Proposed DRAFT Standards

The Science of Energy

How energy exists in different forms; how energy can be transferred and transformed; and how energy causes changes within objects, living things, and systems.

Grade Kindergarten

SC.K.EN.1 Recognize that energy exists in the environment, causes changes, and comes from sources such as the Sun and wind.

SC.K.EN.1.1 Use the five senses to explore forms of energy and observe how energy causes changes.

Example: A Kindergarten class explores energy on a sunny day at a Florida elementary school. Students observe sunlight warming the playground, listen to sounds made by birds and the school bell, use a flashlight to illuminate a dark area of the classroom, and feel moving air from a fan. Through these observations, students explore how light, sound, and heat energy can be detected using their senses and how energy causes changes in the environment.

Student Task(s) –

- Use the five senses to observe examples of light, sound, and heat energy.
- Identify the form of energy being observed.
- Describe a change caused by each form of energy.
- Compare examples of energy found indoors and outdoors.
- Use drawings, pictures, physical actions, or words to communicate observations about energy.

Benchmark Clarifications:

Clarification 1: Instruction includes exploring light, sound, and heat energy using the five senses and is limited to these forms of energy.

Clarification 2: Instruction includes identifying basic changes caused by energy, such as light making objects visible, sound being heard, and heat causing temperature changes.

Clarification 3: Instruction includes using drawings, physical actions, models, or demonstrations to represent observations of light, sound, and heat. Refer to Modeling Skills Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

Clarification 4: Instruction includes making and communicating observations using age-appropriate laboratory practices. Refer to Laboratory Practices Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

SC.K.EN.1.2 Identify everyday uses of energy in the world around us.

Example: A kindergarten student explores different locations around a Florida elementary school, including the playground, classroom, cafeteria, and bus-loading area. During the exploration, the student observes sunlight shining on the playground, a classroom lamp providing light, a school bell making sound, a fan moving air, and warm food being served in the cafeteria.

Student Task(s) –

- Identify examples of light, sound, and heat energy observed at school.
- Describe what each example helps people do or what changes it causes.
- Sort the examples into categories such as light, sound, or heat energy.
- Compare examples of energy use found in different areas of the school.
- Use drawings, pictures, or words to communicate observations about how energy is used in everyday life.

Benchmark Clarifications:

Clarification 1: Instruction includes understanding that energy can cause changes.

Clarification 2: Instruction includes identifying where and how light, sound, and heat energy is used regularly in homes and schools.

Clarification 3: Instruction excludes energy transformations or energy conservation.

Clarification 4: Instruction includes sorting and comparing examples of energy use in everyday life. Refer to Mathematics Skills Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

SC.K.EN.1.3 Explore the Sun and wind as sources of energy and describe how they cause changes in the environment.

Benchmark Clarifications:

Clarification 1: Instruction includes exploring uses of light and heat from the Sun and wind as a source of energy.

Clarification 2: Instruction includes describing how energy from the Sun and wind affects living and non-living things.

Clarification 3: Instruction excludes explanations of weather systems, renewable-energy technologies, or energy transfer mechanisms.

Clarification 4: Instruction includes using diagrams and drawings to represent how energy from the Sun and wind affects living and non-living things. Refer to Modeling Skills Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

Clarification 5: Instruction includes making and communicating observations using age-appropriate laboratory practices. Refer to Laboratory Practices Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

Grade 1

SC.1.EN.1 Describe how light and electricity are sources of energy used in everyday life.

SC.1.EN.1.1 Investigate light energy and explain how it can cause changes.

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Benchmark Clarifications:

Clarification 1: Instruction includes identifying the need for light energy to see objects.

Clarification 2: Instruction includes identifying and describing natural and human-made sources of light.

Clarification 3: Instruction includes exploration of various materials to see if light passes through and how shadows form when light energy is blocked by an object.

Clarification 4: Instruction excludes wavelength, frequency, reflection, or refraction.

Clarification 5: Instruction includes creating drawings and models to represent light sources, objects, and shadows. Refer to Modeling Skills Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

Clarification 6: Instruction includes recording and comparing observations of light and shadows. Refer to Mathematics Skills Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

SC.1.EN.1.2 Identify and describe sources of light energy.

Benchmark Clarifications:

Clarification 1: Instruction includes identifying the Sun as a source of heat and light energy.

Clarification 2: Instruction includes exploring various sources of light energy.

Clarification 3: Instruction includes organizing, comparing, and describing natural and human-made light sources. Refer to Mathematics Skills Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

SC.1.EN.1.3 Describe how people use electricity to provide light, sound, and motion.

Benchmark Clarifications:

Clarification 1: Instruction includes identifying the daily use of electricity in homes and schools.

Clarification 2: Instruction includes recognizing that electricity can power devices that produce light, sound, or motion. Refer to Modeling Skills Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

Clarification 3: Instruction includes examining historical developments that contributed to scientific understanding of how electricity is used to provide light, sound, and motion. Refer to the Timeline of Key Accomplishments Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

Grade 2

SC.2.EN.1 Explain thermal energy and describe sources of energy.

SC.2.EN.1.1 Investigate heat (thermal) energy and explain how it can cause changes.

Benchmark Clarifications:

Clarification 1: Instruction includes identifying examples of thermal energy sources in homes and schools.

Clarification 2: Instruction includes observing, comparing, and describing changes caused by thermal energy using appropriate tools and observations. Refer to Mathematics Skills Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

Clarification 3: Instruction includes conducting investigations involving thermal energy. Refer to Laboratory Practices Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

SC.2.EN.1.2 Observe and explain how to avoid wasting electricity.

Benchmark Clarifications:

Clarification 1: Instruction includes identifying ways that electricity can be used carefully or conserved.

Clarification 2: Instruction is limited to connecting energy conservation to reducing unnecessary energy use and conserving resources.

Clarification 3: Instruction includes collecting and communicating observations about ways electricity can be conserved at home and school. Refer to Laboratory Practices Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

Grade 3

SC.3.EN.1 Explain that energy exists in different forms, can be transferred between objects, and is obtained from a variety of sources.

SC.3.EN.1.1 Investigate how mechanical and chemical energy exist in different forms and explain how they can cause changes.

Benchmark Clarifications:

Clarification 1: Instruction is limited to qualitative descriptions of energy forms and transformations and excludes calculations.

Clarification 2: Instruction includes organizing and comparing observations of energy changes. Refer to Mathematics Skills Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

Clarification 3: Instruction includes using models to represent different forms of energy and changes between energy forms. Refer to Modeling Skills Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

SC.3.EN.1.2 Explain that fossil fuels are sources of energy for electricity, heating, and transportation.

Benchmark Clarifications:

Clarification 1: Instruction includes identifying fossil fuels as coal, oil, and natural gas.

Clarification 2: Instruction includes understanding that fossil fuels are found in limited quantities and take a long time to replenish.

Clarification 3: Instruction is limited to identifying fossil fuels as energy sources and does not include extraction methods, chemical composition, or power-generation processes.

Clarification 4: Instruction includes examining historical developments that contributed to scientific understanding of how fossil fuels are sources of energy. Refer to the Timeline of Key Accomplishments Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

SC.3.EN.1.3 Describe ways humans use fossil fuels for energy.

Benchmark Clarifications:

Clarification 1: Instruction includes examples of fossil fuels used for electricity generation, transportation, and heating.

Clarification 2: Instruction includes recognizing that different energy sources are used for different purposes.

Clarification 3: Instruction includes comparing examples of energy use using charts, diagrams, or models. Refer to Mathematics Skills Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

SC.3.EN.1.4 Investigate and explain how energy can be transferred between objects.

Example: A third-grade student participates in several investigations at a Florida elementary school. In one investigation, the student rolls a soccer ball and observes it transfer energy to another ball during a collision. In another investigation, the student rubs their hands together and notices that their hands become warmer. In a third investigation, the student pushes a toy car and observes it begin moving across the floor.

Student Task(s) –

- Observe and describe how energy is transferred between objects in each investigation.

- Identify examples in which energy transfer causes a change in motion, sound, or temperature.
- Compare the different ways energy is transferred through pushes, collisions, and heating.
- Use observations and evidence from the investigations to explain how energy moved from one object to another.
- Create a diagram or model showing the transfer of energy in one investigation and explain the evidence that supports the model.

Benchmark Clarifications:

Clarification 1: Instruction includes investigating energy transferring from one object to another through pushes, pulls, collisions, and heating.

Clarification 2: Instruction excludes conservation equations or quantitative analysis.

Clarification 3: Instruction includes using models and diagrams to explain energy transfer between objects. Refer to Modeling Skills Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

Clarification 4: Instruction includes collecting observations and evidence to support explanations of energy transfer. Refer to Laboratory Practices Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

SC.3.EN.1.5 Investigate and describe how thermal energy moves.

Benchmark Clarifications:

Clarification 1: Instruction includes the movement of thermal energy from warmer objects to cooler objects.

Clarification 2: Instruction includes observing and recording patterns when thermal energy moves from warmer objects to cooler objects. Refer to Mathematics Skills Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

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SC.3.EN.1.6 Investigate and classify materials as heat (thermal) conductors or insulators.

Benchmark Clarifications:

Clarification 1: Instruction includes investigating materials such as copper, aluminum, wood, steel, plastic, and cotton to classify the materials as conductors or insulators.

Clarification 2: Instruction is limited to conductors or insulators of heat.

Clarification 3: Instruction includes explaining how conductors allow heat to move and insulators slow the movement of heat.

Clarification 4: Instruction is limited to thermal conductors and insulators and excludes electrical conductivity.

Clarification 5: Instruction includes planning and conducting investigations to compare conductors and insulators. Refer to Laboratory Practices Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

Grade 4

SC.4.EN.1 Explain how energy can be classified, transformed, transferred, and used in electrical systems and how energy sources can be categorized.

SC.4.EN.1.1 Investigate and explain how forms of energy are transformed and transferred to power electrical systems.

Benchmark Clarifications:

Clarification 1: Instruction includes identifying and describing how thermal, light, sound, mechanical, chemical, and electrical energy can be transformed and transferred within electrical systems.

Clarification 2: Instruction includes examples of electrical energy.

Clarification 3: Instruction includes classifying and representing forms of energy using models and diagrams. Refer to Modeling Skills Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

SC.4.EN.1.2 Investigate and build a simple circuit.

Benchmark Clarifications:

Clarification 1: Instruction includes that the flow of electricity requires a complete loop (closed circuit), and that switches can open or close a circuit and control the flow of electricity.

Clarification 2: Instruction is limited to simple series circuits and excludes calculations involving voltage, current, resistance, or electrical power.

Clarification 3: Instruction includes organizing and comparing circuit investigation data. Refer to Mathematics Skills Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

Clarification 4: Instruction includes representing simple circuits using drawings, symbols, and models. Refer to Modeling Skills Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

Clarification 5: Instruction includes collecting observations and data from investigations involving simple circuits. Refer to Laboratory Practices Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

Clarification 6: Instruction includes examining historical developments that contributed to scientific understanding of simple circuits. Refer to the Timeline of Key Accomplishments Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

SC.4.EN.1.3 Identify and compare energy sources as renewable or nonrenewable.

Benchmark Clarifications:

Clarification 1: Instruction includes examples of renewable energy sources such as geothermal, solar, hydroelectric, and wind.

Clarification 2: Instruction includes examples of nonrenewable energy sources such as coal, oil, natural gas, and uranium used in nuclear power generation.

Clarification 3: Instruction includes organizing and comparing renewable and nonrenewable energy sources using tables, charts, or graphs. Refer to Mathematics Skills Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

SC.4.EN.1.4 Investigate and trace the flow of energy as it is transferred within a system.

Example: A fourth-grade student investigates a solar-powered water pump used in a Florida school garden. During the investigation, the student observes sunlight shining on the solar panel, the pump moving water through a hose, and sounds produced while the system is operating. The student examines how the different parts of the system work together to move water to garden plants.

Student Task(s) –

- Identify the components of the system and determine the boundaries of the system.
- Describe where the energy enters the system and trace how energy moves from one part of the system to another.
- Explain how the transfer of energy causes water to move through the system.
- Identify evidence that some energy is released as sound or heat during the operation of the system.
- Create an energy-flow diagram, model, or drawing showing how energy moves through the system and how the components work together.
- Use observations and evidence collected during the investigation to explain how energy transfer allows the system to function.

Benchmark Clarifications:

Clarification 1: Instruction includes recognizing that energy is often released as heat or sound during a transfer.

Clarification 2: Instruction includes identifying system components and tracing energy transfers within a defined system.

Clarification 3: Instruction is limited to tracing observable energy transfers and excludes quantitative energy accounting or formal conservation calculations.

Clarification 4: Instruction includes constructing and using models, diagrams, energy-flow drawings, or pictures to trace energy transfers within a system. Refer to Modeling Skills Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

Clarification 5: Instruction includes collecting observations and evidence from investigations of energy transfer in systems. Refer to Laboratory Practices Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

Grade 5

SC.5.EN.1 Analyze how energy is conserved, transferred, and transformed within systems and how humans obtain and use energy resources.

SC.5.EN.1.1 Investigate and explain the principle that energy can be transferred and transformed but is not created or destroyed.

Example: A fifth-grade student visits Kennedy Space Center and observes several systems that use energy, including a solar-powered display, an electric rover model, and a rocket-launch simulation. During the visit, the student investigates how energy moves through each system and observes that some energy is released as heat and sound during operation. An exhibit explains that scientific understanding of the Law of Conservation of Energy developed during the 1800s. The student connects this historical development to observations of energy being transferred and transformed, rather than created or destroyed, in the systems at Kennedy Space Center.

Student Task(s) –

- Identify the forms of energy present in each system.
- Identify evidence that energy is released to the surroundings as heat or sound during energy transfers and transformations.

- Explain how observations of the systems support the scientific understanding of the Law of Conservation of Energy that developed during the 1800s.
- Create an energy-flow diagram or model showing how energy moves through the selected system.
- Use observations and evidence from the investigation to support an explanation of the Law of Conservation of Energy.

Benchmark Clarifications:

Clarification 1: Instruction includes recognizing that energy can be transferred and transformed among multiple forms.

Clarification 2: Instruction is limited to qualitative applications of conservation of energy and excludes algebraic calculations and formal conservation equations.

Clarification 3: Instruction includes using energy-flow diagrams and models to represent conservation of energy in systems. Refer to Modeling Skills Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

Clarification 4: Instruction includes collecting evidence from investigations to support explanations of energy conservation. Refer to Laboratory Practices Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

Clarification 5: Instruction includes examining historical developments that contributed to scientific understanding of the Law of Conservation of Energy. Refer to the Timeline of Key Accomplishments Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

SC.5.EN.1.2 Analyze ways humans use energy.

Benchmark Clarifications:

Clarification 1: Instruction includes comparing different uses and sources of energy.

Clarification 2: Instruction includes organizing and analyzing information related to human energy use. Refer to Mathematics Skills Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

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SC.5.EN.1.3 Analyze the impact and availability of Earth's energy sources.

Example: A Florida coastal community is exploring different energy sources to help meet future energy needs. Community leaders are considering solar energy, wind energy, natural gas, and coal. Students are provided with information showing that Florida receives abundant sunlight throughout the year, while the availability of wind varies by location. The information also describes that natural gas and coal are nonrenewable resources that must be extracted from Earth.

Student Task(s) –

- Classify each energy source as renewable or nonrenewable.
- Compare the availability of each energy source based on the information provided.
- Identify possible environmental impacts associated with each energy source at an introductory level.
- Analyze advantages and limitations of each energy source using evidence from the scenario.
- Compare how the different energy sources could meet the needs of the community.
- Use evidence to compare the advantages and limitations of different energy sources for the community.

Benchmark Clarifications:

Clarification 1: Instruction is limited to introductory comparisons of energy sources and excludes efficiency calculations, electrical generation systems, and energy policy analysis.

Clarification 2: Instruction includes using evidence to explain advantages and limitations of different energy sources. Refer to Laboratory Practices Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

SC.5.EN.1.4 Analyze a system to trace the flow of energy as it is transferred between components and transformed from one form to another.

Benchmark Clarifications:

Clarification 1: Instruction includes analyzing a system by identifying its boundaries, distinguishing components inside and outside the system, and identifying energy inputs, transfers, and outputs.

Clarification 2: Instruction includes tracing the flow of energy through a system using models, diagrams, or pictures, including identifying where energy originates, how it moves, what it does, and where energy is released as heat or sound during transfers.

Clarification 3: Instruction includes analyzing a given system to trace where energy originates, how it moves, and what it does within the specific system.

Clarification 4: Instruction is limited to qualitative energy-flow analysis and does not include open and closed system classifications.

Clarification 5: Instruction includes representing energy movement using diagrams and models. Refer to Modeling Skills Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

SC.5.EN.1.5 Investigate and explain how potential energy and kinetic energy change within a system.

Example: A fifth-grade student visits a Florida state park with mangrove forests and observes a person standing on an elevated boardwalk observation platform, a stretched bungee cord used in a recreation demonstration, a kayak moving through a mangrove-lined waterway, and a bicycle traveling along a park trail.

