2018 - 2019

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

Kindergarten Overview

Kindergarten focuses instructional delivery for science within the following eight (8) Big Ideas/Standards:

Nature of Science

Big Idea 1 – The Practice of Science

Earth and Space Science

Big Idea 5 – Earth in Space and Time

Physical Science

Big Idea 8 – Properties of Matter
Big Idea 9 – Changes in Matter
Big Idea 10 – Forms of Energy
Big Idea 12 – Motion of Objects
Big Idea 13 – Forces and Changes in Motion

Life Science

Big Idea 14 – Organization and Development of Living Organisms

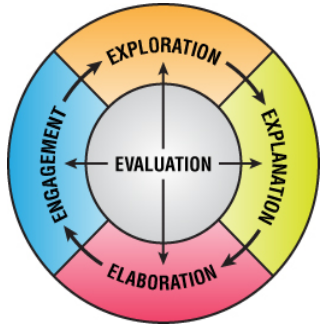
Kindergarten

Instructional Scope and Sequence

Weeks of Instruction	Instructional Scope	Instructional Sequence	Body of Knowledge
Weeks 1 – 9	Practice of Science	August 13 – October 12	Nature of Science
Weeks 10 – 14	Gravity Day & Night Sky	October 16 – November 16	Earth and Space Science
Weeks 15 – 17	Matter	November 26 – December 14	Physical Science
Week 18	Energy	December 17 – December 19	
Weeks 19 – 22	Force & Motion	January 7 – February 1	
Weeks 23 – 36	Plants & Animals	February 4 – May 17	Life Science
Weeks 37 – 38	Enrichment	May 20 – May 31	Nature of Science Life Science Earth and Space Science Physical 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 this 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/LIFE SCIENCE Unit of Study: Practice of Science		PACING: Weeks 1 – 9 August 13 – October 12	
Topics	**Learning Targets/Skills**	**Benchmarks**	**Academic Language**
Weeks 1-2 **Introduction to Science**	*Collaborate with a partner to collect information.* ***Students will:*** • **develop** a science notebook (whole class and/or individual) that will be used all year long to document learning (e.g., observations, measurements, pictures, vocabulary). • **discuss** scientific tools (e.g., ruler, measuring cup, thermometer, hand lens, dropper, goggles) that scientists use to make their work easier. • **draw** a picture of what a scientist looks like and present it to classmates and the teacher. • **collaborate** with a partner to collect information through observation from an activity (i.e. teacher will provide various multi-sensory activities and/or experiences that will allow students to gather a variety of information).	**SC.K.N.1.1**	**answers** **collect** **partner** **problem** **question** **science** **science notebook** **science tools** **scientist** **sort**
Teacher Hints for "Introduction to 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 Digital Program Access Information Document on Canvas for access information. • Interactive notebooks can be developed whole class and/or individually. Developing a whole-class notebook gives the teacher the opportunity to model expectations so that the transition to using individual science notebooks is easier later in the school year. • Non-standard units of measure (e.g., pretzel sticks, marbles) will be used when determining the length and weight of objects in grade K.			
Weeks 3-7 **Five Senses** Sight This topic is continued on the next page.	*Recognize the five senses and related body parts.* ***Students will:*** • **name** *sight* as one of the five senses. • **identify** that the eyes correspond to the sense of sight (on their own body and through pictures). • **describe** objects by using the sense of sight ONLY (color, shape, size). • **explore** how light impacts sight. • **explore** tools that scientists use to enhance, and sometimes hinder, the sense of sight for protection (e.g., goggles, hand lens, microscope, glasses, sunglasses, binoculars).	**SC.K.L.14.1** Embedded Nature of Science SC.K.N.1.1	**eyes** **five senses** **goggles** **hand lens** **observation** **sight**

