnets) with a magnet without contact. • **observe and explain** that the amount of movement a magnet can cause on a magnetic object is affected by the strength of the magnet and its distance from the object. • **investigate** ways to change the motion of an object (including a magnet) by using a magnet. • **explore** the poles of magnets (north and south).	**SC.2.P.13.2** Embedded Nature of Science SC.2.N.1.1	**attract** **magnets** o horseshoe o ring o bar o cow **repel**
Teacher Hints for "Magnets": • An assortment of magnets is recommended for magnet investigations (horseshoe, ring, bar, wand, etc.). • Magnets have a north and south pole even though they may not be marked as such. • The main emphasis for Grade 2 students is to have a solid understanding of the types of objects that are attracted to magnets. Note: They will quickly build a misconception about metallic objects. Aluminum foil and pennies do not have magnetic properties. • Students will need time to discover that repulsion (act of repelling) MAY occur when two magnets are brought together. • Explore the use of contact and non-contact forces to move objects and other magnets with a magnet.		

Teacher Notes

All optional curriculum resources can be found on the 2nd Grade Science Canvas Site

NGSSS BODY OF KNOWLEDGE: NATURE OF SCIENCE/LIFE SCIENCE Unit of Study: Life			PACING: Weeks 29 – 35 March 25 – May 10
Prerequisite Learning	**Kindergarten – SC.K.L.14.1, SC.K.L.14.3** **First Grade – SC.1.L.14.3**		
Topics	**Learning Targets/Skills**	**Benchmarks**	**Academic Language**
Weeks 29-31 **Human Body**	*Distinguish human body parts (brain, heart, lungs, stomach, muscles, and skeleton) and their basic functions.* ***Students will:*** • **identify** outside human body parts (e.g., head, arms, legs, ankles). • **identify** inside human body structures (limited to brain, heart, lungs, stomach, muscles, and skeleton). • **describe** the basic function of the brain, heart, lungs, stomach, muscles, and skeleton. o brain –gets information from your senses; control center of your body o heart – pumps blood and oxygen throughout your body o lungs – take in oxygen o stomach – breaks down food and mixes it with digestive juices o muscles – make your body move (bones, heart, lungs, pupils of your eyes) o skeleton – supports your body; gives it shape; protects internal organs	**SC.2.L.14.1** Embedded Nature of Science SC.2.N.1.1	**brain** **function** **heart** **human body** **lungs** **muscles** **oxygen** **skeleton** **stomach**
Teacher Hints for "Human Body": • This is the first exposure for students to human body structures and functions outside the work they have done with body parts associated with senses. • Internal structures are limited to the following: brain, heart, lungs, stomach, muscles, and skeleton. • In Grade 5, this topic grows to include structures and functions of the following: pancreas, liver, gall bladder, small and large intestines in grade 5. • Human body systems, such as digestive, circulatory, and nervous, are now taught in middle school.			
Weeks 32-35 **Life Cycles**	*Observe and describe major stages in the life cycles of plants and animals, including beans and butterflies.* ***Students will:*** • **observe and describe** major stages in the life cycle of the butterfly (egg, larva, pupa, adult). • **investigate** the life cycles of other animals (e.g., cat, snake, hamster, spider, fish, kangaroo, salamander, penguin, possum). • **observe and describe** major stages in the life cycle of the bean plant (seed, seedling, mature plant). • **investigate** the life cycles of other plants (e.g., marigolds, fern, pine tree, ivy). • **explain** that, when repeated, life cycle investigations yield the same results. • **compare** the life cycles of the butterfly to the bean (or other plants to other animals).	**SC.2.L.16.1** Embedded Nature of Science SC.2.N.1.1 SC.2.N.1.2 SC.2.N.1.4	**adult** **bean** **butterflies** **egg** **frog** **larva** **life cycles** **pupa** **seed** **germinate** **seedling**
Teacher Hints for "Life Cycles": • All living things have a life cycle; not just frogs and butterflies (common misconception held by young learners). • This is the first year this topic is formally taught to children. Previous grade levels may have spent some time observing the growth and development of plants and animals. • Not all animals go through the same kind of change. Some grow from smaller to larger (kitten to cat, shark pup to shark, infant to adult). Some start as one animal and change to something completely different (e.g., mealworm to beetle, tadpole to frog, caterpillar to butterfly).			

Teacher Notes

All optional curriculum resources can be found on the 2nd Grade Science Canvas Site