Student Task(s) –

- Identify examples of potential energy, kinetic energy, or both.
- Describe where energy is stored in the observation platform and stretched bungee cord examples.
- Explain how energy changes between potential energy and kinetic energy during motion.
- Compare the energy present in the kayak and bicycle examples.
- Create a labeled diagram or model showing changes between potential and kinetic energy.

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- Use evidence from the observations to explain how potential and kinetic energy are components of mechanical energy.

Benchmark Clarifications:

Clarification 1: Instruction includes that mechanical energy consists of stored (potential) energy and moving (kinetic) energy.

Clarification 2: Instruction includes gravitational potential energy and elastic potential energy.

Clarification 3: Instruction is limited to qualitative relationships among potential energy, kinetic energy, and motion and excludes formal calculations using energy equations.

Clarification 4: Instruction includes collecting and interpreting data related to energy changes in moving systems. Refer to Mathematics Skills Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

Clarification 5: Instruction includes using diagrams, models, and investigations to explain changes between potential and kinetic energy. Refer to Modeling Skills Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

The Science of Matter

How matter can be observed, measured, classified, and changed; how matter exists in different states and is made of particles; and how the properties and behavior of matter explain the materials and changes observed in everyday life.

Grade Kindergarten

Proposed DRAFT Standards

SC.K.M.1 Recognize that matter has observable properties, can be identified and sorted, and can change in different ways.

SC.K.M.1.1 Identify matter.

Benchmark Clarifications:

Clarification 1: Instruction includes identifying and sorting everyday examples and non-examples of matter based on observable properties.

Clarification 2: Instruction is limited to solids and includes identifying everyday examples of matter such as rocks, clothes, cotton balls, books, bananas, chairs, and trees.

Clarification 3: Instruction includes identifying everyday non-examples of matter such as light, shadows, sounds, and rainbows.

Clarification 4: Instruction includes using observations and sorting activities to identify examples and non-examples of matter. Refer to Mathematics Skills Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

SC.K.M.1.2 Observe and sort everyday examples of matter.

Benchmark Clarifications:

Clarification 1: Instruction includes exploring and observing common classroom solids, such as buttons, paperclips, counters, cubes, and blocks, using sensory observations such as texture, odor, sound, color, and shape.

Clarification 2: Instruction includes sorting and describing solids based on observable properties, including color, shape, weight, and texture, using nonstandard measurements when appropriate.

Clarification 3: Instruction is limited to nonstandard measurements of solids.

Clarification 4: Instruction includes recording observations using drawings, pictures, or charts. Refer to Modeling Skills Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

SC.K.M.1.3 Observe and describe ways matter can change.

Benchmark Clarifications:

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Clarification 1: Instruction includes exploring and observing changes caused by actions such as bending, tearing, cutting, rolling, folding, and reshaping common classroom materials.

Clarification 2: Instruction includes comparing materials before and after a change to describe observable differences.

Clarification 3: Instruction is limited to observable changes in solid materials and excludes classification of changes as physical or chemical.

Grade 1

SC.1.M.1 Classify matter and describe how its properties and combinations can result in observable changes.

SC.1.M.1.1 Classify matter as a solid or liquid.

Benchmark Clarifications:

Clarification 1: Instruction includes solids having their own shape while liquids take the shape of their container.

Clarification 2: Instruction includes comparing solids and liquids based on observable properties.

Clarification 3: Instruction is limited to solids and liquids and excludes particulate explanations of matter and the measurement of liquid volume.

SC.1.M.1.2 Observe, compare, and sort examples of matter.

Benchmark Clarifications:

Clarification 1: Instruction includes exploration and observation of common classroom solids and liquids.

Clarification 2: Instruction includes observing and comparing the amount of matter in containers using nonstandard observations.

Clarification 3: Instruction includes sorting materials based on magnetic and nonmagnetic properties.

Clarification 4: Instruction is limited to nonstandard measurements of solids and liquids.

Clarification 5: Instruction includes sorting solids by size, relative volume, and whether they are magnetic or nonmagnetic. Refer to Mathematics Skills Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

SC.1.M.1.3 Observe and describe how matter can change when materials are mixed or combined.

Benchmark Clarifications:

Clarification 1: Instruction includes investigating changes caused by mixing and combining materials.

Clarification 2: Instruction includes observing mixtures such as trail mix, sand and water, or mixing and baking ingredients to make cookies.

Clarification 3: Instruction includes describing evidence that a change occurred.

Clarification 4: Instruction is limited to solid and liquid matter.

Clarification 5: Instruction is limited to observing and describing changes and excludes physical and chemical change classifications.

Grade 2

SC.2.M.1 Explain that matter exists in different states, can be measured, and can change in ways that may or may not produce new substances.

SC.2.M.1.1 Classify matter as a solid, liquid, or gas.

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Benchmark Clarifications:

Clarification 1: Instruction includes that matter can exist as a solid, liquid, or gas.

Clarification 2: Instruction includes comparing solids, liquids, and gases based on observable properties.

Clarification 3: Instruction includes solids and liquids both have a definite volume, while gases do not have a definite shape or volume and expand to fill their container.

Clarification 4: Instruction includes sorting and comparing examples of solids, liquids, and gases. Refer to Mathematics Skills Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

SC.2.M.1.2 Measure and compare the temperature of matter.

Benchmark Clarifications:

Clarification 1: Instruction includes measuring the temperature of solids, liquids, and gases using appropriate thermometers.

Clarification 2: Instruction includes comparing matter using temperature data. Refer to Mathematics Skills Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

SC.2.M.1.3 Describe how some changes in matter create new substances while others do not.

Benchmark Clarifications:

Clarification 1: Instruction includes comparing changes that do not create new substances such as melting, freezing, and dissolving.

Clarification 2: Instruction includes exploring changes such as decaying, decomposition, or cooking that create new substances.

Clarification 3: Instruction excludes atomic-level explanations, chemical equations, and conservation-of-matter concepts.

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Clarification 4: Instruction includes identifying evidence used to determine whether a change created a new substance or not. Refer to Laboratory Practices Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

Clarification 5: Instruction includes examining historical developments that contributed to scientific understanding of changes in matter. Refer to the Timeline of Key Accomplishments Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

Grade 3

SC.3.M.1 Explain that matter is made of particles, has measurable properties, and can undergo physical and chemical changes.

SC.3.M.1.1 Model particle motion in solids, liquids, and gases.

Example: A third-grade student visits a Florida beach on a warm day and observes ice cubes in a cooler, liquid water in a bottle, and water vapor rising from a wet boardwalk after a rain shower. The student learns that all three examples are forms of matter and that scientists use particle models to explain how matter behaves.

Student Task(s) –

- Classify each example as a solid, liquid, or gas.
- Create particle models showing the arrangement and motion of particles in each state.
- Compare how particles move in solids, liquids, and gases.
- Explain how warming temperatures affect particle motion.
- Use observations and models to explain differences in particle motion among solids, liquids, and gases.

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Benchmark Clarifications:

Clarification 1: Instruction includes that all matter is made of tiny particles that are too small to see without magnification.

Clarification 2: Instruction includes that temperature affects particle motion.

Clarification 3: Instruction is limited to particle models and excludes atomic structure, molecules, isotopes, and subatomic particles.

Clarification 4: Instruction includes a variety of representations to model particle motion in matter. Refer to Modeling Skills Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

Clarification 5: Instruction includes examining historical developments that contributed to scientific understanding of how particles move in solids, liquids, and gases. Refer to the Timeline of Key Accomplishments Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

SC.3.M.1.2 Measure and compare properties of matter.

Benchmark Clarifications:

Clarification 1: Instruction includes selecting and using tools such as balances, scales, rulers, measuring tapes, graduated cylinders, measuring cups, and thermometers to collect measurements.

Clarification 2: Instruction includes measuring and comparing mass, weight, volume, temperature, and length of solids and liquids using appropriate tools and units. Refer to Mathematics Skills Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

Clarification 3: Instruction includes organizing and recording measurement data in tables, charts, or other appropriate formats. Refer to Laboratory Practices Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

SC.3.M.1.3 Distinguish between chemical changes and physical changes in matter.

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Benchmark Clarifications:

Clarification 1: Instruction includes identifying evidence of a physical change, such as a change in state, size, shape, or dissolving, when no new substance is formed.

Clarification 2: Instruction includes identifying evidence of a chemical change, such as the formation of a new substance, gas production, color change, odor production, light production, or temperature change.

Clarification 3: Instruction includes investigating examples of physical and chemical changes, such as melting, freezing, dissolving, cooking, burning, rusting, digestion, and decay.

Clarification 4: Instruction is limited to observable evidence of physical and chemical changes and excludes atomic-level explanations, chemical equations, and reaction balancing.

Clarification 5: Instruction includes using observations and evidence to classify changes in matter. Refer to Laboratory Practices Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

Grade 4

SC.4.M.1 Explain how matter can be classified, measured, represented by atomic models, and separated based on its properties.

SC.4.M.1.1 Recognize that matter is made of atoms and use models to represent atoms.

Benchmark Clarifications:

Clarification 1: Instruction includes recognizing that atoms are extremely small building blocks of matter.

Clarification 2: Instruction includes models, drawings, and representations to show that all matter is composed of atoms.

Clarification 3: Instruction includes recognizing that there are many different types of atoms, and the different combinations are what defines different substances.

Clarification 4: Instruction is limited to conceptual models of atoms and excludes subatomic particles, atomic number, mass number, isotopes, electron arrangement, and chemical bonding.

Clarification 5: Instruction includes using models to represent atoms and matter composed of atoms. Refer to Modeling Skills Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

Clarification 6: Instruction includes examining historical developments that contributed to scientific understanding of the composition of atoms. Refer to the Timeline of Key Accomplishments Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

SC.4.M.1.2 Measure and compare the volume of solids using water displacement.

Example: A fourth-grade student collects several objects during a field trip to a Florida beach, including a shell, a smooth rock, and a piece of driftwood. The student wants to determine and compare the volume of each object. Using a graduated cylinder filled with water, the student records the initial water level, submerges each object one at a time, and records the new water level after each object is added.

Student Task(s) –

- Measure the volume of each object using water displacement.
- Record the initial and final water levels.
- Organize and compare volume measurements.
- Explain how displaced water can be used to determine volume.
- Use evidence to explain why both floating and submerged objects have volume.

Benchmark Clarifications:

Clarification 1: Instruction includes recognizing that floating and submerged objects both have volume.

Clarification 2: Instruction includes distinguishing between mass and volume using real-world examples.

Clarification 3: Instruction is limited to measuring the volume of solids and excludes density calculations.

Clarification 4: Instruction includes organizing and recording measurement data from water-displacement investigations. Refer to Mathematics Skills Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

Clarification 5: Instruction includes comparing volume measurements of different objects. Refer to Laboratory Practices Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

SC.4.M.1.3 Classify matter by observable and measurable properties.

Benchmark Clarifications:

Clarification 1: Instruction is limited to classification based on observable and measurable properties and excludes classification based on atomic structure or chemical composition.

Clarification 2: Instruction includes organizing and comparing observations and measurements to classify matter. Refer to Mathematics Skills Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

Clarification 3: Instruction includes observing and measuring the physical properties of matter using appropriate tools and senses. Refer to Laboratory Practices Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

SC.4.M.1.4 Investigate how some combinations of substances can be separated while others cannot.

Example: A fourth-grade student at a Florida elementary school is helping clean up after a school garden and science investigation day. Several mixtures have been collected,

including sand and water from the garden, iron filings mixed with sand from a magnet investigation, muddy water from a playground puddle, and salt dissolved in water from a classroom activity.

Student Task(s) –

- Investigate each mixture and determine whether its components can be separated.
- Select and use an appropriate physical separation method, such as filtering, evaporation, magnetism, or settling.
- Describe the observable properties of the substances and explain why the separation method is effective.
- Record observations before and after separation.
- Compare the effectiveness of different separation methods.
- Use evidence from the investigation to explain why the properties of substances determine which separation methods are effective.

Benchmark Clarifications:

Clarification 1: Instruction includes exploring physical separation methods, such as filtering, evaporation, magnetism, and settling, and using observable properties to explain why different methods are effective.

Clarification 2: Instruction is limited to common classroom mixtures and solutions involving solids and liquids and excludes chemical separation processes, as well as the terms solute and solvent.

Clarification 3: Instruction includes organizing, comparing, and analyzing observations and data collected before and after physical separation. Refer to Mathematics Skills Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

Clarification 4: Instruction includes conducting investigations, recording observations, and using evidence to explain separation results. Refer to Laboratory Practices Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

Proposed DRAFT Standards

Grade 5

SC.5.M.1 Analyze the composition, properties, and changes of matter to classify substances and solve problems using evidence.

SC.5.M.1.1 Explain that all matter is made of atoms, that elements are made of one type of atom, and that atoms contain subatomic particles.

Benchmark Clarifications:

Clarification 1: Instruction includes recognizing that different elements have different properties because they are made of different types of atoms.

Clarification 2: Instruction includes identifying the three major subatomic particles of atoms as protons, neutrons, and electrons and recognizing that protons have a positive charge, neutrons have no charge, and electrons have a negative charge.

Clarification 3: Instruction is limited to basic conceptual models of atoms, elements, and subatomic particles and excludes atomic number, mass number, isotopes, electron arrangements, chemical bonding, and periodic table organization.

Clarification 4: Instruction includes using models to represent atoms, elements, and subatomic particles. Refer to Modeling Skills Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

Clarification 5: Instruction includes examining historical developments that contributed to scientific understanding of how matter is made of atoms. Refer to the Timeline of Key Accomplishments Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

SC.5.M.1.2 Solve a real-world problem using observable and measurable properties of matter.

Proposed DRAFT Standards

Example: A Florida coastal park is replacing informational signs along a nature trail. The signs must withstand frequent rain, strong sunlight, high humidity, and salty air from the nearby ocean. Students investigate several materials, including wood, plastic, aluminum, and cardboard, to determine which material would be most suitable for the new signs.

Student Task(s) –

- Observe and compare the observable and measurable properties of each material.
- Collect and record observations and measurements.
- Organize information in tables, charts, or other appropriate formats.
- Analyze the evidence to determine which material is best suited for the signs.
- Explain how the properties of each material affect its suitability for the task.
- Use evidence to justify a recommendation.

Benchmark Clarifications:

Clarification 1: Instruction includes exploring a real-world problem that can be solved by applying knowledge of matter and its properties.

Clarification 2: Instruction is limited to observable properties including texture, color, shape, odor, magnetism, flexibility, hardness, state of matter, and ability to sink or float, and measurable properties including mass, weight, length, volume, and temperature.

Clarification 3: Instruction includes collecting, organizing, and analyzing observations and measurements to evaluate possible solutions. Refer to Mathematics Skills Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

Clarification 4: Instruction includes using evidence to justify solutions to real-world problems. Refer to Laboratory Practices Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

SC.5.M.1.3 Analyze evidence to compare and contrast physical and chemical changes in matter.

Proposed DRAFT Standards

Example: While visiting a Florida citrus grove, a fifth-grade student observes orange trees growing throughout the year. The student learns that the leaves of the orange trees use sunlight, water, and carbon dioxide from the air to produce sugars that help the tree grow and produce fruit. The student also observes that water evaporates from puddles after a rainstorm and that oranges can be cut into smaller pieces during harvesting and processing.

Student Task(s) –

- Classify each example as a physical change or a chemical change.
- Identify evidence that photosynthesis is a chemical change.
- Explain how photosynthesis produces new substances that were not present before.
- Compare photosynthesis to physical changes such as cutting an orange or water evaporating from a puddle.
- Use observations and evidence to explain why some changes create new substances while others only change the form, size, or state of matter.
- Create a model or diagram showing the matter involved before and after photosynthesis and identify evidence supporting its classification as a chemical change.

Benchmark Clarifications:

Clarification 1: Instruction includes analyzing evidence to classify changes in matter as physical changes or chemical changes, including changes involving mixtures.

Clarification 2: Instruction includes using observations and investigations to classify changes based on evidence such as change in state, dissolving, formation of a new substance, color change, gas production, temperature change, or whether components can be separated using physical methods.

Clarification 3: Instruction includes investigating how heating, cooling, mixing, and reactions affect matter.

Clarification 4: Instruction is limited to observable evidence of changes in matter and excludes atomic-level explanations, chemical equations, reaction balancing, and distinguishing mixtures from compounds at the molecular level.

Clarification 5: Instruction includes using models and diagrams to represent evidence of physical and chemical changes. Refer to Modeling Skills Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

Clarification 6: Instruction includes collecting and using evidence from investigations to compare and explain physical and chemical changes. Refer to Laboratory Practices Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

Clarification 7: Instruction includes examining historical developments that contributed to scientific understanding of physical and chemical changes in matter. Refer to the Timeline of Key Accomplishments Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

SC.5.M.1.4 Compare mixtures and pure substances using observable and measurable properties.

Example: A fifth-grade student examines materials from different locations around Florida, including seawater from the coast, soil from a school garden, distilled water used in a science laboratory, table salt, and air collected in a balloon. The student investigates the materials to determine whether each is a mixture or a pure substance using observations and physical tests.