Weeks 3-7 **Five Senses** Touch Hearing Smell Taste	***Students will:*** • **name** *touch* as one of the five senses. • **identify** that the fingers and skin correspond to the sense of touch. • **describe** the feel (texture) of objects using the sense of touch (e.g., soft, hard, cold, warm, sticky, rough, smooth). • **determine** a hidden object by its feel (e.g., feely box, feely socks, feely bag). • **explore** tools that scientists use to reduce, and sometimes eliminate, the sense of touch for the purpose of protection (e.g., gloves, oven mitts, shoes, tongs, forceps). ***Students will:*** • **name** *hearing* as one of the five senses. • **identify** that the ears correspond to the sense of hearing. • **describe** the sound an object can make (e.g., low/high pitch-thud and screech, loud/soft volume-siren and whisper, tweet, buzz, beep). • **determine** a mystery sound (e.g., recordings, mystery sound box/bag). • **determine** the location of real-world sounds heard during a sound walk around the school campus. • **explore** tools that reduce and enhance the sense of hearing (e.g., hands, head phones, ear plugs, hearing aide, stethoscope, cup telephones). ***Students will:*** • **name** *smell* as one of the five senses. • **identify** that the nose corresponds to the sense of smell. • **use** the proper technique for smelling substances (wafting). • **identify and describe** the smell of different mystery substances. ***Students will:*** • **name** *taste* as one of the five senses. • **identify** that the tongue corresponds to the sense of taste. • **describe** the taste of different substances (sour, sweet, bitter, salty). • **explore** the relationship between smell and taste.	**SC.K.L.14.1** Embedded Nature of Science SC.K.N.1.1	**fingers** **skin** **texture** **touch (feel)** **bitter** **ears** **hear** **nose** **salty** **smell** **sound** **sour** **sweet** **taste** **tongue** **waft**

Teacher Hints for "Five Senses":

- The sense of sight is the most developed sense in humans.
- Students can discover that light is necessary for objects to be seen.
- The sense of touch is not highly developed in students of this age.
- A description of how something feels is relative making this a difficult task for some students.
- Hearing is the sense that is second only to sight in the degree of development in humans.
- The descriptions of sound may include, but are not limited to, the following: loud, soft, ringing, clanging, beeping, squawking, dripping, howling.
- Wafting is a safe method of smelling substances by fanning your hand over the substance pulling the smell towards your nose.
- Tasting in science is a safety issue. Continually impress upon children the need to never taste a substance unless specifically instructed to do so.
- Taste is a sense that relies heavily on the sense of smell. Try holding your nose and tasting an unknown flavor of life saver. Make a prediction of what flavor it is. Let go of your nose and make another prediction. Check to see if your prediction was correct.

Weeks 8-9 **Investigations Using Five Senses**	*Make observations of the natural world and know that they are descriptors collected using the five senses.* *Recognize that learning can come from careful observation.* ***Students will:*** • **explore** basic science process skills with a partner that are important to a scientist through hands-on investigations (e.g., observing, sorting, predicting, comparing, measuring, communicating). • **explore** the hands-on use of science tools with a partner (e.g., hand lens, thermometer, balance, measuring cup, beaker, ruler, meter stick, timer) that help scientists gather information about the world around them. • **observe and describe** familiar things from the natural world using the five senses (e.g., plants, animals, rocks, sky, weather). • **observe and describe** a familiar, man-made object using the five senses (e.g., plastic fork, marker, chair, baseball bat, mitten). • **list** new things learned after making careful observations and hearing the observations of others. • **identify and describe** the roles the senses play in a given situation (e.g., sitting around a campfire, riding a bike, playing at the beach, popping corn in an air popper, making applesauce, using scented and colorful play dough). • **ask questions and find answers** about the world around them using their five senses.	**SC.K.N.1.2** **SC.K.N.1.5** Embedded Nature of Science SC.K.N.1.1	**answers** **ask** **balance** **beaker** **communicate** **compare** **describe** **find** **explore** **hand lens** **measure** **measuring cup** **yard/meter stick** **observation** **observe** **predict** **question** **ruler** **science tools** **sort** **thermometer** **timer**

Teacher Hints for "Investigations Using Five Senses":