NGSSS BODY OF KNOWLEDGE: NATURE OF SCIENCE/LIFE SCIENCE Unit of Study: Basic Needs			PACING: Weeks 36 – 37 May 13 – May 24
Prerequisite Learning	**Kindergarten – none** **First Grade – SC.1.L.16.1**		
Topics	**Learning Targets/Skills**	**Benchmarks**	**Academic Language**
Weeks 36-37 **Basic Needs**	*Compare and contrast the basic needs that all living things, including humans, have for survival.* ***Students will:*** • i**dentify** the basic needs of plants (water, light, air, nutrients, space). • **identify** the basic needs of animals (water, air, food, shelter, space). • **compare** the basic needs that all living things (plant and animal) have for survival. • **investigate** a plant's ability to survive when one of its basic needs are not met. • **compare** findings with other groups focusing on any differences that may have occurred. • **describe** how different animals and plants depend on each other and the environment to meet their basic needs.	**SC.2.L.17.1** Embedded Nature of Science SC.2.N.1.1 SC.2.N.1.2	**basic needs** o air o food o light o nutrients o shelter o space o water **environment/habitat** o arctic o desert o ocean o prairie o rain forest o tundra o wetlands o woodland **living** **survival**
	Recognize and explain that living things are found all over Earth, but each is only able to live in habitats that meet its basic needs. ***Students will:*** • **describe** different environments (e.g., ocean, rain forest, desert, tundra, prairie, wetlands, woodland). • **match** plants and animals to their environments/habitats (e.g., wetlands, desert, woodland, prairie, ocean, rainforest, arctic). • **explain** that plants and animals live in habitats that meet their basic needs.	**SC.2.L.17.2**	
Teacher Hints for "Basic Needs": • In previous years, students have learned about the basic needs of all living things. In Grade 2, they focus on being able to compare the basic needs of two living organisms. • Plants and animals are adapted to survive in different environments. Students should be able to discuss the features they have that allow them to survive in their specific environment.			

Teacher Notes

All optional curriculum resources can be found on the 2nd Grade Science Canvas Site

NGSSS BODY OF KNOWLEDGE: NATURE OF SCIENCE Unit of Study: Enrichment			PACING: Weeks 38 – 39 May 27 – May 31
Topics	**Learning Targets/Skills**	**Benchmarks**	**Academic Language**
Weeks 38 **Enrichment**	***Students will:*** • **engage** in learning experiences that review/enrich understanding of basic and integrated science process skills as they prepare for third 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**	

Basic and integrated science process skills are defined on page 29 of the Grade 2 Science Curriculum Map.
Use the Practice of Science Resource Alignment suggestions (found on the 2nd Grade Science Canvas Site) that were not utilized throughout the school year.

Science Process Skills: Basic and Integrated

BASIC

Observing:	using your senses to gather information about an object or event; a description of what is actually perceived; information that is considered to be 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)

HEALTH	**Students will:**
HE.2.B.3.2	Name healthy options to health-related issues or problems.
HE.2.C.1.6	Recognize the locations and functions of major human organs.
LANGUAGE ARTS	**Students will:**
LAFS.2.RI.1.3	Describe the connections between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text.
LAFS.2.RI.2.4	Determine the meanings of words and phrases in a text relevant to a grade 2 topic or subject area.
LAFS.2.RI.4.10	By the end of year, read and comprehend informational texts, including history/social studies, science, and technical texts, in the grades 2-3 text complexity band proficiently, with scaffolding as needed at the high end of the range.
LAFS.2.SL.1.1	Participate in collaborative conversations with diverse partners about grade 2 topics and texts with peers and adults in small and larger groups. a. Follow agreed-upon rules for discussions (e.g., gaining the floor in respectful ways, listening to others with care, speaking one at a time about the topics and texts under discussion). b. Build on others' talk in conversations by linking their comments to the remarks of others. c. Ask for clarification and further explanation as needed about the topics and texts under discussion.
LAFS.2.W.3.7	Participate in shared research and writing projects (e.g., read a number of books on a single topic to produce a report; record science observations).
LAFS.2.W.3.8	With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question.
MATHEMATICS	**Students will:**
MAFS.2.MD.4.9	Generate measurement data by measuring lengths of several objects to the nearest whole unit, or by making repeated measurements of the same object. Show the measurements by making a line plot, where the horizontal scale is marked off in whole-number units.
MAFS.2.MD.4.10	Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems using information presented in a bar graph.
TECHNOLOGY	**Students will:**
Creativity and innovation	Demonstrate creative thinking, construct knowledge, and develop innovative products and processes using technology.
Communication and collaboration	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.
Research and informational fluency	Apply digital tools to gather, evaluate, and use information.
Critical thinking, problem solving, and decision making	Use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.
Digital Citizenship	Understand human, cultural, and societal issues related to technology and practice legal and ethical behavior.
Technology operations and concepts	Demonstrate a sound understanding of technology concepts, systems, and operations.

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.

Look for and express regularity in repeated reasoning. (SMP.8)

Recognizing repetition or regularity in the course of solving a problem (or series of similar problems) can lead to results more quickly and efficiently.

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*)

Standard/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*

Unit of Study: an overarching organizational sub-structure comprised of a collection of topics used to group content and concepts for a more narrow focus

Topics: a grouping of benchmarks and skills that form a subset of scientific concepts covered in each unit of study

Benchmarks: 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 benchmarks

Vocabulary: the content terminology and other academic language and phrases that support mastery of the learning targets and skills; for teacher- and student-use alike

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

Pacing: a recommendation of time frames for initial delivery of instruction and assessment in preparation for 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

Resource Alignment: a listing of available, high quality and benchmark-aligned materials including: labs, strategies, lessons, and videos from textbook and other media sources. All suggested resources may be accessed in Canvas.

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.

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