Student Task(s) –

- Observe and compare the properties of each material.
- Classify each material as a mixture or a pure substance using evidence from observations and investigations.
- Identify which materials can be separated using physical methods and explain how those methods could be used.
- Organize observations and classifications in a table or chart.
- Create a drawing, diagram, or model representing a mixture and a pure substance.
- Use evidence to compare mixtures and pure substances and justify each classification.

Proposed DRAFT Standards

Benchmark Clarifications:

Clarification 1: Instruction includes recognizing that components of mixtures can often be separated using physical methods and comparing mixtures and pure substances using observable and measurable properties.

Clarification 2: Instruction includes examples such as seawater, soil, trail mix, and air as mixtures and distilled water, table salt, sugar, and copper as pure substances.

Clarification 3: Instruction is limited to observable and measurable properties of matter and excludes particle-level, atomic-level, and molecular-level explanations, including homogeneous and heterogeneous mixture classifications.

Clarification 4: Instruction includes organizing and comparing observations and measurements to support classifications. Refer to Mathematics Skills Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

Clarification 5: Instruction includes using drawings, diagrams, and models to represent mixtures and pure substances. Refer to Modeling Skills Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

Clarification 6: Instruction includes conducting observations and investigations to classify materials as mixtures or pure substances. Refer to Laboratory Practices Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

The Science of Force and Motion

How forces affect the motion of objects; how motion can be observed, measured, and described; and how forces interact to produce changes in motion.

Grade Kindergarten

SC.K.FM.1 Recognize that pushes and pulls affect the motion and position of objects.

Proposed DRAFT Standards

SC.K.FM.1.1 Investigate pushes and pulls as forces.

Example: During a Kindergarten investigation, a student pushes a toy car across the floor and pulls it back using a string. The student observes how pushes and pulls change the car's movement and uses physical actions to model a push and a pull.

Benchmark Clarifications:

Clarification 1: Instruction includes describing whether an object is being pushed or pulled during play or classroom investigations.

Clarification 2: Instruction includes multiple representations, such as drawings, physical actions and models, or demonstrations to represent pushes and pulls. Refer to Modeling Skills Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

Clarification 3: Instruction includes examining historical developments that contributed to scientific understanding of forces. Refer to the Timeline of Key Accomplishments Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

SC.K.FM.1.2 Investigate how pushes and pulls can change the motion of objects.

Benchmark Clarifications:

Clarification 1: Instruction includes investigating how pushing or pulling can make an object start moving, stop moving, or change direction.

Clarification 2: Instruction includes investigating how stronger or weaker pushes and pulls affect how fast and far an object moves.

Clarification 3: Instruction includes making and communicating observations from investigations. Refer to Laboratory Practices Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

SC.K.FM.1.3 Describe how objects move.

Benchmark Clarifications:

Proposed DRAFT Standards

Clarification 1: Instruction includes observing everyday objects, including 3-D figures, moving in different ways, such as rolling, sliding, spinning, swinging, and moving back-and-forth.

Clarification 2: Instruction includes classifying motion by pathways such as straight, curved, circular, and back-and-forth.

Clarification 3: Instruction includes describing motion using positional and directional words such as fast, slow, up, down, near, far, left, right, forward, and backward.

Clarification 4: Instruction includes describing an object's position using reference points, such as next to, behind, in front of, under, and between other objects.

Grade 1

SC.1.FM.1 Describe how forces cause changes in motion and how surfaces and contact interactions affect moving objects.

SC.1.FM.1.1 Describe changes in motion.

Benchmark Clarifications:

Clarification 1: Instruction includes describing changes in an object’s position or pathway during motion and recognizing when an object speeds up, slows down, starts, stops, or changes direction.

Clarification 2: Instruction includes comparing how far objects move over the same amount of time using observations.

Clarification 3: Instruction includes identifying predictable patterns, organizing and comparing observations in changing motion. Refer to Mathematics Skills Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

SC.1.FM.1.2 Investigate how contact forces affect motion.

Benchmark Clarifications:

Clarification 1: Instruction includes exploring contact forces that happen when objects touch, including pushing, pulling, or bumping using everyday materials such as toys, balls, and books.

Clarification 2: Instruction includes conducting investigations using everyday materials, making observations and using evidence to explain the effects of contact forces. Refer to Laboratory Practices Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

SC.1.FM.1.3 Explore how friction can affect an object's motion.

Benchmark Clarifications:

Clarification 1: Instruction includes comparing how objects move on different surfaces and recording observations through investigations.

Clarification 2: Instruction excludes mathematical calculation of force amounts.

Clarification 3: Instruction includes recording and comparing observations of an object's motion on different surfaces. Refer to Mathematics Skills Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

Clarification 4: Instruction includes conducting investigations and recording observations to explore the effects of friction on motion. Refer to Laboratory Practices Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

Grade 2

SC.2.FM.1 Explain how motion can be measured and how contact and noncontact forces affect objects.

SC.2.FM.1.1 Measure and represent motion.

Benchmark Clarifications:

Proposed DRAFT Standards

Clarification 1: Instruction includes measuring, comparing, and representing motion using distance traveled over time with appropriate tools, units, diagrams, models, and data displays.

Clarification 2: Instruction is limited to distance and time as measures and excludes formal speed calculations.

Clarification 3: Instruction includes organizing and comparing motion data using appropriate units and data displays. Refer to Mathematics Skills Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

Clarification 4: Instruction includes using diagrams, models, and data displays to represent and compare motion. Refer to Modeling Skills Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

SC.2.FM.1.2 Investigate contact and noncontact forces.

Example: During a second-grade investigation, students push a book across a desk and observe a pencil fall to the floor. Students compare how forces can cause motion through direct contact and through gravity acting at a distance.

Student Task(s) –

- Observe examples of contact and noncontact forces.
- Identify whether each force requires direct contact.
- Compare contact and noncontact forces.
- Describe how gravity affects objects.
- Use observations and evidence to explain how forces affect motion.

Benchmark Clarifications:

Clarification 1: Instruction includes investigating contact forces and noncontact forces, limited to gravity and magnetism.

Clarification 2: Instruction includes exploring how gravity pulls objects toward Earth and how magnets can cause movement without touching an object.

Clarification 3: Instruction is limited to classroom investigations and excludes mathematical calculations of forces and the formal vocabulary of inertia.

Clarification 4: Instruction includes observing and describing the effects of gravity and magnetism on everyday and classroom objects. Refer to Laboratory Practices Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

Clarification 5: Instruction includes examining historical developments that contributed to scientific understanding of how forces can be either contact or noncontact. Refer to the Timeline of Key Accomplishments Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

SC.2.FM.1.3 Explain how contact and noncontact forces affect motion.

Benchmark Clarifications:

Clarification 1: Instruction includes investigating how contact forces and noncontact forces, limited to gravity and magnetism, can start, stop, speed up, slow down, or change the direction of an object's motion.

Clarification 2: Instruction includes exploring how pushes, pulls, supports, and gravity affect the motion of everyday and classroom objects.

Clarification 3: Instruction is limited to qualitative descriptions of force and motion and excludes mathematical calculations of forces and the formal vocabulary of inertia.

Clarification 4: Instruction includes observing and describing how forces affect objects at rest and in motion. Refer to Laboratory Practices Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

Grade 3

Proposed DRAFT Standards

SC.3.FM.1 Explain how forces and gravity influence motion and how distance, time, and speed are related.

SC.3.FM.1.1 Investigate and explain the relationship among distance, time, and speed.

Example: During a classroom activity, third-grade students race model airboats inspired by those used in the Florida Everglades. Students test the airboats on a marked track and record how far each airboat travels and how long it takes to reach the finish line. In another trial, students allow the airboats to travel for the same amount of time and compare the distances traveled.

Student Task(s) –

- Measure and record distance and time data for each airboat.
- Compare airboats traveling the same distance in different amounts of time and the same amount of time over different distances.
- Organize the data in tables, charts, or other representations.
- Identify patterns relating distance, time, and motion.
- Use evidence to explain which airboat moved faster without calculating speed.

Benchmark Clarifications:

Clarification 1: Instruction includes comparing objects traveling the same distance in different amounts of time.

Clarification 2: Instruction includes comparing objects traveling the same amount of time but traveling different distances.

Clarification 3: Instruction excludes the mathematical computation of the speed of objects.

Clarification 4: Instruction includes organizing and comparing data related to distance and time. Refer to Mathematics Skills Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

Proposed DRAFT Standards

SC.3.FM.1.2 Investigate how gravity affects the motion of objects.

Example: During a third-grade science investigation, students explore how gravity and air resistance affect the motion of objects. Students drop a flat sheet of paper and a crumpled paper ball from the same height and observe how quickly each reaches the ground. They learn that Galileo's investigations helped advance scientific understanding of how objects move as they fall. They notice that both objects fall because gravity pulls them toward Earth, but the crumpled paper reaches the ground faster because its shape experiences less air resistance than the flat sheet of paper.

Student Task(s) –

- Observe and compare a flat sheet of paper and a crumpled paper ball as they fall.
- Conduct repeated trials and record observations.
- Organize and analyze data to identify patterns.
- Explain how gravity affects both objects.
- Use evidence to explain how shape and air resistance affect motion.

Benchmark Clarifications:

Clarification 1: Instruction includes a review of gravity as a noncontact force and the understanding that gravity pulls objects toward Earth.

Clarification 2: Instruction includes exploring how gravity pulls on all objects regardless of mass. When objects move through air, differences in shape can affect their motion because of air resistance.

Clarification 3: Instruction excludes the mathematical calculation of gravitational force.

Clarification 4: Instruction includes collecting observations and evidence during gravity investigations. Refer to Laboratory Practices Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

Clarification 5: Instruction includes examining historical developments that contributed to scientific understanding of gravity and the motion of falling objects. Refer to the Timeline of

Proposed DRAFT Standards

Key Accomplishments Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

SC.3.FM.1.3 Investigate how balanced and unbalanced forces affect motion.

Benchmark Clarifications:

Clarification 1: Instruction includes describing how forces affect motion based on classroom exploration.

Clarification 2: Instruction includes investigations where an object's motion does not change when pushes or pulls are balanced and an object's motion does change when pushes or pulls are unbalanced.

Clarification 3: Instruction includes using diagrams, models, or demonstrations to represent balanced and unbalanced forces. Refer to Modeling Skills Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

Clarification 4: Instruction includes examining historical developments that contributed to scientific understanding of balanced and unbalanced forces. Refer to the Timeline of Key Accomplishments Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

Grade 4

SC.4.FM.1 Analyze how magnetic forces, motion patterns, mass, and force influence the motion of objects.

SC.4.FM.1.1 Investigate and explain magnetic attraction and repulsion.

Benchmark Clarifications:

Clarification 1: Instruction includes a review of magnetism as a noncontact force.

Clarification 2: Instruction includes that magnets have two poles and that magnetic poles can attract or repel one another.

Clarification 3: Instruction includes the testing and classification of materials that are attracted to magnets and materials that are not attracted to magnets.

Clarification 4: Instruction includes describing how magnetic forces are affected by a magnet's strength and its distance from an object or another magnet.

Clarification 5: Instruction includes using diagrams, arrows, and models to represent magnetic interactions. Refer to Modeling Skills Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

Clarification 6: Instruction includes using observations and investigations to classify materials based on magnetic properties. Refer to Laboratory Practices Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

Clarification 7: Instruction includes examining historical developments that contributed to scientific understanding of magnetic forces. Refer to the Timeline of Key Accomplishments Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

SC.4.FM.1.2 Analyze patterns of motion using position, direction, distance, and time.

Benchmark Clarifications:

Clarification 1: Instruction includes identifying and explaining repeating or predictable patterns in motion.

Clarification 2: Instruction includes describing relationships among position, direction, distance, and time, including how distance and time can be used to describe how fast an object moves.

Clarification 3: Instruction includes using observations and evidence to explain pathways and patterns of motion.

Clarification 4: Instruction excludes the mathematical computation of the speed of objects.

Clarification 5: Instruction includes interpreting data about motion over time. Refer to Mathematics Skills Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

Clarification 5: Instruction includes using diagrams, tables, charts, or representations to analyze patterns of motion. Refer to Modeling Skills Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

SC.4.FM.1.3 Investigate and explain the relationship between motion, mass, and force.

Example: A fourth-grade student investigates carts used to transport oranges in a Florida citrus grove. The student places different numbers of oranges in identical carts and applies the same push to each cart. The student then repeats the investigation by applying stronger and weaker pushes to the same cart and observes how the motion changes.

Student Task(s) –

- Investigate how carts with different masses respond to the same force.
- Investigate how different amounts of force affect the motion of the same cart.
- Record and organize observations in a table or chart.
- Identify patterns showing how force and mass affect motion.
- Use evidence to explain the relationship among motion, force, and mass.

Benchmark Clarifications:

Clarification 1: Instruction includes understanding that motion depends on both force and mass, including that greater forces produce greater changes in motion and objects with greater mass require more force to achieve similar changes in motion.

Clarification 2: Instruction includes identifying how the mass of an object and the force applied to it interact to produce changes in motion.

Clarification 3: Instruction excludes mathematical calculations.

Clarification 4: Instruction includes organizing and comparing evidence collected from investigations involving mass and force. Refer to Mathematics Skills Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

Clarification 5: Instruction includes conducting investigations, recording and organizing observations, identifying patterns, and using evidence to explain the relationship between motion, mass, and force. Refer to Laboratory Practices Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

Grade 5

SC.5.FM.1 Analyze how forces interact to change motion and explain relationships among force, mass, weight, and simple machines.

SC.5.FM.1.1 Investigate and explain how simple machines change the amount or direction of force needed to do work.

Example: A fifth-grade student visits a Florida marina and observes workers loading supplies onto boats. The workers use ramps to move heavy equipment onto docks, pulleys to lift fishing gear, wheel-and-axle systems to move carts, and wedges and screws as part of tools used for maintenance and repairs. The student investigates how these simple machines help workers move objects more easily and learns that simple machines have contributed to human efforts to make work easier throughout history.

Student Task(s) –

- Identify examples of simple machines used at the marina.
- Investigate how simple machines change the amount or direction of force.
- Identify the components of a simple machine system and explain how they work together.
- Compare moving an object with and without a simple machine.
- Record observations and evidence from investigations.
- Use evidence to explain how simple machines make work easier.

Benchmark Clarifications:

Clarification 1: Instruction includes work as occurring when a force causes an object to move a distance.

Clarification 2: Instruction includes recognizing that simple machines help transfer forces to make work easier.

Clarification 3: Instruction includes explaining the functions of levers, pulleys, inclined planes, wheels and axles, screws, and wedges based on investigations.

Clarification 4: Instruction includes identifying the components of a simple machine system and explaining how the components work together to change the amount or direction of force.

Clarification 5: Instruction excludes mathematical computations of forces.

Clarification 6: Instruction includes using tools to investigate how levers, pulleys, inclined planes, wheels and axles, screws, and wedges change the force needed to move an object. Refer to Laboratory Practices Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

Clarification 7: Instruction includes examining historical developments that contributed to scientific understanding of how simple machines change the amount or direction of force. Refer to the Timeline of Key Accomplishments Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

SC.5.FM.1.2 Investigate and explain that when one object exerts a force on another object, the second object exerts an equal force in the opposite direction.

Benchmark Clarifications:

Clarification 1: Instruction includes recognizing that forces occur when objects interact through pushes, pulls, collisions, or other actions and understanding that forces always occur as equal and opposite action-reaction pairs acting on different objects.

Clarification 2: Instruction excludes mathematical computations of forces.

Clarification 3: Instruction includes using diagrams and models to represent force pairs. Refer to Modeling Skills Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

Clarification 4: Instruction includes examining historical developments that contributed to scientific understanding of equal and opposite action-reaction pairs of forces. Refer to the Timeline of Key Accomplishments Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

SC.5.FM.1.3 Investigate and explain how collisions between objects change their motion.

Example: A fifth-grade student investigates collisions between model boats representing vessels traveling through Florida coastal waterways and estuaries. During the investigation, students send model boats of different masses across a water tank and observe what happens when the boats collide with stationary boats and with other moving boats. Students record changes in speed and direction before and after each collision.

Student Task(s) –

- Observe and describe how collisions change motion.
- Compare changes in speed and direction after different collisions.
- Investigate how object mass affects collision outcomes.
- Organize observations and measurements from multiple trials.
- Identify patterns in how collisions affect motion.
- Use evidence to explain how collisions can change speed, direction, or motion.

Benchmark Clarifications:

Clarification 1: Instruction includes investigating collisions involving everyday objects such as balls, toy cars, marbles, or falling water.

Clarification 2: Instruction includes observing and explaining how collisions can change the speed or direction of moving objects and how the mass of objects can affect the results of a collision.

Clarification 3: Instruction includes identifying the objects involved in a collision and using observations to describe how the interaction changes their motion.

Clarification 4: Instruction is limited to qualitative descriptions of collisions and excludes mathematical calculations involving force, momentum, or energy.

Clarification 5: Instruction includes organizing, comparing, and recording observations and measurements. Refer to Mathematics Skills Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

Clarification 6: Instruction includes using observations and evidence to explain changes in motion resulting from collisions. Refer to Laboratory Practices Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

SC.5.FM.1.4 Compare mass and weight in different situations.