- Descriptions of the basic science process skills (inquiry) can be found on page 28.
- Observation is the foundation of the science processes. Initial information about an object comes from the sense of sight.
- Making observations in a science classroom includes the use of all five senses (when appropriate). Help students avoid the misconception that observations only include what they can see.
- Students should be purposefully engaged in activities that incorporate multiple senses.
- Observations should lead to questions. As students engage in becoming better observers (attention to details), they will also become more curious and ask more questions.
- An explanation of what has been learned should include evidence from what has been observed through the use of the five senses. (I learned _____ because I observed _____ by using my sense of _____.).
- Non-standard units of measure are used in Kindergarten. Students will measure length, volume, weight, and temperature using objects such as cubes, paper clips, pennies, popsicle sticks, pretzels, and marbles.
- The following descriptors should be used when describing or comparing length, volume, weight, and temperature: long/short, wide/narrow, tall/short, empty/full, heavy/light, hot/warm/cold.
- An explanation of what has been learned should include evidence from what has been "measured" with non-standard units of measure. (I learned _____ because I used _____ to measure _____.).
- Handling scientific tools such as beakers, rulers, and thermometers (precise measurements not required) to conduct simple investigations will provide students with early experiences that will set them up for success when they begin using standard units of measure (inches and centimeters) in grade 1.

Teacher Notes

All optional curriculum resources can be found on the Kindergarten Science Canvas Site

NGSSS BODY OF KNOWLEDGE: NATURE OF SCIENCE/EARTH AND SPACE SCIENCE	PACING: Weeks 10 – 14
Unit of Study: Gravity and Day & Night Sky	October 16 – November 16

Topics	Learning Targets/Skills	Benchmarks	Academic Language
Week 10 **Gravity**	*Explore the Law of Gravity by investigating how objects are pulled toward the ground unless something holds them up.* ***Students will:*** • **predict** what will happen to objects when supports that are holding them up are removed. • **collaborate** as a class about how to collect data during a gravity investigation (e.g., record simple descriptive sentences/phrases, record a video, collect tally marks, draw pictures). • **investigate** how objects are pulled toward the ground unless something holds them up. • **record** predictions, observations and results of a gravity investigation in pictorial or written form in a science notebook. • **identify** gravity as the reason objects are pulled toward the ground (fall) when they are not held up by something. • **describe** what has been learned after carefully observing the effects of gravity and hearing the observations of others.	**SC.K.E.5.1** Embedded Nature of Science SC.K.N.1.1 SC.K.N.1.2 SC.K.N.1.3 SC.K.N.1.5	**gravity** **hold up** **pull down**
Teacher Hints for "Gravity": • When objects fall, they are being pulled by gravity. • Gravity is a non-contact force that is difficult for young students to conceptualize. However, they have been fascinated by gravity since they started dropping objects repeatedly off their high chairs. This concept is rooted in a cause/effect relationship and students should be comfortable expressing the relationship.			
Weeks 11-12 **Day and Night Sky** This topic is continued on the next page.	*Recognize the repeating pattern of day and night.* ***Students will:*** • **identify** activities that are done during the day. • **identify** activities that are done during the night. • **explain** how daytime activities are different from nighttime activities. • **identify** details in nature that make day different from night. • **create** 2-dimensional and 3-dimensional models of things that are visible in the day and/or night sky. • **describe** the repeating pattern of day and night. **Please note:** The moon will be visible during the day on November 15th at 9:54 AM. It can also be seen during on 10/24, 10/31, 1/27, and 2/19 at various times during the day. (http://www.calendar-12.com/moon_phases).	**SC.K.E.5.2** Embedded Nature of Science SC.K.N.1.1 SC.K.N.1.4	**clouds** **dawn** **day (daytime)** **dusk** **moon** **night (nighttime)** **pattern** **rise** **set** **sky** **stars** **sun**