Benchmark Clarifications:

Clarification 1: Instruction includes recognizing that mass is the amount of matter in an object and weight is the pull of gravity on an object.

Clarification 2: Instruction includes that an object's mass remains the same regardless of location, while its weight changes when the strength of gravity changes, such as on Earth and the Moon.

Clarification 3: Instruction is limited to conceptual comparisons of mass and weight and excludes mathematical calculations involving gravitational force or weight.

Clarification 4: Instruction includes comparing the mass and weight of objects using observations, measurements, models, and real-world scenarios. Refer to Mathematics Skills Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

Clarification 5: Instruction includes representing relationships among gravity, mass, and weight using diagrams, models, or illustrations. Refer to Modeling Skills Supporting Mastery of K-5 Energy, Matter, and Force and Motion Benchmarks.

Proposed DRAFT Standards

The Science of Planet Earth

How Earth's surface is made of land, water, rocks, soil, and living things; how weather and water shape Earth's surface; how Earth systems interact and change over time; and how evidence from rocks and fossils helps us understand Earth's past.

Grade Kindergarten

Proposed DRAFT Standards

SC.K.PE.1 Recognize that Earth is made of land, water, rocks, soil, and living things that can change over time.

SC.K.PE.1.1 Identify that Earth's surface is made up of land and bodies of water.

Example: A student examines photographs of Florida environments including a beach, a river, a pond, and a grassy park. The student identifies which parts of each photograph show land and which parts show bodies of water.

Student Task(s) –

- Identify examples of land and water in each photograph.
- Sort pictures into groups showing land, water, and both.
- Describe observable differences between land and water.

Benchmark Clarifications:

Clarification 1: Instruction includes examples of land such as soil, sand, rocks, hills, and mountains.

Clarification 2: Instruction of bodies of water is limited to oceans, lakes, rivers, and ponds.

Clarification 3: Instruction focuses on observing and categorizing features of Earth's surface as land or water and excludes classification of the land, soil, rocks, and living things.

Clarification 4: Instruction includes using pictures, maps, globes, models, diagrams, or other representations to identify and distinguish between land and bodies of water. Refer to Modeling Skills Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

SC.K.PE.1.2 Identify and describe oceans and mountains as major features of Earth's surface.

Example: Students use a globe and photographs to compare the Atlantic Ocean near Florida with mountain regions found in other parts of the United States.

Student Task(s) –

- Identify oceans and mountains in pictures and on a globe.
- Describe how mountains and oceans are different.
- Compare features using words such as high, low, land, and water.

Benchmark Clarifications:

Clarification 1: Instruction includes describing oceans as large bodies of salt water and mountains as elevated areas of land that rise much higher than the surrounding land.

Clarification 2: Instruction excludes measurements, formation, or naming specific mountain ranges or oceans.

Clarification 3: Instruction includes comparing features using informal language, such as high or low, land or water, and near or far. Refer to Mathematics Skills Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

Clarification 4: Instruction includes using pictures, globes, maps, models, or other representations to identify, represent, and compare mountains and oceans. Refer to Modeling Skills Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

SC.K.PE.1.3 Describe ways nature can cause fast or slow changes.

Benchmark Clarifications:

Clarification 1: Instruction includes examples of fast changes such as floods, hurricanes, landslides, or volcanic eruptions.

Clarification 2: Instruction includes examples of slow changes such as rocks breaking apart and becoming sand.

Clarification 3: Instruction includes observing evidence of change and cause-and-effect relationships.

Clarification 4: Instruction includes examining historical developments that contributed to scientific understanding that nature can cause changes to the Earth's surface. Refer to the Timeline of Key Accomplishments Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

Proposed DRAFT Standards

SC.K.PE.1.4 Observe and describe Earth materials found in the environment.

Example: Students collect observations of rocks, sand, soil, and water found around a Florida schoolyard and playground.

Student Task(s) –

- Describe earth materials using color, texture, and size.
- Sort materials into groups.
- Record observations using drawings or charts.

Benchmark Clarifications:

Clarification 1: Instruction includes hands-on exploration and observation to describe earth materials such as rocks, soil, sand, and water.

Clarification 2: Instruction includes recording observations using pictures, drawings, or charts.

Clarification 3: Instruction includes sorting earth materials by color, texture, size, and using informal language to describe observations. Refer to Mathematics Skills Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

Clarification 4: Instruction includes hands-on exploration and observation. Refer to Laboratory Practices Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

SC.K.PE.1.5 Identify natural resources found in the environment around you.

Example: Students explore a Florida school garden and identify natural resources including water, soil, plants, rocks, and animals.

Student Task(s) –

- Identify examples of natural resources.
- Sort resources into groups.
- Explain ways people use natural resources.

Benchmark Clarifications:

Clarification 1: Instruction includes hands-on exploration to observe, recognize, and name natural resources such as water, rocks, soil, plants, and animals found in the local environment.

Clarification 2: Instruction includes sorting and classifying natural resources by type or observable characteristics and describing their uses using informal language. Refer to Mathematics Skills Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

Clarification 3: Instruction includes hands-on exploration and recognition. Refer to Laboratory Practices Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

SC.K.PE.1.6 Describe how living things and environments change.

Benchmark Clarifications:

Clarification 1: Instruction includes hands-on activities, outdoor observations, or stories showing how living things and their surroundings change over time.

Clarification 2: Instruction includes observing and describing changes in living things, such as plants growing or leaves falling, and in environments such as weather changes, water drying up, or soil being moved.

Clarification 3: Instruction includes identifying simple cause-and-effect relationships between changes in living things or environments and the factors that contribute to those changes.

Clarification 4: Instruction includes making observations, collecting information, and using evidence to describe changes in living things and their environments over time. Refer to Laboratory Practices Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

SC.K.PE.1.7 Identify that water is found in oceans, rivers, lakes, ponds, and atmosphere.

Example: Students investigate photographs of the Gulf of America, a Florida lake, a river, ponds, and clouds observed during a summer afternoon.

Student Task(s) –

- Identify locations where water is found.
- Compare different places where water is found.
- Explain that clouds are made of water.

Benchmark Clarifications:

Clarification 1: Instruction includes hands-on exploration and patterns to observe that water is found in oceans, rivers, lakes, ponds, and in the atmosphere, including clouds.

Clarification 2: Instruction excludes advanced terminology or measurement.

Clarification 3: Instruction includes demonstrations, models, or other representations to explain how water flows downhill and collects in larger bodies of water. Refer to Modeling Skills Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

Clarification 4: Instruction includes making observations and gathering information to identify and compare places where water is found. Refer to Laboratory Practices Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

SC.K.PE.2 Recognize and describe observable patterns in weather.

SC.K.PE.2.1 Observe, record, and compare daily weather observations.

Example: A kindergarten class records Florida weather conditions for one week using pictures and symbols.

Student Task(s) –

- Record daily weather observations.
- Compare weather from one day to another.
- Identify patterns in the week's weather.

Proposed DRAFT Standards

Benchmark Clarifications:

Clarification 1: Instruction includes that weather describes the conditions outside from day to day.

Clarification 2: Instruction includes observations of weather limited to the presence or absence of wind, precipitation, cloud coverage, and air temperature.

Clarification 3: Instruction includes informal language to describe weather conditions, such as windy, not windy, rainy, not rainy, cloudy, sunny, hot, and cold.

Clarification 4: Instruction includes comparing and describing daily weather over a period of time, such as one week. Refer to Mathematics Skills Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

Clarification 5: Instruction includes making and recording daily weather observations using pictures, symbols, or words and collecting information about weather conditions over time. Refer to Laboratory Practices Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

SC.K.PE.2.2 Observe and describe the function of weather tools in relation to wind.

Example: Students observe a windsock at a Florida school and watch how it changes direction throughout the day.

Student Task(s) –

- Identify evidence of wind.
- Explain how a windsock helps describe wind direction.
- Describe the direction the windsock points.

Benchmark Clarifications:

Clarification 1: Instruction includes recognizing that weather tools, such as windsocks and wind vanes, help scientists observe and describe wind direction.

Clarification 2: Instruction includes identifying wind as moving air that can be described by how fast or slow it moves and where it is blowing from.

Clarification 3: Instruction includes identifying and describing wind direction using the cardinal directions north, south, east, and west.

Clarification 4: Instruction excludes measuring wind speed and combination directions such as northwest, northeast, southwest, and southeast.

Clarification 5: Instruction includes using positional language and cardinal directions to identify and describe wind direction. Refer to Mathematics Skills Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

Clarification 6: Instruction includes collecting evidence of wind in nature and in daily observations. Refer to Laboratory Practices Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

SC.K.PE.2.3 Observe and describe clouds using their attributes.

Example: Students observe clouds during several afternoons in Florida's rainy season.

Student Task(s) –

- Describe cloud color, shape, and size.
- Compare clouds observed on different days.
- Identify patterns between clouds and weather conditions.

Benchmark Clarifications:

Clarification 1: Instruction includes identifying clouds as visible objects in the sky made of tiny water droplets or ice crystals.

Clarification 2: Instruction is limited to describing clouds by observable characteristics such as color, size, and shape using informal language such as white, gray, dark, light, fluffy, wispy, large, and small.

Clarification 3: Instruction excludes formal cloud classifications and cloud-type terminology, such as cumulus, stratus, and cirrus.

Clarification 4: Instruction includes organizing and comparing cloud observations to identify patterns and relationships between cloud appearance and weather conditions. Refer to Mathematics Skills Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

Clarification 5: Instruction includes using drawings or other representations to describe and compare observable cloud attributes. Refer to Modeling Skills Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

Clarification 6: Instruction includes making and recording observations and using evidence to identify patterns between cloud appearance and weather conditions. Refer to Laboratory Practices Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

Grade 1

SC.1.PE.1 Describe Earth materials, surface features, and observable processes that change Earth's surface over time.

SC.1.PE.1.1 Describe land as rock, soil, and sand that supports living things in a variety of ways.

Example: Students investigate soil from a Florida garden and identify ways soil supports plants and animals.

Student Task(s) –

- Observe and describe soil using its characteristics.
- Identify living things found in or on soil.
- Explain why soil helps support life.

Benchmark Clarifications:

Clarification 1: Instruction includes the understanding that land is made up of rock, soil, and sand.

Clarification 2: Instruction includes defining soil as part of Earth's surface made from small pieces of rock and things that are no longer living.

Clarification 3: Instruction includes recognizing that soil contains living things and supports plants and animals, and that rocks and soil are important for supporting living things.

Clarification 4: Instruction excludes identification of soil layers or composition beyond observable features: color, texture, and presence of organisms.

Clarification 5: Instruction includes observing soil in different environments, such as gardens, forests, and schoolyards. Refer to Laboratory Practices Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

SC.1.PE.1.2 Identify and describe plains and lakes as features of Earth's surface.

Example: Students examine photographs and maps of Lake Okeechobee and Florida grasslands.

Student Task(s) –

- Identify plains and lakes.
- Describe observable characteristics of each feature.
- Explain how plants, animals, and people use these environments.

Benchmark Clarifications:

Clarification 1: Instruction includes identifying plains as large areas of mostly flat land and lakes as bodies of water surrounded by land.

Clarification 2: Instruction includes describing how plains and lakes can support living things, such as plants and animals, and how people can use them, such as for recreation or as a water source.

Clarification 3: Instruction excludes detailed formation processes or complex vocabulary.

Clarification 4: Instruction includes comparing and describing observable attributes of plains and lakes using spatial and measurement language. Refer to Mathematics Skills Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

Clarification 5: Instruction includes using maps, diagrams, photographs, models, or other representations to locate, represent, and compare plains and lakes. Refer to Modeling Skills Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

SC.1.PE.1.3 Describe how water and wind can change Earth's surface.

Example: Students investigate how wind and water move sand at a Florida beach.

Student Task(s) –

- Observe how sand is moved by water or wind.
- Describe changes to the surface.
- Explain how water and wind can change land over time.

Benchmark Clarifications:

Clarification 1: Instruction includes observing and describing how water and wind can move soil, sand, or small rocks from one place to another.

Clarification 2: Instruction is limited to observable changes and excludes the terms weathering, erosion, and deposition.

Clarification 3: Instruction includes using models and demonstrations to explore how Earth's surface can change after wind or rain. Refer to Modeling Skills Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

Clarification 4: Instruction includes using observations and investigations to explore how Earth's surface can change after wind or rain. Refer to Laboratory Practices Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

Proposed DRAFT Standards

SC.1.PE.1.4 Describe how rocks and soil can be broken apart and moved by water, wind, and living things.

Example: Students observe plant roots growing through cracks in sidewalks and rocks around a Florida elementary school playground.

Student Task(s) –

- Identify evidence that rocks and soil can change.
- Explain how water, wind, or living things contribute to change.
- Compare different causes of change.

Benchmark Clarifications:

Clarification 1: Instruction includes observing and describing how rocks can break into smaller pieces and be moved from place to place by wind, water, soil, or living things, such as plant roots or animals.

Clarification 2: Instruction includes identifying that rocks can change over time through processes such as breaking, wearing down, or being reshaped.

Clarification 3: Instruction includes using drawings, diagrams, models, or other representations to show how water, wind, and living things can break apart and move rocks and soil. Refer to Modeling Skills Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

Clarification 4: Instruction includes hands-on exploration, demonstrations, outdoor observations, or stories showing how rocks change over time. Refer to Laboratory Practices Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

SC.1.PE.1.5 Describe ways we use living things as resources.

Example: Students investigate products commonly used in Florida homes that come from plants or animals.

Student Task(s) –

- Identify plant and animal resources.
- Describe how people use each resource.
- Classify resources according to their use.

Benchmark Clarifications:

Clarification 1: Instruction includes identifying plants and animals as resources that provide food, shelter, clothing, and other needs.

Clarification 2: Instruction includes examples of how people use living things in daily life, such as eating fruits or using wood for building.

Clarification 3: Instruction includes a focus on basic relationships and uses.

Clarification 4: Instruction excludes detailed biological process.

Clarification 5: Instruction includes sorting, classifying, and comparing living resources based on their uses. Refer to Mathematics Skills Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

SC.1.PE.1.6 Compare animals from today to animals in the past, including extinct animals.

Example: Students compare modern Florida animals, such as alligators and birds, with fossil evidence of extinct animals such as mammoths and dinosaurs. Students also examine fossilized marine organisms found in Florida and discover that much of present-day Florida was covered by shallow seas during times when dinosaurs lived elsewhere. They learn that, during the 1800s, scientists organized Earth's history using fossil classification and correlation to reveal evidence of changing environments and organisms over time. Students use pictures, models, and fossils to compare organisms that lived at different times in Earth's history.

Student Task(s) –

- Compare characteristics of modern Florida animals with extinct animals from the past.

Proposed DRAFT Standards

- Identify similarities and differences between living and extinct organisms.
- Examine fossil evidence to determine what organisms lived in the past.
- Explain how fossils help scientists learn about ancient life and environments.
- Use evidence from pictures, models, or fossils to support a claim about how life on Earth has changed over time.

Benchmark Clarifications:

Clarification 1: Instruction includes identifying similarities between animals living today and animals from the past, such as dinosaurs or mammoths.

Clarification 2: Instruction includes recognizing that some animals no longer exist (extinct) and discussing possible reasons for extinction in informal terms.

Clarification 3: Instruction includes a focus on basic comparisons and observable features.

Clarification 4: Instruction excludes advanced classification or evolutionary processes.

Clarification 5: Instruction includes using pictures, models, or stories to compare features, behaviors, and habitats. Refer to Modeling Skills Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

Clarification 6: Instruction includes examining historical developments that contributed to scientific understanding of animals of the past, including extinct animals, to understand animals of today. Refer to the Timeline of Key Accomplishments Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

SC.1.PE.2 Observe, describe, and compare weather patterns, weather tools, and daily changes in the sky.

SC.1.PE.2.1 Observe, record, and compare daily weather observations.

Example: Students create a month-long Florida weather calendar showing cloudy, sunny, rainy, and stormy days.

Student Task(s) –

- Record daily weather observations.
- Organize observations in a chart.
- Identify weather patterns over time.

Benchmark Clarifications:

Clarification 1: Instruction includes observations of weather that are limited to the presence of clouds, with words such as sunny, cloudy, or foggy, the presence of rain, with words such as rainy, stormy, snowy, and descriptions of air temperature, with words such as freezing cold, cold, cool, warm, and hot.

Clarification 2: Instruction includes comparing daily weather over a period of time, such as over one month.

Clarification 3: Instruction includes weather comparisons being made from one day to the next over a period of time, such as over one week or one month, and noticing weather patterns. Refer to Mathematics Skills Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

Clarification 4: Instruction includes making and recording weather observations over time using pictures, symbols, and words and collecting observational evidence about weather conditions. Refer to Laboratory Practices Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

SC.1.PE.2.2 Identify and compare the types of precipitation.

Example: Students compare photographs and videos showing rain in Florida and snow, sleet, and hail from other regions of the United States.

Student Task(s) –

- Identify forms of precipitation.
- Compare similarities and differences.

- Explain how air temperature influences precipitation type.

Benchmark Clarifications:

Clarification 1: Instruction includes defining precipitation as solid or liquid water that falls from the clouds to the Earth's surface.