Weeks 11-12 **Day and Night Sky** This topic is continued from the previous page.	*Recognize that the Sun can only be seen in the daytime.* ***Students will:*** • **identify and describe** the sun. • **describe** attributes that define daytime (with the sun as the primary detail). • **identify** how the sun appears to rise at dawn, move across the sky during the day, and set at dusk.	**SC.K.E.5.3** Embedded Nature of Science SC.K.N.1.2 SC.K.N.1.3 SC.K.N.1.5	
	Observe that sometimes the Moon can be seen at night and sometimes during the day. ***Students will:*** • **identify and describe** the moon. • **describe** attributes that define nighttime (with the moon as a primary detail). • **describe** how the moon appears to change shape and brightness. • **observe and discuss** how sometimes the moon can be seen during the day while the sun is out.	**SC.K.E.5.4** Embedded Nature of Science SC.K.N.1.2 SC.K.N.1.3 SC.K.N.1.5	
Teacher Hints for "Day and Night Sky": • The sun is the closest star to the Earth. • Understanding that day and night repeats on a regular basis is foundational to the understanding that day and night is caused by the rotation of Earth on its axis. Earth's rotation on its axis is taught in Grade 4. • Students may make observations that the shape of the moon appears to change over time. Teachers may want to consider making models of the different shapes of the moon that have been observed (e.g., clay, Oreo cookies, construction paper). • Tracking and recording the observable shapes of the moon is no longer a requirement outlined in the map (this concept will be taught in Grade 4). • Sort pictures seen in the day or night sky. • Record objects seen in both the day and night sky.			
Weeks 13-14 **Size and Distance** This topic is continued on the next page.	*Observe that things can be big and things can be small as seen from Earth.* ***Students will:*** • **compare** the size of an object on the ground to one seen in the sky (e.g., airplane, hot air balloon, parachute, bird, kite). • **explain** how the object looks smaller in the sky even though it does not change in size. • **discuss** how objects appear to get smaller the farther away they get and larger the closer they get. • **make observations** of objects found in space (sun, moon, and stars).	**SC.K.E.5.5** Embedded Nature of Science SC.K.N.1.2 SC.K.N.1.3 SC.K.N.1.5	**appear** **big (large)** **distance** **far away** **nearby** **size** **small**

Weeks 13-14 **Size and Distance** This topic is continued from previous page.	*Observe that some objects are far away and some are nearby as seen from Earth.* ***Students will:*** • **compare** the apparent size of stars to the apparent size of the sun and moon as seen from Earth. • **explain** the distance of some objects in the day and night sky in relation to Earth (stars are farther away from Earth than the sun and moon). • **explain** that the moon looks larger than the stars because it is closer to Earth (nearby) even though it is not larger and vice versa (far away). • **explain** that the sun looks larger than the other stars because it is closer to Earth (nearby) even though it is smaller than some of the other stars and vice versa (far away).	**SC.K.E.5.6** Embedded Nature of Science SC.K.N.1.2 SC.K.N.1.5	

Teacher Hints for "Size and Distance":

- Students need to define what makes an object big and what makes an object small. According to the class's definition, students should be able to accurately sort all kinds of objects. Eventually we want students to realize that size is relative.
- Students need to define what determines when an object is far away and when an object is nearby. According to the class's definition, students should be able to accurately categorize all kinds of objects. Eventually we want students to realize that distance is relative.
- The farther away something gets, the smaller it appears to become; the closer something gets the larger it appears to become. The object never actually changes in size. This is intuitive to us but not to students.
- The relationship between size and distance is foundational to understanding concepts of size and distance as they relate to space (this concept is further developed in Grade 3).
- The moon is closer to Earth than the stars. The moon appears to be larger than the stars. The relationship that exists between size and distance is what explains why the moon appears to be larger than the stars even though it is not.
- Consider discussing size and distance relationships accurately represented in fiction and non-fiction literature.

Teacher Notes

All optional curriculum resources can be found on the Kindergarten Science Canvas Site

NGSSS BODY OF KNOWLEDGE: NATURE OF SCIENCE/PHYSICAL SCIENCE		PACING: Weeks 15 – 17
Unit of Study: Matter		November 26 – December 14

Topics	Learning Targets/Skills	Benchmarks	Academic Language
Weeks 15-16 **Properties of Matter**	*Sort objects by observable properties, such as size, shape, color, temperature (hot or cold), weight (heavy or light) and texture.* *Keep records as appropriate-such as pictorial records of investigations conducted.* ***Students will:*** • **discuss** types of observations scientists make (e.g., size, color, temperature, texture, time, quantity, changes to objects). • **discuss** different ways scientists record their observations during investigations (e.g., notes, charts, illustrations, video). • **describe** objects by their observable properties after collaborating with a partner (e.g., shape, color, size-big/small/tall/short, weight-heavy/light, texture-soft/hard/rough/smooth, temperature-hot/cold). • **sort** objects according to an observable property comparing the quantity (more/less) in each group. • **re-sort** the same objects according to a different observable property comparing the quantity (more/less) in each group. • **explain** the reasoning of how objects have been sorted and re-sorted. • **estimate and compare** the sizes of different objects (long/short, tall/short, wide/narrow, thick/thin, big/little). • **estimate and compare** the weights of different objects (heavier/lighter) using their hands and a pan balance. • **estimate and compare** the temperature of different objects through touch (hot/warm/cold). • **record** predictions, observations and results of investigations in pictorial or written form in a science notebook whole class and/or as an individual.	**SC.K.P.8.1** **SC.K.N.1.3** Embedded Nature of Science SC.K.N.1.1 SC.K.N.1.2 SC.K.N.1.5	**estimate** **heavy** **investigate** **light** **matter** **pan balance** **predict** **property (attribute)** **record** **ruler** **science notebook** **sort** **temperature** **texture** **weight**

Teacher Hints for "Properties of Matter":

- Students are not responsible for being able to distinguish materials as solids, liquids, or gases in Kindergarten (only the material's properties that can be observed with or without tools).
- A pan balance, ruler, and thermometer can be used to compare the weight, length (including width and height), and temperature of materials. Standard measurement in precise units (inches and centimeters) will be taught in Grade 1 (science).

Weeks 17 **Changes in Matter**	*Recognize that the shape of materials such as paper and clay can be changed by cutting, tearing, crumpling, smashing, or rolling.* *Observe and create a visual representation of an object which includes its major features.* ***Students will:*** • **describe** an object, including its major features, using as many of the five senses as possible. • **match** a description of an object to its 2-dimensional or 3-dimensional visual representation (model). • **create** a 2-dimensional or 3-dimensional model of an object using paper or clay. • **demonstrate** multiple ways to change the shape and size of the paper or clay model (e.g., fold, bend, cut, tear, crumple, smash, roll, soak, heat, freeze). • **match** altered forms of materials to their originals (e.g., ripped up pieces of paper to a full sheet, smashed piece of gum to a piece right out of the wrapper, liquid water to ice). • **explain** that when these changes are made to paper and clay, only the shape or size of the material changes, not the material itself. • **demonstrate** how other objects or substances change when heated or cooled (e.g., chocolate, water/ice, crayon). • **record** observations of the object before and after change in science notebooks.	**SC.K.P.9.1** **SC.K.N.1.4** Embedded Nature of Science SC.K.N.1.2 SC.K.N.1.3 SC.K.N.1.5	**bend** **change** **cool** **crumple** **cut** **fold** **heat** **model** **roll** **smash** **soak** **tear**
Teacher Hints for "Changes in Matter": • The primary focus of this benchmark is to be able to explain that materials change in many different ways (e.g., size, shape, color, texture, temperature). Students do not need to understand the difference between physical and chemical change even though the textbook provides examples of both. • Physical changes can generally be described by noting the change in size and form of an object.			

Teacher Notes

All optional curriculum resources can be found on the Kindergarten Science Canvas Site

NGSSS BODY OF KNOWLEDGE: NATURE OF SCIENCE/PHYSICAL SCIENCE	PACING: Week 18
Unit of Study: Energy	December 17 – December 19

Topics	Learning Targets/Skills	Benchmarks	Academic Language
Week 18 **Sound**	*Observe that things that make sound vibrate.* ***Students will:*** • **distinguish** soft sounds from loud sounds (e.g., ringing a bell and sounding a fire alarm, dropping a cotton ball and dropping a wooden block). • **observe** that sounds are made when parts of musical objects vibrate (e.g., guitar strings, drums, musical triangles, xylophones, cymbals, tambourines). • **investigate** other ways vibrations can be seen and felt (e.g., striking tuning forks and placing in water, plucking rubber bands, feeling vocal cords when speaking, feeling a radio speaker, saying some letter sounds and feeling it on the lips). • **keep records** of sound investigations in a science notebook.	**SC.K.P.10.1** Embedded Nature of Science SC.K.N.1.2 SC.K.N.1.3 SC.K.N.1.5	**energy** **loud** **soft** **sound** **vibrate**