Clarification 2: Instruction is limited to rain, sleet, snow, and hail as forms of precipitation.

Clarification 3: Instruction includes how air temperature influences the type of precipitation that falls.

Clarification 4: Air temperature descriptions are limited to freezing cold, cold, cool, warm, and hot.

Clarification 5: Instruction excludes exact temperature measurements.

Clarification 6: Instruction includes organizing and interpreting data about precipitation types using tables, tally charts, pictographs, or other visual displays. Refer to Mathematics Skills Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

SC.1.PE.2.3 Observe and describe the function of weather tools that measure precipitation.

Example: Students use a classroom rain gauge to measure rainfall during Florida's summer rainy season.

Student Task(s) –

- Record precipitation measurements.
- Compare rainfall amounts across several days.
- Explain how rain gauges help scientists collect data.

Benchmark Clarifications:

Clarification 1: Instruction includes recognizing that weather tools help scientists measure precipitation.

Clarification 2: Instruction includes describing precipitation using words such as more, less, heavy, light, or none based on observations or collected data.

Clarification 3: Instruction is limited to tools that observe precipitation, such as a rain gauge or ruler.

Clarification 4: Instruction includes measuring and comparing the amount of precipitation collected using nonstandard and standard tools, such as using inches on a rain gauge or ruler. Refer to Mathematics Skills Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

Clarification 5: Instruction includes collecting evidence of precipitation in nature, such as observing a puddle or designing a homemade rain collector. Refer to Laboratory Practices Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

SC.1.PE.2.4 Explain Earth's rotation as the cause of the repeating pattern of day and night.

Example: Students maintain an observation journal showing sunrise and sunset patterns during a school week in Florida and use a globe and light source to investigate how Earth's rotation creates the repeating pattern of day and night.

Student Task(s) –

- Identify the repeating pattern of day and night.
- Describe observations made during daytime and nighttime.
- Compare observations collected over several days.
- Use a model to demonstrate Earth's rotation.
- Explain how Earth's rotation causes the repeating pattern of day and night.

Benchmark Clarifications:

Clarification 1: Instruction includes recognizing that daytime and nighttime occur in a predictable repeating pattern.

Clarification 2: Instruction includes recognizing that Earth's rotation causes the repeating pattern of day and night.

Clarification 3: Instruction includes observing that the Sun appears visible during the day and not visible at night because different parts of Earth face toward or away from the Sun as Earth rotates.

Clarification 4: Instruction includes organizing and comparing observations of daytime and nighttime patterns using drawings, charts, tables, or calendars to identify repeating patterns over time. Refer to Mathematics Skills Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

Clarification 5: Instruction includes using models to represent Earth's rotation and to explain the repeating pattern of day and night. Refer to Modeling Skills Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

SC.1.PE.2.5 Identify examples of severe weather and describe actions people can take to prepare for each.

Example: A Florida community receives a hurricane watch. Students examine weather information and discuss actions families can take to prepare safely.

Student Task(s)

- Identify examples of severe weather.
- Describe actions that help people prepare.
- Explain why preparation is important for safety.

Benchmark Clarifications:

Clarification 1: Instruction includes identifying severe weather as weather that can be dangerous, cause damage, and sometimes happen quickly.

Clarification 2: Instruction includes identifying human actions that help people prepare for severe weather.

Clarification 4: Instruction includes using observations and evidence from weather information to identify severe weather and determine appropriate actions people can take

to prepare safely. Refer to Laboratory Practices Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

Grade 2

SC.2.PE.1 Identify Earth materials, surface features, and evidence that Earth and life have changed over time.

SC.2.PE.1.1 Observe, describe, and classify rocks based on observable properties.

Example: A student visits several locations in Florida and collects photographs of limestone, coquina, and beach rocks. The student compares the rocks based on color, texture, size, shape, hardness, and visible patterns.

Student Task(s) –

- Sort rock samples into groups based on observable properties.
- Create a chart showing similarities and differences among rocks.
- Explain why certain rocks were grouped together.
- Use observations to identify patterns among collected samples.

Benchmark Clarifications:

Clarification 1: Instruction includes comparing rocks based on color, texture, size, shape, hardness, and visible patterns.

Clarification 2: Instruction includes the use of rock samples, photographs, or hands-on models.

Clarification 3: Instruction excludes the memorization of rock names or detailed rock cycle stages.

Clarification 4: Instruction includes sorting, classifying, and organizing data about rock properties using tally charts, tables, bar graphs, or other visual representations to identify

similarities, differences, and patterns. Refer to Mathematics Skills Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

Clarification 5: Instruction includes making and recording observations, classifying rocks based on observable properties and using evidence to explain how rocks are grouped. Refer to Laboratory Practices Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

SC.2.PE.1.2 Identify and describe the basic characteristics of rivers, volcanoes, canyons, and deltas.

Benchmark Clarifications:

Clarification 1: Instruction includes identifying rivers as flowing bodies of water and describing that rivers move water from one place to another.

Clarification 2: Instruction includes identifying a canyon as a narrow, deep valley cut by a river through rock.

Clarification 3: Instruction includes identifying volcanoes as openings in Earth's surface through which melted rock, gases, and ash can reach the surface.

Clarification 4: Instruction includes identifying deltas as areas where a river slows down near a larger body of water and deposits sediment, creating new land.

Clarification 5: Instruction includes recognizing features and describing cause-and-effect patterns.

Clarification 6: Instruction excludes plate tectonics, magma chemistry, or detailed erosion or deposition rates.

Clarification 7: Instruction includes using maps, diagrams, or other models to represent and compare the basic characteristics of rivers, volcanoes, canyons, and deltas. Refer to Modeling Skills Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

SC.2.PE.1.3 Identify and describe weathering as a natural process that slowly breaks apart or changes rocks on Earth's surface.

Benchmark Clarifications:

Clarification 1: Instruction includes recognizing weathering means rocks can break into smaller pieces over time.

Clarification 2: Instruction includes examples of weathering caused by wind, water, ice, temperature change, or plants.

Clarification 3: Instruction excludes chemical weathering or advanced physical processes.

Clarification 4: Instruction includes using models, diagrams, or other representations to explain how weathering changes rocks over time. Refer to Modeling Skills Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

Clarification 5: Instruction includes observations and investigations of weathering. Refer to Laboratory Practices Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

SC.2.PE.1.4 Describe ways we use rocks as resources.

Benchmark Clarifications:

Clarification 1: Instruction includes identifying rocks as natural resources used in everyday life.

Clarification 2: Instruction includes examples using rocks for building materials (e.g., gravel, stone), making tools, creating art, or as sources of minerals.

Clarification 3: Instruction includes recognizing that people use rocks in different ways depending on their properties such as hardness, color, and size.

Clarification 4: Instruction focuses on practical uses and observable characteristics.

Clarification 5: Instruction includes comparing and classifying rocks based on observable properties to determine how those properties make rocks useful for different purposes. Refer to Mathematics Skills Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

SC.2.PE.1.5 Explain what fossils are and how they provide evidence of past life.

Example: A museum exhibit compares fossilized dinosaur bones from western North America with fossilized marine shells, sharks' teeth, and ancient sea creatures discovered

in Florida. Students learn that most of Florida was covered by shallow seas during much of the time dinosaurs lived elsewhere. Students learn that scientists use fossil evidence to explain what ancient organisms and environments may have been like.

Student Task(s) –

- Compare Florida marine fossils with dinosaur fossils.
- Explain how fossils provide evidence of organisms from the past.
- Determine what fossils found in Florida suggest about ancient environments.
- Create a drawing showing a Florida shallow sea during the age of dinosaurs.

Benchmark Clarifications:

Clarification 1: Instruction includes defining fossils as remains or traces of living things from the past, found in rocks or soil.

Clarification 2: Instruction includes recognizing that fossils provide evidence about organisms and environments that existed in the past.

Clarification 3: Instruction includes using drawings, diagrams, or other models to represent organisms and environments from the past based on fossil evidence. Refer to Modeling Skills Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

Clarification 4: Instruction includes examining historical developments that contributed to scientific understanding of fossils and their connection to past life. Refer to the Timeline of Key Accomplishments Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

SC.2.PE.1.6 Recognize that rocks, fossils, and landforms provide evidence that Earth has changed over time.

Benchmark Clarifications:

Clarification 1: Instruction includes recognizing that rocks, fossils, and landforms provide evidence that Earth and living things have changed over time.

Clarification 2: Instruction includes examples such as extinct organisms, changing environments, and landforms shaped by natural processes.

Clarification 3: Instruction includes examining and comparing rocks, fossils, and landforms and using observable evidence to support explanations of how Earth has changed over time. Refer to Laboratory Practices Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

Clarification 4: Instruction includes examining historical developments that contributed to scientific understanding of how rocks, fossils, and landforms provide evidence that Earth has changed over time. Refer to the Timeline of Key Accomplishments Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

SC.2.PE.2 Observe, measure, and describe how the Sun and weather influence Earth's surface and daily conditions.

SC.2.PE.2.1 Identify the beneficial and harmful effects of the Sun and recognize the importance of sun safety.

Benchmark Clarifications:

Clarification 1: Instruction includes identifying ways to stay safe in the sun.

Clarification 2: Instruction includes activities that explore the Sun's effects, such as creating sun prints or observing ultraviolet (UV) beads. Refer to Laboratory Practices Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

SC.2.PE.2.2 Observe and describe the function of thermometers used to measure air temperature.

Example: Students measure morning and afternoon temperatures during a Florida school week using classroom thermometers.

Student Task(s) –

- Record daily temperature observations.
- Compare temperatures measured at different times of day.
- Identify patterns in temperature changes.
- Explain how thermometers help scientists collect weather information.

Benchmark Clarifications:

Clarification 1: Instruction includes recognizing that weather tools help scientists observe and measure air temperature.

Clarification 2: Instruction includes identifying air temperature as how hot or cold the air around us feels.

Clarification 3: Instruction includes measuring, organizing, representing, and comparing temperature data collected at different times to identify patterns and relationships. Refer to Mathematics Skills Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

Clarification 4: Instruction includes collecting, recording, and interpreting temperature observations and measurements using thermometers during investigations of weather conditions. Refer to Laboratory Practices Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

SC.2.PE.2.3 Observe and record measurements taken with weather tools.

Benchmark Clarifications:

Clarification 1: Instruction includes collecting observations and measurements using wind vanes, windsocks, rain gauges, and thermometers.

Clarification 2: Instruction includes organizing, representing, and comparing weather measurements collected over time using tables, charts, graphs, or other visual displays to identify patterns and relationships. Refer to Mathematics Skills Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

Clarification 3: Instruction includes collecting, recording, and interpreting observations and measurements using weather tools during investigations of weather conditions. Refer to Laboratory Practices Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

SC.2.PE.2.4 Recognize how heat energy can change liquid water.

Benchmark Clarifications:

Clarification 1: Instruction includes that evaporation is a process that happens when water is warmed by thermal energy, and it changes from a liquid to a gas known as water vapor.

Clarification 2: Instruction includes using models or diagrams to represent how thermal energy causes liquid water to change into water vapor. Refer to Modeling Skills Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

Clarification 3: Instruction includes opportunities to observe and investigate evaporation in nature and everyday life. Refer to Laboratory Practices Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

Grade 3

SC.3.PE.1 Explain how water and surface processes change Earth's surface and provide evidence about Earth's past.

SC.3.PE.1.1 Describe how water on Earth can change.

Benchmark Clarifications:

Clarification 1: Instruction includes identifying that water on Earth exists in different states of matter: liquid, solid, and gas.

Clarification 2: Instruction includes describing changes between the forms caused by heating or cooling, such as melting, condensation, or evaporation.

Clarification 3: Instruction excludes molecular explanations and quantitative calculations beyond grade-level observations and measurements.

Clarification 4: Instruction includes organizing, representing, and interpreting observations of changes in water to identify patterns related to heating and cooling. Refer to Mathematics Skills Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

Clarification 5: Instruction includes using models or diagrams to represent changes in water between its different states and to show how heating or cooling causes those

changes. Refer to Modeling Skills Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

SC.3.PE.1.2 Describe beaches and dunes and explain how lakes, rivers, and other waterways shape and connect parts of Earth's surface.

Example: Students investigate how water moves through Florida's waterways, from rivers to estuaries and eventually to the Gulf of America or Atlantic Ocean.

Student Task(s) –

- Trace the path of water using a Florida map.
- Identify beaches, dunes, rivers, and lakes.
- Explain how connected waterways move water across Earth's surface.
- Build a model showing connected waterways.

Benchmark Clarifications:

Clarification 1: Instruction includes identifying beaches as areas where land meets a body of water and dunes as hills or ridges of sand shaped by wind.

Clarification 2: Instruction includes describing that waves and wind move sand and can change beaches and dunes over time.

Clarification 3: Instruction includes identifying waterways as paths that water follows, such as streams, rivers, and canals, and describing that waterways can connect to lakes and larger bodies of water.

Clarification 4: Instruction includes using spatial reasoning to trace, compare, and represent the paths and connections among waterways. Refer to Mathematics Skills Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

Clarification 5: Instruction includes using maps, models, or other representations to trace and explain how water moves through connected waterways. Refer to Modeling Skills Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

Proposed DRAFT Standards

SC.3.PE.1.3 Describe erosion as the movement of earth materials by water, wind, or ice.

Example: Students observe photographs showing changes along Florida beaches after tropical storms and hurricanes.

Student Task(s) –

- Compare before-and-after shoreline photographs.
- Identify evidence of erosion.
- Explain how moving water changed the beach.
- Use a sand-and-water investigation to model erosion.

Benchmark Clarifications:

Clarification 1: Instruction includes identifying that erosion means earth materials are carried from one place to another.

Clarification 2: Instruction includes recognizing that water can move across Earth's surface and cause changes to landforms.

Clarification 3: Instruction is limited to movement of materials by water, wind or ice and excludes erosion rates.

Clarification 4: Instruction includes using models, diagrams, or other representations to explain how erosion moves earth materials from one place to another. Refer to Modeling Skills Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

Clarification 5: Instruction includes investigations of erosion, such as soil washing away in rain, sand blowing in the wind, or rivers carrying rocks. Refer to Laboratory Practices Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

SC.3.PE.1.4 Describe ways we use water as a resource.

Benchmark Clarifications:

Clarification 1: Instruction includes identifying water as a natural resource used for purposes such as drinking, cooking, cleaning, bathing, growing plants, watering crops, recreation, providing habitats for animals, and supporting living things.

Clarification 2: Instruction includes a focus on practical uses and observable characteristics.

Clarification 3: Instruction excludes focus on advanced water management.

Clarification 4: Instruction includes measuring, representing, and comparing quantities of water used for different purposes. Refer to Mathematics Skills Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

SC.3.PE.1.5 Describe how fossils provide evidence of what environments were like in the past.

Benchmark Clarifications:

Clarification 1: Instruction includes identifying that fossils can show what kinds of plants and animals lived in different places and times.

Clarification 2: Instruction includes using fossils to infer characteristics of past and ancient environments, such as using the presence of marine fossils as evidence that an area was once covered by or connected to a marine environment.

Clarification 3: Instruction includes using models, diagrams or representations of fossils and environments to show how fossil evidence can be used to infer characteristics of past environments. Refer to Modeling Skills Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

Clarification 4: Instruction includes examining historical developments that contributed to scientific understanding of how fossils provide evidence of past environments. Refer to the Timeline of Key Accomplishments Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

SC.3.PE.2 Explain how the Sun influences Earth systems and how weather observations and technologies help people understand and predict weather.

Proposed DRAFT Standards

SC.3.PE.2.1 Describe how the Sun influences Earth's systems.

Benchmark Clarifications:

Clarification 1: Instruction includes that the Sun provides energy that warms Earth's surface, drives the water cycle, and influences weather patterns.

Clarification 2: Instruction includes that most living things depend directly or indirectly on energy from the Sun.

Clarification 3: Instruction includes examples of the Sun's influence on land, water, weather, and living things.

Clarification 4: Instruction includes using models or diagrams to represent how energy from the Sun influences interconnected Earth systems, including land, water, weather, and living things. Refer to Modeling Skills Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

SC.3.PE.2.2 Use weather technologies and weather information to make informed daily decisions.

Example: Students examine a weather forecast predicting afternoon thunderstorms in Central Florida.

Student Task(s) –

- Interpret weather forecast information.
- Decide whether outdoor activities should be adjusted.
- Explain how weather tools provide useful information.
- Use forecast evidence to justify recommendations.

Benchmark Clarifications:

Clarification 1: Instruction includes exposure to weather technologies such as tools, weather stations, applications, and websites.

Clarification 2: Instruction includes collection of weather data with tools limited to wind vanes, windsocks, rain gauges, and thermometers.

Clarification 3: Instruction includes using weather information to make daily decisions, such as selecting appropriate clothing, determining safe outdoor activities, and preparing for severe weather.

Clarification 4: Instruction includes organizing, representing, and interpreting weather data from tools and forecasts using tables, charts, graphs, or other visual displays to identify patterns and support decision making. Refer to Mathematics Skills Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

Clarification 5: Instruction includes collecting weather observations and measurements using tools and gathering evidence from weather forecasts and weather information. Refer to Laboratory Practices Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

SC.3.PE.2.3 Identify condensation and describe conditions that cause water vapor to change into liquid water.