Teacher Hints for "Sound":

- All sound is made by vibrating matter. Vibrations are back-and-forth movements.
- Vibrations can often be seen and felt.
- Soft and loud sounds refer to the volume (loudness) of sound. High and low sounds refer to pitch. While students do not need to know the difference between volume and pitch, be careful to avoid associating high and low sounds with volume (loudness).
- Collaborate with the music teacher to develop an instructional plan to support sound energy.
- Ask your music teacher if you can borrow instruments to build sound centers.

Teacher Notes

All optional curriculum resources can be found on the Kindergarten Science Canvas Site

NGSSS BODY OF KNOWLEDGE: NATURE OF SCIENCE/PHYSICAL SCIENCE Unit of Study: Force & Motion		PACING: Weeks 19-22 January 7 – February 1	
Topics	**Learning Targets/Skills**	**Benchmarks**	**Academic Language**
Weeks 19-20 **Motion of Objects**	*Investigate that things move in different ways, such as fast, slow, etc.* ***Students will:*** • **demonstrate and describe** the different ways their bodies and other objects move (e.g., roll, fly, crawl, swim, bounce, hop, run, waddle, wiggle, sway, tumble, pounce, walk, jump, skip). • **describe** the speed at which things move (fast and slow). • **investigate** different directions of motion (e.g., forward, backward, upward, downward, sideways, back-and-forth, up and down, in a circle, zigzag, straight). • **record** predictions, observations and results of movement investigations in pictorial or written form in a science notebook. • **describe** what has been learned after carefully observing the movement of objects and hearing the observations of others.	**SC.K.P.12.1** Embedded Nature of Science SC.K.N.1.2 SC.K.N.1.3 SC.K.N.1.5	**back-and-forth** **backward** **direction** **downward** **fast** **forward** **motion** **movement** **slow** **upward** **zigzag**
Teacher Hints for "Motion of Objects": • It takes a push or pull to cause motion. • A push or pull may require contact. o Throwing a ball is a push that requires contact. o Propelling a boat forward through the water is a push that requires contact. o Picking up an object is a pull that requires contact. o Tightening a belt is a pull that requires contact. • A push or pull does not always require contact. o Repulsion of two magnets demonstrates a push that does not require contact. o Gravity acting on an object demonstrates a pull that does not require contact. o Blowing air through a straw demonstrates a push of an object without touching it. o Sucking air through a straw demonstrates a pull on an object without touching it. • Include the exploration of magnetism when instructing motion. Like poles of two magnets will repel (push). Opposite poles of two magnets will attract (pull).			
Weeks 21-22 **Forces and Changes in Motion** This topic is continued on the next page.	*Observe that a push or a pull can change the way an object is moving.* ***Students will:*** • **describe** the position of an object (e.g., on, in, above, below, under, between, before, after, beside). • **collaborate** with a partner to discuss ways to change an object's motion. • **demonstrate** ways to make an object change position/move. • **predict** how a push and pull will change an object's speed and/or direction. • **investigate** how push and pull can change the speed or direction of an object's movement (fast, slow, back and forth, up and down). • **record** predictions, observations and results of push and pull investigations in pictorial or written form in a science notebook. • **describe** what has been learned after carefully observing the change in an object's motion and hearing the observations of others.	**SC.K.P.13.1** Embedded Nature of Science SC.K.N.1.1 SC.K.N.1.2 SC.K.N.1.3 SC.K.N.1.5	**above** **after** **before** **below** **beside** **between** **direction** **in** **motion** **movement** **on** **pull** **push** **speed** **under**

Teacher Hints for "Forces and Changes in Motion":

- Continue exploration of magnetism when instructing pushes/pulls and changes in motion.
- When an object moves it always changes position and sometimes changes direction.
- Additional words that can describe the position of an object may include, but are not limited to, the following: over, beneath, to the right/left of, and behind.
- Force is required to make an object move. Young children know that it requires a push or pull to move things. They also realize that they do not always have enough force in their own strength to move some objects.