Benchmark Clarifications:

Clarification 1: Instruction includes identifying condensation as the process by which water vapor changes from a gas to a liquid.

Clarification 2: Instruction includes that condensation occurs when water vapor cools and forms liquid water on a surface or around tiny particles in the air.

Clarification 3: Instruction includes recognizing and using diagrams or models to represent condensation as part of the water cycle. Refer to Modeling Skills Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

Clarification 4: Instruction includes observing examples of condensation in everyday life such as dew, water droplets on a cold surface, or clouds. Refer to Laboratory Practices Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

SC.3.PE.2.4 Classify cloud types and describe the weather conditions commonly associated with each type to make weather predictions.

Example: Students observe cloud formations during Florida's rainy season.

Student Task(s) –

- Classify observed clouds as cirrus, stratus, cumulus, or cumulonimbus.
- Compare cloud observations over several days.
- Predict weather conditions based on cloud type.
- Create a cloud observation journal.

Benchmark Clarifications:

Clarification 1: Instruction includes relating cloud types to common weather conditions, such as fair weather, storms, or precipitation.

Clarification 2: Instruction is limited to cirrus, stratus, cumulus, and cumulonimbus cloud types.

Clarification 3: Instruction includes organizing cloud observations and identifying patterns between cloud types and weather conditions. Refer to Mathematics Skills Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

Clarification 4: Instruction includes classifying clouds based on observable characteristics such as shape, appearance, and height in the sky. Refer to Laboratory Practices Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

Grade 4

SC.4.PE.1 Describe Earth's major systems and explain how surface processes and resources influence Earth's surface.

SC.4.PE.1.1 Identify Earth's major systems and describe their basic characteristics.

Benchmark Clarifications:

Clarification 1: Instruction includes Earth's major systems: geosphere, hydrosphere, atmosphere, and biosphere.

Clarification 2: Instruction includes identifying examples of each Earth system.

Clarification 3: Instruction includes using models or diagrams to identify and represent the geosphere, hydrosphere, atmosphere, and biosphere and their basic characteristics. Refer to Modeling Skills Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

SC.4.PE.1.2 Explain how weathering, erosion, and deposition change Earth's surface.

Example: Students investigate how barrier islands and sand dunes along Florida's coast change over time.

Student Task(s) –

- Identify examples of weathering, erosion, and deposition.
- Analyze photographs showing coastal change.
- Compare how weathering, erosion, and deposition affect different locations.
- Create a diagram illustrating the three processes.

Benchmark Clarifications:

Clarification 1: Instruction includes describing how weathering breaks down, erosion moves, and deposition deposits materials in new locations.

Clarification 2: Instruction includes using diagrams, models, or other representations to explain how weathering, erosion, and deposition change Earth's surface, including examples such as rivers, deltas, and sand dunes. Refer to Modeling Skills Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

Clarification 3: Instruction includes conducting investigations, collecting observations, and analyzing evidence to explain how weathering, erosion, and deposition change Earth's surface. Refer to Laboratory Practices Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

SC.4.PE.1.3 Describe ways we use fossil fuels as resources.

Example: Students examine common uses of fossil fuels, including gasoline used for transportation, natural gas used for heating and coal used to generate electricity.

Student Task(s) –

- Identify fossil fuels used in the examples.
- Describe how each fossil fuel is used as a resource.
- Compare the different uses of coal, oil, and natural gas.

Benchmark Clarifications:

Clarification 1: Instruction includes identifying fossil fuels, such as coal, oil, and natural gas, as nonrenewable resources used for energy, heating, transportation, and making products.

Clarification 2: Instruction focuses on basic uses and observable effects.

SC.4.PE.1.4 Identify types of fossils and explain what fossils reveal about the behavior of organisms.

Benchmark Clarifications:

Clarification 1: Instruction includes recognizing different types of fossils, such as body fossils or trace fossils, and describing what they show about how organisms lived, moved, and interacted.

Clarification 2: Instruction includes examples such as footprints, burrows, or preserved bones or teeth and how these provide clues about behavior.

Clarification 3: Instruction includes interpreting evidence from fossils to make claims about how organisms lived in the past.

Clarification 4: Instruction excludes advanced paleontological classification.

Clarification 5: Instruction includes using models, diagrams or representations of fossils to show how fossil evidence provides clues about how organisms lived, moved, and interacted. Refer to Modeling Skills Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

Clarification 6: Instruction includes examining historical developments that contributed to scientific understanding of types of fossils and how organisms lived, moved, and interacted. Refer to the Timeline of Key Accomplishments Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

SC.4.PE.2 Describe how weather is measured, how water moves through Earth's systems, and how climate patterns vary across Earth.

SC.4.PE.2.1 Observe, measure, and describe air pressure and humidity using weather tools.

Example: Students compare weather conditions before and after a thunderstorm.

Student Task(s) –

- Record humidity and air pressure data.
- Compare observations before and after the storm.
- Organize data into tables and graphs.
- Explain relationships between measurements and weather conditions.

Benchmark Clarifications:

Clarification 1: Instruction includes identifying air pressure as the pressure exerted by the air and humidity as the amount of water vapor in the air.

Clarification 2: Instruction includes using a barometer to measure air pressure and a hygrometer to measure humidity.

Clarification 3: Instruction includes comparing air pressure and humidity observations to identify general weather patterns, such as high and low air pressure and high and low humidity.

Clarification 4: Instruction includes organizing observations using tables, charts, or graphs. Refer to Mathematics Skills Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

Clarification 5: Instruction includes collecting, recording, and comparing observations using weather tools. Refer to Laboratory Practices Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

SC.4.PE.2.2 Create and use models to describe the hydrologic cycle.

Example: Students investigate how Florida's frequent summer thunderstorms are connected to the water cycle.

Student Task(s) –

- Create a labeled water-cycle model.
- Identify evaporation, condensation, precipitation, runoff, and collection.
- Trace water movement through the system.
- Explain how the Sun drives the water cycle.

Benchmark Clarifications:

Clarification 1: Instruction includes the hydrologic cycle as the continuous movement of water between Earth's surface and the atmosphere.

Clarification 2: Instruction includes evaporation, condensation, precipitation, runoff, and collection.

Clarification 3: Instruction includes recognizing that water changes between solid, liquid, and gaseous states during the water cycle.

Clarification 4: Instruction includes the importance of the hydrologic cycle in distributing water needed by living things.

Clarification 5: Instruction includes creating, using, and interpreting models of the hydrologic cycle. Refer to Modeling Skills Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

SC.4.PE.2.3 Differentiate among Earth's major climate zones.

Example: Students compare Florida's climate to Alaska and northern Canada.

Student Task(s) –

- Compare temperature and precipitation data.
- Locate climate zones on a map.
- Explain relationships among latitude, temperature, and climate.

Benchmark Clarifications:

Clarification 1: Instruction includes comparing climate zones based on temperature, precipitation, proximity to water, and latitude.

Clarification 2: Instruction includes recognizing patterns between latitude and climate conditions. Refer to Mathematics Skills Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

Clarification 3: Instruction includes using maps, diagrams, or other models to locate, represent, and compare Earth's major climate zones. Refer to Modeling Skills Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

Grade 5

SC.5.PE.1 Analyze how Earth's systems interact, how Earth's surface changes over time, and how humans use and conserve resources.

SC.5.PE.1.1 Explain how Earth's systems interact and affect one another.

Example: Students investigate how a hurricane affects Earth’s systems. Students examine information about a hurricane’s movement and effects on land, water, air, and living things. They identify the Earth systems involved and explain how changes in one system affect other systems.

Student Task(s) –

- Identify the geosphere, hydrosphere, atmosphere, and biosphere involved in the scenario.
- Identify evidence of interactions among Earth's systems.
- Explain how a change in one Earth system affects another.
- Use evidence from the scenario to explain relationships among multiple Earth systems.
- Create a model showing how the Earth systems interact during the hurricane.

Benchmark Clarifications:

Clarification 1: Instruction includes interactions among the geosphere, hydrosphere, atmosphere, and biosphere.

Clarification 2: Instruction includes examples such as water shaping landforms, weather interacting with land and water, and living things depending on and affecting Earth's systems.

Clarification 3: Instruction includes creating models or diagrams to represent how Earth’s systems interact and affect one another. Refer to Modeling Skills Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

Clarification 4: Instruction includes identifying cause-and-effect relationships among Earth's systems. Refer to Laboratory Practices Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

SC.5.PE.1.2 Describe the structure of Earth and identify the crust, mantle, and core.

Benchmark Clarifications:

Clarification 1: Instruction includes identifying the crust, mantle, and core as the major layers of Earth.

Clarification 2: Instruction includes recognizing that the crust is Earth's outer layer, the mantle is beneath the crust, and the core is located at Earth's center.

Clarification 3: Instruction includes recognizing that the lithosphere is the rigid outer portion of Earth's geosphere.

Clarification 4: Instruction excludes composition, density, pressure, and plate tectonics.

Clarification 5: Instruction includes using diagrams, models, or other representations to represent and explain the relative locations of Earth's crust, mantle, and core. Refer to Modeling Skills Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

Clarification 6: Instruction includes examining historical developments that contributed to scientific understanding of the structure of Earth. Refer to the Timeline of Key Accomplishments Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

SC.5.PE.1.3 Describe ways humans can reduce the effects of weathering and erosion.

Example: Students investigate how vegetation, ground cover, and barriers can reduce the effects of weathering and erosion on a slope or shoreline. Students examine photographs or other evidence of areas with and without these measures and compare the effects on the movement of earth materials.

Student Task(s) –

- Identify evidence of weathering and erosion in the examples.
- Identify ways people can reduce the effects of weathering and erosion.
- Compare areas with and without vegetation, ground cover, or barriers.
- Describe how each measure can reduce the movement of earth materials.
- Use observations and evidence to explain which measure would help reduce erosion in a given situation.

Benchmark Clarifications:

Clarification 1: Instruction includes actions such as planting vegetation, using ground cover, and building barriers to reduce erosion.

Clarification 2: Instruction includes explaining how these actions help protect soil and landforms.

Clarification 3: Instruction excludes engineering design details.

Clarification 4: Instruction includes evaluating solutions using observations and evidence to identify observable cause-and-effect relationships. Refer to Laboratory Practices Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

SC.5.PE.1.4 Compare renewable and nonrenewable natural resources.

Example: Students compare solar energy installations in Florida with phosphate mining and fossil fuel use.

Student Task(s) –

- Classify resources as renewable or nonrenewable.
- Organize information in tables and graphs.
- Compare renewable and nonrenewable resources based on their uses, availability, advantages, and limitations.
- Support claims using evidence.

Benchmark Clarifications:

Clarification 1: Instruction includes identifying renewable resources as resources that can be replenished naturally over relatively short periods of time and nonrenewable resources as resources that are replenished over extremely long periods of time.

Clarification 2: Instruction includes examples of renewable resources such as solar energy, freshwater, forests, and biomass.

Clarification 3: Instruction includes examples of nonrenewable resources such as fossil fuels, phosphate, limestone, and uranium used in nuclear power generation.

Clarification 4: Instruction includes organizing and comparing renewable and nonrenewable resources using tables, charts, or graphs. Refer to Mathematics Skills Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

Clarification 5: Instruction includes collecting evidence and using evidence to compare renewable and nonrenewable natural resources and support claims about their uses and availability. Refer to Laboratory Practices Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

SC.5.PE.1.5

Explain the importance of conserving Earth’s resources.

Benchmark Clarifications:

Clarification 1: Instruction includes describing conservation as using resources responsibly to reduce waste and maintain availability.

Clarification 2: Instruction includes explaining how conservation can help protect natural resources, ecosystems, and future resource availability.

Clarification 3: Instruction includes conservation actions such as reducing, reusing, recycling, conserving water, and conserving energy to reduce waste and protect Earth's resources.

Clarification 4: Instruction includes evaluating everyday choices that support conservation.

Clarification 5: Instruction includes measuring, representing, and comparing resource use and waste to evaluate how conservation actions can reduce resource consumption. Refer to Mathematics Skills Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

Clarification 6: Instruction includes conducting investigations, collecting, and analyzing evidence, and using data to evaluate how conservation practices can reduce waste and help maintain Earth's resources. Refer to Laboratory Practices Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

SC.5.PE.1.6 Use fossil evidence to explain Earth's past environments and organisms.

Example: A road construction project in Florida exposes layers of limestone containing fossilized shells, corals, and marine organisms. Students learn that, during the 1800s, scientists increasingly organized Earth's history by classifying and comparing fossils, using evidence from different locations to identify changes in organisms and environments over time. Scientists examine the fossils and compare them to organisms that live in shallow

ocean environments today. Based on the evidence, they conclude that much of Florida was once covered by a shallow sea.

Students analyze photographs, fossil specimens, diagrams, or data tables showing fossils found in Florida limestone and compare the fossils to modern marine organisms then use evidence to determine what Florida's environment was like in the past.

Student Task(s) –

- Use evidence from Florida limestone fossils to explain why scientists infer that parts of Florida were once covered by shallow seas.
- Compare fossilized marine organisms found in Florida limestone to similar organisms living today and describe how they provide evidence of past environments.
- Construct a claim supported by fossil evidence describing how Florida's environment has changed over time.
- Create and use a model, diagram, or labeled illustration showing the relationship among marine organisms, limestone formation, and Florida's ancient shallow-sea environment.

Benchmark Clarifications:

Clarification 1: Instruction includes using fossils as evidence of organisms and environments that existed in the past.

Clarification 2: Instruction includes explaining how fossils provide evidence that Earth has changed over time.

Clarification 3: Instruction excludes detailed geologic time scales and advanced dating methods.

Clarification 4: Instruction includes using and interpreting models, diagrams, and other representations based on fossil evidence to explain organisms and environments that existed in Earth’s past. Refer to Modeling Skills Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

Clarification 5: Instruction includes analyzing fossil evidence to construct and support explanations about organisms and environments that existed in Earth's past. Refer to Laboratory Practices Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

Clarification 6: Instruction includes examining historical developments that contributed to scientific understanding of fossils and how they explain Earth's past environments and organisms. Refer to the Timeline of Key Accomplishments Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

SC.5.PE.2 Analyze factors that influence weather and climate patterns on Earth.

SC.5.PE.2.1 Analyze how elevation and proximity to water influence weather conditions.

Example: Students compare weather patterns in Tampa, Orlando, and locations in the Appalachian Mountains.

Student Task(s) –

- Analyze temperature and precipitation data.
- Compare coastal and inland conditions.
- Explain the influence of large bodies of water.
- Identify cause-and-effect relationships.

Benchmark Clarifications:

Clarification 1: Instruction includes analyzing how factors such as temperature, precipitation, wind patterns, and air pressure are influenced by elevation and proximity to large bodies of water.

Clarification 2: Instruction includes comparing weather conditions in locations with different elevations or distances from large bodies of water.

Clarification 3: Instruction includes organizing, comparing, and interpreting weather data from locations with different elevations or distances from large bodies of water to identify patterns and relationships. Refer to Mathematics Skills Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

Clarification 4: Instruction includes using maps, diagrams, models, or other representations to explain relationships among elevation, proximity to large bodies of water, and weather conditions. Refer to Modeling Skills Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

Clarification 5: Instruction includes using weather observations and evidence to explain how elevation and proximity to large bodies of water influence weather conditions. Refer to Laboratory Practices Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

SC.5.PE.2.2 Explain the relationship between weather and climate.

Example: Students work in pairs to examine monthly weather records from Miami collected over many years.

Student Task(s) –

- Identify climate patterns.
- Explain differences between weather and climate.
- Each pair of students researches the daily high temperatures for a given month over the past year and calculates the mean temperature for that month.
- Groups compare the mean monthly temperatures and how they are used as one part of a description for long-term climate averages.
- Use graphs to support conclusions.

Benchmark Clarifications:

Clarification 1: Instruction includes that weather describes short-term atmospheric conditions.

Clarification 2: Instruction includes that climate describes long-term weather patterns in a region.

Clarification 3: Instruction includes using weather observations and data, such as mean, median, mode, and range, collected over time to identify climate patterns. Refer to Mathematics Skills Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

Clarification 4: Instruction includes using data, maps, and models to explain relationships between factors and weather or climate patterns. Refer to Modeling Skills Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

Clarification 5: Instruction includes collecting, organizing, and analyzing weather observations and data over time to identify patterns and explain the relationship between weather and climate. Refer to Laboratory Practices Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

SC.5.PE.2.3

Analyze factors that influence weather and climate.

Example: Students compare Florida, Arizona, and Alaska using climate maps and weather data.

Student Task(s) –

- Compare climate variables among locations.
- Identify factors influencing weather and climate.
- Analyze maps and data tables.
- Explain why climates differ.

Benchmark Clarifications:

Clarification 1: Instruction includes analyzing factors that influence weather and climate, such as elevation, proximity to water, latitude, wind, humidity, and ocean currents.

Clarification 2: Instruction includes comparing how these factors contribute to differences in weather and climate in different locations.

Clarification 3: Instruction focuses on qualitative relationships.

Clarification 4: Instruction excludes advanced atmospheric or oceanographic processes, such as atmospheric circulation modeling and detailed ocean-current dynamics.