Teacher Notes

All optional curriculum resources can be found on the Kindergarten Science Canvas Site

NGSSS BODY OF KNOWLEDGE: NATURE OF SCIENCE/LIFE SCIENCE Unit of Study: Animals & Plants			PACING: Weeks 23 – 36 February 4 – May 17
Topics	**Learning Targets/Skills**	**Benchmarks**	**Academic Language**
Weeks 23-26 **Animals**	*Observe animals, describe how they are alike and how they are different in the way they look and in the things they do.* ***Students will:*** • **record** observations of many kinds of animals in a science notebook. • i**dentify** differences between different kinds of animals (e.g., some have feathers and some have fur, some lay eggs and some give live birth). • **identify** similarities among different kinds of animals (e.g., they all swim, they all have six legs). • **sort** animals by the way they look (e.g., fur, scales, feathers, fins, feet). • **sort** animals by the way they move (e.g., fly, swim, slither, crawl, walk, hop). • **create** a 2-dimensional and/or 3-dimensional model of an animal and its features. • **observe and explain** that animals grow and change as they get older. • **discuss** the needs of animals (food, water, air, space and shelter).	**SC.K.L.14.3** Embedded Embedded Nature of Science 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	**air** **animal** **behavior** **change** **feathers** **feet** **fins** **food** **fur** **grow** **move** **needs** **scales** **shelter** **skin** **space** **water**
Teacher Hints for "Animals": • This unit focuses on the animal portion of the Plants & Animals Unit of Study. This unit is working towards students being able to describe how plants compare to other plants, animals compare to other animals, and how plants compare to animals. • Animals must eat food to get energy to do the things that keep them alive. • Animals can move around. Students infer an animal's movement by its appearance. Be careful to avoid misconceptions (an ostrich has wings and feathers but does not fly). • Animals have parts that are important to their survival.			
Week 27 **Enrichment**	***Students will:*** • **engage** in learning experiences that enrich their understanding of science concepts and science process skills (Weeks 1-9). • **conduct** a class experiment to gain early experience with the scientific method, the structure used by grade 5 students for the school's science fair event.		**experiment**
Teacher Hints for "Enrichment": • The scientific method used by Grade 5 students consists of the following: Problem/Question, Research, Hypothesis, Experiment (materials and procedures), Data, Results, Conclusion, and Application. • Descriptions of integrated science process skills (scientific method) can be found on page 28 of the curriculum map. • Allowing Kindergarteners the freedom to build class experiments and investigations will be extremely helpful as students move throughout elementary school.			

Weeks 28-30 **Plants**	*Observe plants, describe how they are alike and how they are different in the way they look and in the things they do.* ***Students will:*** • **record** observations of many kinds of plants (flowers, trees, grass, cactus, bushes, fern) in a science notebook. • **observe** the parts of a plant using a hand lens (stems, roots, leaves, flowers, seeds, cones). • i**dentify** differences between different kinds of plants (e.g., some have cones and some have flowers, some have thin leaves and some have thick leaves). • **identify** similarities among different kinds of plants (e.g., they have oval-shaped leaves, they produce flowers, they change size). • **sort** plants by the way they look (e.g., leaf shape, size, color, other attributes). • **create** a 2-dimensional and/or 3-dimensional model of a plant and its parts. • **observe and explain** that plants grow and change as they get older. • **discuss** the needs of plants (water, soil, light, air, space).	**SC.K.L.14.3** Embedded Nature of Science SC.K.N.1.2 SC.K.N.1.3 SC.K.N.1.4 SC.K.N.1.5	**air** **change** **cone** **different** **flower** **grow** **leaves** **light** **model** **needs** **parts** **plant** **roots** **same** **seeds** **soil** **space** **stem** **sun** **water**
Teacher Hints for "Plants": • This unit focuses on the plant portion of the Plants & Animals Unit of Study. This unit is working towards students being able to describe how plants compare to other plants, animals compare to other animals, and how plants compare to animals. • Plants make their own food; they do not eat food (there are exceptions though). • A plant does not move from one place to another by itself. • Plants have parts that are important to their survival.			
Weeks 31-34 **Animals and Plants**	*Observe plants and animals, describe how they are alike and how they are different in the way they look and the things they do.* ***Students will:*** • **describe** how a plant and an animal are alike (physical characteristics, basic needs, and growth/change). • **describe** how a plant and an animal are different (physical characteristics, basic needs, and growth/change).	**SC.K.L.14.3** Embedded Nature of Science SC.K.N.1.1	**alike** **different**
Teacher Hints for "Animals and Plants": • Students should be able to compare the physical characteristics of plants and animals, the basic needs of plants and animals, and the ways they grow and change. • This is the portion of the Plants & Animals Unit of Study that describes how plants compare to animals.			