Clarification 5: Instruction includes organizing, comparing, and interpreting weather and climate data to identify patterns and relationships among factors that influence weather

and climate. Refer to Mathematics Skills Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

Clarification 6: Instruction includes using data, maps, models, or other representations to show how factors influence weather and climate patterns. Refer to Modeling Skills Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

SC.5.PE.2.4 Compare the climates of major terrestrial biomes.

Example: Students compare a Florida forest ecosystem with desert, grassland, and tundra biomes.

Student Task(s) –

- Analyze temperature and precipitation data.
- Compare climate patterns among biomes.
- Construct graphs showing climatic differences.
- Explain how differences in temperature and precipitation help distinguish the climates of different biomes.

Benchmark Clarifications:

Clarification 1: Instruction includes identifying and comparing examples of biomes commonly associated with each climate zone.

Clarification 2: Instruction is limited to deserts, grasslands, forests, and tundra.

Clarification 3: Instruction includes comparing temperature and precipitation patterns among biomes.

Refer to Mathematics Skills Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

Clarification 4: Instruction includes developing and using models, maps, line graphs, diagrams, or other representations to compare temperature and precipitation patterns and

distinguish the climates of major terrestrial biomes. Refer to Modeling Skills Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

The Science of Space

How the Sun, Moon, stars, planets, and other objects in space can be observed, measured, and modeled; how patterns of motion in the Earth-Moon-Sun system explain observable phenomena; and how scientists use evidence, technology, and models to investigate the Solar System and the universe.

Grade Kindergarten

SC.K.SP.1 Observe and describe the Sun and patterns in the daytime and nighttime sky.

SC.K.SP.1.1 Develop a model showing that Earth receives light and heat from the Sun.

Example: A kindergarten student compares two identical toys placed outside on a sunny Florida playground. One toy is placed in direct sunlight, and the other is placed in the shade. The student observes differences in light and warmth and then uses a lamp and globe model to represent how sunlight reaches Earth. Students also learn that people have used observations of the Sun for centuries to develop scientific understanding of how the Sun provides light and heat to Earth. They compare these historical observations with their own observations of objects in sunlight and shade.

Student Task(s) –

- Identify the Sun as a source of light and heat.
- Compare observations of objects in sunlight and shade.
- Use a drawing, diagram, or model to show light traveling from the Sun to Earth.
- Explain how the Sun provides light and heat to Earth.

- Use observations from the investigation to support the model.

Benchmark Clarifications:

Clarification 1: Instruction includes understanding that Earth is a planet on which we live and the Sun is a star and a source of light and heat for Earth.

Clarification 2: Instruction includes developing and using drawings, diagrams, or physical models to represent the Earth-Sun system. Refer to Modeling Skills Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

Clarification 3: Instruction includes examining historical developments that contributed to scientific understanding of the Sun's contribution of light and heat for the Earth. Refer to the Timeline of Key Accomplishments Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

SC.K.SP.1.2 Observe and describe the repeating pattern of day and night.

Example: A kindergarten student observes photographs taken daily during the morning, afternoon, evening, and nighttime over five days at a Florida elementary school. The student then uses a globe and flashlight model to investigate why day and night occur.

Student Task(s) –

- Identify examples of daytime and nighttime.
- Observe changes in the sky throughout the day.
- Describe the repeating pattern of day and night.
- Compare observations of daytime to nighttime.
- Use observations to describe the repeating pattern.

Benchmark Clarifications:

Clarification 1: Instruction includes observing day and night as a repeating pattern caused by Earth's rotation.

Clarification 2: Instruction includes observing changes in shadows throughout the day.

Clarification 3: Instruction includes recording and communicating observations of daytime and nighttime. Refer to Laboratory Practices Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

Clarification 4: Instruction includes examining historical developments that contributed to scientific understanding of the patterns of day and night. Refer to the Timeline of Key Accomplishments Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

Grade 1

SC.1.SP.1 Observe and describe the Moon and its observable patterns.

SC.1.SP.1.1 Identify and describe characteristics of the Moon.

Benchmark Clarifications:

Clarification 1: Instruction includes that the Moon is a natural object that orbits Earth.

Clarification 2: Instruction includes observing and describing visible characteristics of the Moon, such as its shape, surface features, and brightness.

Clarification 3: Instruction includes observing the Moon with the naked eye during the day and night.

Clarification 4: Instruction includes recognizing that the Moon reflects light from the Sun.

Clarification 5: Instruction includes recognizing that the Moon is smaller than the Earth.

Clarification 6: Instruction includes examining historical developments that contributed to scientific understanding of the characteristics of the Moon. Refer to the Timeline of Key Accomplishments Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

SC.1.SP.1.2 Observe and describe patterns in the Moon's appearance and motion as seen from Earth.

Example: A first-grade student observes the Moon over four weeks from a Florida backyard or schoolyard and records the Moon's appearance using drawings and photographs.

Student Task(s) –

- Observe and record the Moon's appearance over time.
- Identify patterns in how the Moon appears to change.
- Compare observations from different dates.
- Organize observations in a journal or data table.
- Explain that the Moon follows a repeating pattern.

Benchmark Clarifications:

Clarification 1: Instruction includes observing the Moon during both the day and night.

Clarification 2: Instruction includes observing and recognizing that the Moon appears to move across the sky and rise and set at different times.

Clarification 3: Instruction excludes causes and naming of individual phases of the Moon.

Clarification 4: Instruction includes organizing, representing, comparing, and interpreting observations of the Moon’s appearance over time using calendars, journals, tables, charts, or other visual displays to identify repeating monthly patterns. Refer to Mathematics Skills Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

Clarification 5: Instruction includes making and recording observations of the Moon’s appearance and position over time using drawings, journals, photographs, or other records and using those observations as evidence to describe repeating patterns. Refer to Laboratory Practices Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

Grade 2

SC.2.SP.1 Describe stars and identify observable patterns in the nighttime sky.

Proposed DRAFT Standards

SC.2.SP.1.1 Observe and describe stars in the night sky.

Benchmark Clarifications:

Clarification 1: Instruction includes observing and describing that stars appear to vary in brightness and position in the night sky.

Clarification 2: Instruction includes recognizing that the Sun is a star.

Clarification 3: Instruction includes how telescopes help scientists observe objects in space.

Clarification 4: Instruction includes examples of how people have observed and studied stars throughout history.

Clarification 5: Instruction includes making and recording observations of stars and using evidence from observations to describe differences in brightness and position in the night sky. Refer to Laboratory Practices Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

Clarification 6: Instruction includes examining historical developments that contributed to scientific understanding of stars at night. Refer to the Timeline of Key Accomplishments Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

SC.2.SP.1.2 Use observations to compare visible properties of stars.

Example: A second-grade student examines scientific images of several stars of different colors, including the Sun. The student compares visible characteristics including color and apparent brightness and size.

Student Task(s) –

- Compare visible properties of different stars.
- Identify similarities and differences among stars.
- Compare the Sun with other stars.
- Organize observations in a table or chart.
- Use evidence to explain how stars can appear differently when viewed from Earth.

Benchmark Clarifications:

Clarification 1: Instruction includes recognizing that the Sun is a star that appears brighter than other stars because it is much closer to Earth.

Clarification 2: Instruction includes observing and describing that stars can appear different from one another when viewed from Earth.

Clarification 3: Instruction is limited to visible properties including the color of stars and the apparent brightness and size.

Clarification 4: Instruction excludes galaxies and universe structure.

Clarification 5: Instruction includes organizing observations and interpreting data using tables, charts, or graphs. Refer to Mathematics Skills Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

SC.2.SP.1.3 Observe and describe patterns in the motion of stars as visible from Earth.

Example: A second-grade student examines a series of nighttime photographs taken from the same Florida location over several hours. The photographs show stars appearing in different positions across the sky.

Student Task(s) –

- Compare star positions in the photographs.
- Identify patterns in apparent star movement.
- Observe that stars appear to move from east to west.
- Recognize constellation patterns.
- Use observations to describe nightly patterns in the sky.

Benchmark Clarifications:

Clarification 1: Instruction includes patterns of star motion as visible from Earth nightly.

Clarification 2: Instruction includes recognizing that stars, including the Sun, appear to move from east to west across the sky in a repeating pattern.

Clarification 3: Instruction may include recognizing that some stars appear in recognizable patterns called constellations.

Clarification 4: Instruction includes organizing, representing, comparing and interpreting observational data about star positions and apparent movement using tables, charts, graphs, calendars or other visual displays to identify patterns and relationships over time. Refer to Mathematics Skills Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

Clarification 5: Instruction includes planning and conducting observations of star positions over time, recording observations, collecting evidence, and using that evidence to support explanations of the apparent motion of stars across the sky. Refer to Laboratory Practices Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

Grade 3

SC.3.SP.1 Model Earth's motions and describe patterns in the Earth-Moon-Sun system.

SC.3.SP.1.1 Identify Earth’s reference points on a globe.

Example: A third-grade student uses a classroom globe to locate the North Pole, South Pole, Equator, Northern Hemisphere, and Southern Hemisphere and investigates how the globe's tilted axis helps represent Earth. Students examine how scientists and explorers developed and used reference points such as the Equator and the North and South Poles to describe locations on Earth.

Student Task(s) –

- Locate major reference points on a globe.
- Identify Earth's axis.
- Compare locations north and south of the Equator.
- Observe the tilt of Earth's axis.

- Use the globe to explain how reference points help scientists describe locations on Earth.

Benchmark Clarifications:

Clarification 1: Instruction includes the reference points of the Earth including the northern and southern hemisphere and equator, and the position of the North and South Pole.

Clarification 2: Instruction includes the concept of an axis as an imaginary line through Earth connecting the North Pole and South Pole about which Earth rotates.

Clarification 3: Instruction excludes measurement of the angle of tilt and exact longitude and latitude locations of reference points.

Clarification 4: Instruction includes using a mounted globe as a model to represent and explain Earth's tilted axis and the location of major Earth reference points. Refer to Modeling Skills Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

Clarification 5: Instruction includes examining historical developments that contributed to scientific understanding of the Earth's major reference points. Refer to the Timeline of Key Accomplishments Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

SC.3.SP.1.2 Use models to describe how Earth's rotation and revolution create observable patterns.

Example: A third-grade student uses a globe, lamp, and Moon model to investigate Earth's rotation, Earth's revolution around the Sun, and the Moon's orbit around Earth. Students also examine how scientists developed models of the Earth-Sun-Moon system over time and how improved observations contributed to scientific understanding of Earth's rotation and revolution.

Student Task(s) –

- Model Earth's rotation.
- Model Earth's revolution around the Sun.
- Model the Moon's orbit around Earth.

- Identify patterns associated with days, years, and lunar motion.
- Explain how Earth's motions create observable patterns.

Benchmark Clarifications:

Clarification 1: Instruction includes Earth rotating once approximately every 24 hours.

Clarification 2: Instruction includes Earth revolving around the Sun once approximately every year.

Clarification 3: Instruction includes the Moon orbiting Earth.

Clarification 4: Instruction includes seasonal changes and changing patterns in the sky over the year.

Clarification 5: Instruction includes developing, using, and interpreting models and simulations to explain how Earth's rotation, Earth's revolution, and the Moon's orbit create observable patterns. Refer to Modeling Skills Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

Clarification 6: Instruction includes examining historical developments that contributed to scientific understanding of how the Earth rotates and revolves. Refer to the Timeline of Key Accomplishments Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

Grade 4

SC.4.SP.1 Analyze patterns within the Earth-Moon-Sun system using observations, models, and evidence.

SC.4.SP.1.1 Use models to explain patterns in the Earth-Moon-Sun system.

Example: A fourth-grade student uses a lamp, globe, and foam ball to model the Earth-Moon-Sun system. The student observes how the positions and motions of the Earth and Moon create predictable patterns, then compares the model with diagrams, observations,

and data collected over one month. Students also examine how observations and technological advances, including telescopes, contributed to the development of scientific understanding of the Earth-Moon-Sun system and its predictable patterns.

Student Task(s) –

- Use a model to investigate how the relative positions and motions of Earth, the Moon, and the Sun affect the Moon's appearance.
- Demonstrate how the Moon orbits Earth and how Earth orbits the Sun.
- Identify and describe repeating patterns in the Earth-Moon-Sun system, such as Moon phases.
- Explain how the changes in the relative positions of Earth, the Moon, and the Sun affect the Moon's appearance.
- Use evidence from models and observations to support explanations of predictable patterns in the Earth-Moon-Sun system.

Benchmark Clarifications:

Clarification 1: Instruction includes recognizing Moon phases as repeating monthly patterns.

Clarification 2: Instruction includes the daily rising and setting of the Sun, Moon, and stars.

Clarification 3: Instruction includes developing, using, and interpreting simulations, models, and data-based representations to explain repeating patterns within the Earth-Moon-Sun system. Refer to Modeling Skills Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

Clarification 4: Instruction includes making and recording observations of patterns in the Earth-Moon-Sun system and using evidence from observations, models, simulations, and other technologies to support explanations. Refer to Laboratory Practices Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

Clarification 5: Instruction includes examining historical developments that contributed to scientific understanding of the Earth-Moon-Sun system. Refer to the Timeline of Key Accomplishments Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

Proposed DRAFT Standards

SC.4.SP.1.2 Explain how Earth’s rotation and revolution contribute to observable patterns on Earth.

Example: A fourth-grade student analyzes shadow measurements, daylight observations, and seasonal photographs collected during different times of the year in Florida.

Student Task(s) –

- Compare daylight and shadow patterns.
- Identify seasonal patterns in observations.
- Explain how Earth's rotation affects day and night.
- Explain how Earth's revolution and tilted axis contribute to seasonal changes.
- Use evidence from observations to support explanations.

Benchmark Clarifications:

Clarification 1: Instruction includes that Earth's rotation causes day and night and the apparent motion of objects across the sky.

Clarification 2: Instruction includes that Earth's revolution around the Sun, together with Earth's tilted axis, contributes to seasonal patterns.

Clarification 3: Instruction includes comparing the effects of Earth's rotation and revolution using observations of shadows, daylight patterns, seasonal weather patterns, and changing star patterns.

Clarification 4: Instruction excludes eclipses and tides.

Clarification 5: Instruction includes measuring, organizing, representing, and comparing observations of shadows, daylight, and seasonal patterns using tables, charts, graphs, calendars, or other visual displays to identify patterns and relationships over time. Refer to Mathematics Skills Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

Clarification 6: Instruction includes making and recording observations of shadows, daylight, and seasonal patterns and using evidence from those observations to support explanations of observable patterns on Earth. Refer to Laboratory Practices Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

Proposed DRAFT Standards

Grade 5

SC.5.SP.1 Analyze the organization of the Solar System and explain how gravity influences the motion of objects in space.

SC.5.SP.1.1 Compare the characteristics of objects in the Solar System.

Example: A fifth-grade student investigates the Solar System by examining scientific data and images of planets, moons, asteroids, comets, and the Sun. Students also examine how improvements in observations and technology contributed to changes in scientific understanding of the objects in the Solar System.

Student Task(s) –

- Compare characteristics of Solar System objects.
- Classify planets as inner or outer planets.
- Organize information using tables and charts.
- Analyze similarities and differences among Solar System objects.
- Use evidence to explain how objects in the Solar System differ.

Benchmark Clarifications:

Clarification 1: Instruction includes comparing all objects in the Solar System, including the Sun, planets and dwarf planets, moons, asteroids, and comets.

Clarification 2: Instruction includes comparing planets based on observable characteristics such as size, composition, atmosphere, temperature, rings, and moons.

Clarification 3: Instruction includes comparing inner and outer planets at an introductory level.

Clarification 4: Instruction includes recognizing that an object's apparent size depends on its distance from the observer, such as the Sun appearing smaller than Earth despite being much larger because it is much farther away.

Clarification 5: Instruction includes organizing, representing, comparing, and interpreting data about Solar System objects using tables, charts, graphs, or other visual displays to identify similarities, differences, and patterns. Refer to Mathematics Skills Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

Clarification 6: Instruction includes using and interpreting models of the Solar System to compare the relative characteristics and locations of the Sun, planets, moons, asteroids, and comets. Refer to Modeling Skills Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

Clarification 7: Instruction includes examining historical developments that contributed to scientific understanding of the Solar System. Refer to the Timeline of Key Accomplishments Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

SC.5.SP.1.2 Describe Earth's place within the Solar System and the Milky Way galaxy.

Example: A fifth-grade student uses scale diagrams and models to investigate Earth's location within the Solar System, the Milky Way galaxy, and the larger universe.

Student Task(s) –

- Locate Earth within the Solar System.
- Describe the Solar System as part of the Milky Way galaxy.
- Describe how galaxies are part of the universe.
- Compare the relative organization of the Solar System, galaxy, and universe.
- Use models to explain Earth's place in space.

Benchmark Clarifications:

Clarification 1: Instruction includes Earth as one of the planets in the Solar System.

Clarification 2: Instruction includes the Solar System as part of the Milky Way galaxy.

Clarification 3: Instruction includes that the universe contains many galaxies.

Clarification 4: Instruction excludes galaxy classification and universe expansion.