Weeks 35-36 **Real vs. Imaginary**	*Recognize that some books and other media portray animals and plants with characteristics and behaviors they do not have in real life.* ***Students will:*** • **identify** characteristics and behaviors of plants and animals shown in books and other media as real or imaginary. • **discuss** how plant characteristics and behaviors shown in books and other media are alike and different from the characteristics of a real plant (e.g., has green leaves, grew from a seed, grew to the clouds, talks to another oak tree). • **discuss** how animal characteristics and behaviors shown in books and other media are alike and different from the characteristics of a real animal (e.g., has two wings, eats nuts, sings a song, goes to school to learn).	**SC.K.L.14.2** Embedded Nature of Science SC.K.N.1.1 SC.K.N.1.2 SC.K.N.1.3 SC.K.N.1.5	**animal** **imaginary** **plant** **pretend** **real**
Teacher Hints for "Real vs. Imaginary": • Students can generally tell you why a picture of a plant or animal is real or imaginary and provide some simple explanation of why. They will find it more challenging if they are asked to describe ways a single picture is both real and imaginary.			

Teacher Notes

All optional curriculum resources can be found on the Kindergarten Science Canvas Site

NGSSS BODY OF KNOWLEDGE: NATURE OF SCIENCE/LIFE SCIENCE Unit of Study: Enrichment			PACING: Weeks 37 – 38 May 20 – 31
Topics	**Learning Targets/Skills**	**Benchmarks**	**Academic Language**
Weeks 37-38 **Enrichment**	***Students will:*** • **engage** in learning experiences that enrich their understanding of science concepts and basic science process skills as they prepare for first grade.		
Teacher Hints for "Enrichment": • Reminder: Basic (inquiry) and integrated (scientific method) science process skills can be found on page 28 of the curriculum map.			

Teacher Notes

All optional curriculum resources can be found on the Kindergarten 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)

HEALTH	**Students will:**
HE.K.C.1.5	Recognize there are body parts inside and outside of the body.
LANGUAGE ARTS	**Students will:**
LAFS.K.RI.1.1	With prompting and support, ask and answer questions about key details in a text.
LAFS.K.RI.2.4	With prompting and support, ask and answer questions about unknown words in a text.
LAFS.K.RI.4.10	Actively engage in group reading activities with purpose and understanding.
LAFS.K.SL.1.1	Participate in collaborative conversations with diverse partners about *kindergarten topics* and texts with peers and adults in small and larger groups. a. Follow agreed-upon rules for discussions (e.g., listening to others and taking turns speaking about the topics and texts under discussion). b. Continue a conversation through multiple exchanges.
LAFS.K.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.K.MD.1.2	Directly compare two objects with a measurable attribute in common, to see which object has "more of/"less of" the attribute, and describe the difference. *For example, directly compare the heights of two children and describe one child as taller/shorter.*
MAFS.K.MD.2.3	Classify objects into given categories; count the numbers of objects in each category and sort the categories by count.
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

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

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

Formative Assessment Strategies: techniques that can be used before, during, and after instruction to evaluate student learning

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