Clarification 5: Instruction includes using scale diagrams and models to represent and explain the relative organization of Earth, the Solar System, the Milky Way galaxy, and the universe. Refer to Modeling Skills Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

Clarification 6: Instruction includes examining historical developments that contributed to scientific understanding of the Earth's place within the Solar System and the Milky Way Galaxy. Refer to the Timeline of Key Accomplishments Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

SC.5.SP.1.3 Explain how gravity affects objects in the Solar System.

Example: A fifth-grade student investigates gravity using models, videos, and simulations showing planetary orbits, moons orbiting planets, and astronauts on the Moon. Students also examine how scientific observations and the work of scientists such as Isaac Newton contributed to the understanding that gravity affects the motion of objects in the Solar System.

Student Task(s) –

- Identify examples of gravity in the Solar System.
- Explain how gravity affects planetary and lunar motion.
- Use models to show how gravity keeps objects in orbit.
- Use evidence to explain the role of gravity in the Solar System.

Benchmark Clarifications:

Clarification 1: Instruction includes gravity as a force that pulls objects toward one another.

Clarification 2: Instruction includes gravity keeping planets in orbit around the Sun and moons in orbit around planets.

Clarification 3: Instruction includes that gravitational attraction between objects is affected by their mass and distance from one another.

Clarification 4: Instruction is limited to conceptual explanations and excludes mathematical calculations.

Clarification 5: Instruction includes developing, using, and interpreting models and simulations to explain how gravity affects the motion of planets and moons and keeps objects in orbit. Refer to Modeling Skills Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

Clarification 6: Instruction includes examining historical developments that contributed to scientific understanding of the relationship between gravity and objects in space. Refer to the Timeline of Key Accomplishments Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

SC.5.SP.1.4 Explain how technology helps scientists study space.

Example: A fifth-grade student investigates technologies used at Kennedy Space Center and Cape Canaveral, including telescopes, satellites, spacecraft, probes, and rovers. The student examines how these technologies allow scientists to observe, collect data about, and investigate objects and phenomena in space. Students examine how advances in technology have expanded scientific understanding of space over time.

Student Task(s) –

- Identify technologies used to study space.
- Compare how different technologies collect data.
- Explain how space technologies extend human observations.
- Describe Florida's role in space exploration.
- Use evidence to explain how technology helps scientists investigate the Solar System and beyond.

Benchmark Clarifications:

Proposed DRAFT Standards

Clarification 1: Instruction includes recognizing that technology allows scientists to observe and collect information about objects in space.

Clarification 2: Instruction includes examples from Florida's role in space exploration.

Clarification 3: Instruction includes examples of launches, astronaut missions, satellites, and spacecraft associated with Kennedy Space Center and Cape Canaveral.

Clarification 4: Instruction includes using observations and evidence collected through space technologies to explain how scientists investigate objects and phenomena in space. Refer to Laboratory Practices Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

Clarification 5: Instruction includes examining historical developments that contributed to space exploration and study. Refer to the Timeline of Key Accomplishments Supporting Mastery of K-5 Planet Earth and Space Benchmarks.

Proposed DRAFT Standards

The Science of Life

How living things are distinguished from nonliving things; how organisms grow, develop, reproduce, and pass traits to offspring; and how structures, behaviors, and environmental conditions influence survival over time.

Grade Kindergarten

SC.K.SL.1 Recognize characteristics of living things and describe how living things grow, reproduce, and use behaviors to meet their needs and survive.

SC.K.SL.1.1 Classify objects and organisms as living things or nonliving things using observable characteristics.

Example: A kindergarten student sorts pictures of plants, animals, mushrooms, rocks, water, and toys into groups and uses observable evidence to explain why each item is living or nonliving.

Student Task(s) –

Observe characteristics.

Sort living and nonliving things.

Compare classifications.

Use evidence to justify classifications.

Benchmark Clarifications:

Clarification 1: Instruction includes identifying observable characteristics of living things such as growing, obtaining resources, reproducing, and responding to their environment.

Clarification 2: Instruction includes recognizing that nonliving things do not carry out life processes such as growing, reproducing, obtaining resources to survive, or responding to their environment.

Clarification 3: Instruction includes comparing living and nonliving things using observable evidence.

Clarification 4: Instruction includes examples of living things, such as plants, animals, and fungi, and nonliving things, such as rocks, water, soil, and manufactured objects.

Clarification 5: Instruction includes sorting and classifying living and nonliving things using observable evidence. Refer to Mathematics Skills Supporting Mastery of K-5 Life Benchmarks.

Clarification 6: Instruction includes classifying objects and organisms as living or nonliving based on observable characteristics. Refer to Laboratory Practices Supporting Mastery of K-5 Life Benchmarks.

SC.K.SL.1.2 Identify and describe characteristics common to living things.

Benchmark Clarifications:

Clarification 1: Instruction includes recognizing that living things need resources such as food, water, air, or sunlight to survive and grow.

Clarification 2: Instruction includes recognizing that living things grow, reproduce, use resources to meet their needs, and respond to their environment.

Clarification 3: Instruction includes observing that living things change throughout their lives.

Clarification 4: Instruction excludes cellular processes and detailed life cycle stages.

Clarification 5: Instruction includes using drawings, photographs, and models to represent characteristics common to living things. Refer to Modeling Skills Supporting Mastery of K-5 Life Benchmarks.

SC.K.SL.1.3 Recognize that living things reproduce and produce offspring.

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Benchmark Clarifications:

Clarification 1: Instruction includes identifying reproduction as a characteristic of living things.

Clarification 2: Instruction includes recognizing that offspring come from parent organisms.

Clarification 3: Instruction includes observing examples of offspring in plants and animals.

Clarification 4: Instruction excludes detailed life cycle stages and mechanisms of inheritance.

Clarification 5: Instruction includes examining historical developments that contributed to scientific understanding of reproduction and offspring of living things. Refer to the Timeline of Key Accomplishments Supporting Mastery of K-5 Life Benchmarks.

SC.K.SL.1.4 Identify similarities between parents and offspring.

Example: A kindergarten student compares photographs of adult dogs and puppies, adult birds and chicks, and mature plants and seedlings.

Student Task(s) –

Identify similarities.

Compare observable traits.

Match parents and offspring.

Use evidence from photographs.

Benchmark Clarifications:

Clarification 1: Instruction includes recognizing that offspring can share observable characteristics with their parents.

Clarification 2: Instruction includes examples from both plants and animals.

Clarification 3: Instruction excludes genetic explanations of inherited traits.

Clarification 4: Instruction includes organizing and comparing observable characteristics of parents and offspring, such as identifying similarities and differences in photographs,

drawings or other representations. Refer to Mathematics Skills Supporting Mastery of K-5 Life Benchmarks.

Clarification 5: Instruction includes comparing observable characteristics using drawings, photographs, and models. Refer to Modeling Skills Supporting Mastery of K-5 Life Benchmarks.

Clarification 6: Instruction includes making observations of plants and animals or their representations and using observable evidence to identify similarities between parents and offspring. Refer to Laboratory Practices Supporting Mastery of K-5 Life Benchmarks.

SC.K.SL.1.5 Explain how behaviors help organisms meet their needs and survive.

Example: Students in a Kindergarten class are looking at a picture to observe a group of animals in a habitat and identify behaviors that help them meet their needs, such as eating, drinking, moving, hiding, nesting, and obtaining shelter. Students use counting, comparing, and sorting skills to determine how many animals are showing each behavior. Students identify patterns in the data, such as noticing that more animals are eating than hiding, and use quantitative reasoning to answer questions about the behaviors they observe. Students view a picture showing:

5 birds eating

3 rabbits hiding

5 squirrels eating

2 foxes resting in a shelter

Student Task(s) –

Identify the behaviors each animal is performing.

Count the number of animals showing each behavior.

Compare which behaviors are seen most and least often.

Identify patterns, such as eating is the most common behavior observed.

Use quantitative reasoning to explain their observations, such as "There are 10 animals eating and only 3 hiding, so more animals are eating than hiding."

Benchmark Clarifications:

Clarification 1: Instruction includes identifying observable behaviors organisms use to meet their needs and survive, such as eating, drinking, moving, hiding, nesting, and obtaining shelter.

Clarification 2: Instruction includes recognizing cause-and-effect relationships between behaviors and survival.

Clarification 3: Instruction excludes distinctions between inherited and learned behaviors.

Clarification 4: Instruction includes counting, sorting, and comparing observations of organism behaviors and using the resulting information to identify patterns in the behaviors observed. Refer to Mathematics Skills Supporting Mastery of K-5 Life Benchmarks.

Clarification 5: Instruction includes observing organisms or representations of organisms, identifying behaviors, and using observations as evidence to explain how behaviors help organisms meet their needs and survive. Refer to Laboratory Practices Supporting Mastery of K-5 Life Benchmarks.

SC.K.SL.1.6 Identify how behaviors of parents toward offspring help offspring survive.

Example: A kindergartener observes photographs and videos of different animals caring for their young. The student observes a bird bringing food to its chicks, a mammal feeding its young, and an animal sheltering or protecting its offspring. The student identifies how each parent's behavior helps the offspring meet its needs and survive. Students also examine how Charles Henry Turner used systematic observation to study animal behavior, connecting careful observations of animal behavior to scientific understanding of how organisms interact with their environments.

Student Task(s) –

Identify behaviors parents use to care for their offspring.

Describe how different young animals obtain food.

Compare an offspring that receives food from a parent with an offspring that obtains food from its environment.

Explain that parent behaviors can help offspring meet their needs and survive.

Benchmark Clarifications:

Clarification 1: Instruction includes identifying observable behaviors that parents use to care for their offspring and support their survival, such as nesting, feeding, protecting, or sheltering.

Clarification 2: Instruction includes understanding that these behaviors help offspring survive.

Clarification 3: Instruction includes examining historical developments that contributed to scientific understanding of how parental behavior contributes to offspring survival. Refer to the Timeline of Key Accomplishments Supporting Mastery of K-5 Life Benchmarks.

SC.K.SL.1.7 Describe how living things use their environment to meet their needs.

Example: A kindergarten student observes a plant growing near a window and a bird obtaining food and water in a schoolyard habitat.

Student Task(s) –

Identify resources organisms use.

Describe where resources come from.

Explain how resources support survival.

Use observations to support explanations.

Benchmark Clarifications:

Clarification 1: Instruction includes describing how plants and animals obtain food, water, air, sunlight, and shelter from their surroundings.

Clarification 2: Instruction includes recognizing that different living things meet their needs in different ways.

Clarification 3: Instruction includes examples of organisms finding food, water, or shelter.

Clarification 4: Instruction includes cause-and-effect relationships between meeting needs and survival.

Clarification 5: Instruction excludes food chains, food webs, and ecosystem interactions.

Clarification 6: Instruction includes using drawings, photographs, and models to represent how living things obtain resources from their environment. Refer to Modeling Skills Supporting Mastery of K-5 Life Benchmarks.

Clarification 7: Instruction includes observing living things in their environments and using observations as evidence to describe how organisms obtain resources needed for survival. Refer to Laboratory Practices Supporting Mastery of K-5 Life Benchmarks.

Grade 1

SC.1.SL.1 Explain how living things grow, develop, and meet their needs throughout their life cycles.

SC.1.SL.1.1 Compare similarities and differences between parents and offspring.

Example: A Florida park ranger observes an adult osprey and a young osprey in a nest. Both birds have similar beaks and feathers, but the young osprey is smaller and has different feather markings.

Student Task(s) –

Identify similarities and differences between parent and offspring, in observable traits such as size, color, shape, and body coverings.

Compare the observable similarities and differences between the parent and offspring using evidence from observations.

Benchmark Clarifications:

Clarification 1: Instruction includes recognizing patterns between parent organisms and their offspring in plants and animals.

Clarification 2: Instruction includes recognizing that offspring may not be identical to their parents.

Clarification 3: Instruction excludes mechanisms of inheritance.

Clarification 4: Instruction includes organizing and comparing observable characteristics of parents and offspring to identify similarities, differences and patterns. Refer to Mathematics Skills Supporting Mastery of K-5 Life Benchmarks.

Clarification 5: Instruction includes using drawings, photographs or models to represent and compare observable similarities and differences between parents and offspring. Refer to Modeling Skills Supporting Mastery of K-5 Life Benchmarks.

SC.1.SL.1.2 Describe how living things meet their basic needs for growth and survival.

Benchmark Clarifications:

Clarification 1: Instruction includes identifying food, water, air, shelter, and room to live, grow, and carry out life processes as basic needs of living things.

Clarification 2: Instruction includes comparing how plants and animals meet their basic needs.

Clarification 3: Instruction includes recognizing that living things obtain resources from their environment to support their growth and survival.

Clarification 4: Instruction excludes ecosystem relationships such as food chains and food webs.

Clarification 5: Instruction includes using diagrams and models to represent how habitats provide resources needed for organisms to live, grow, and survive. Refer to Modeling Skills Supporting Mastery of K-5 Life Benchmarks.

SC.1.SL.1.3 Describe how living things grow and change throughout their life cycles.

Example: A student grows a bean plant from a seed and records changes over several weeks. The plant becomes taller, develops leaves, and produces new structures as it grows.

Student Task(s) –

Sequence the stages of plant growth.

Describe changes observed during growth.

Explain how the plant changed over time.

Benchmark Clarifications:

Clarification 1: Instruction includes recognizing that living things change as they grow.

Clarification 2: Instruction includes identifying major stages in plant and animal life cycles.

Clarification 3: Instruction includes comparing growth and change in plants and animals. Refer to Mathematics Skills Supporting Mastery of K-5 Life Benchmarks.

Clarification 4: Instruction includes sequencing stages of growth and development using diagrams and models. Refer to Modeling Skills Supporting Mastery of K-5 Life Benchmarks.

Clarification 5: Instruction excludes detailed metamorphosis and reproductive processes.

SC.1.SL.1.4 Describe how parent behaviors support the growth and survival of offspring.

Benchmark Clarifications:

Clarification 1: Instruction includes identifying observable behaviors that parents use to support the growth and survival of their offspring, such as feeding, protecting, sheltering, and caring for offspring.

Clarification 2: Instruction includes explaining how parent behaviors increase offspring survival.

Clarification 3: Instruction includes recognizing that different organisms use different strategies to care for their young.

Clarification 4: Instruction includes making observations and using evidence to explain how parent behaviors support the growth and survival of offspring. Refer to Laboratory Practices Supporting Mastery of K-5 Life Benchmarks.

SC.1.SL.1.5 Explain how behaviors help organisms obtain resources and survive.

Benchmark Clarifications:

Clarification 1: Instruction includes identifying observable behaviors that organisms use to obtain resources and survive, such as eating, drinking, moving, hiding, and seeking shelter.

Clarification 2: Instruction includes recognizing cause-and-effect relationships between behaviors and survival.

Clarification 3: Instruction includes comparing how different organisms use behaviors to meet similar needs.

Clarification 4: Instruction excludes distinctions between inherited and learned behaviors.

Clarification 5: Instruction includes making observations and using evidence to explain how behaviors help organisms obtain resources and survive. Refer to Laboratory Practices Supporting Mastery of K-5 Life Benchmarks.

SC.1.SL.1.6 Explain how physical structures help organisms survive in their environments.

Example: A student observes that a pelican uses its beak to catch fish while a squirrel uses its claws to climb trees and gather food. Both organisms use different structures and behaviors to meet their needs.

Student Task(s) –

Identify a structure used by each organism.

Explain how the structures help the organisms survive.

Compare how the organisms obtain resources.

Benchmark Clarifications:

Clarification 1: Instruction includes examples of physical structures such as beaks for obtaining food, claws for climbing or obtaining food, shells for protection, roots for obtaining water, and leaves for obtaining sunlight.

Clarification 2: Instruction includes identifying physical structures as observable body parts or plant structures and connecting each structure to the function it performs to help an organism meet its needs and survive.

Clarification 3: Instruction includes describing cause-and-effect relationships between structures and survival.

Clarification 4: Instruction includes comparing how different structures help organisms obtain resources, protection, or shelter.

Clarification 5: Instruction may include using tables, diagrams, photographs, and models to represent structure-function relationships. Refer to Modeling Skills Supporting Mastery of K-5 Life Benchmarks.

Grade 2

SC.2.SL.1 Explain how traits, structures, and responses help organisms survive in their environments.

SC.2.SL.1.1 Explain how traits help organisms survive in their environments.

Example: A student compares a mangrove tree growing along the Florida coast with a cactus growing in a dry environment. Each organism has traits that help it survive where it lives.

Student Task(s) –

Identify traits of each organism.

Explain how the traits help survival.

Compare how organisms meet similar needs in different environments.

Benchmark Clarifications:

Clarification 1: Instruction includes recognizing that living things have needs, such as obtaining food, water, and shelter, and avoiding danger, that can be supported by their traits.

Clarification 2: Instruction includes examples of traits such as a giraffe's long neck, a polar bear's thick fur, a duck's webbed feet, or a cactus's prickly, water-storing stem.

Clarification 3: Instruction includes recognizing that different organisms have different traits that support survival in different environments.

Clarification 4: Instruction excludes detailed genetic mechanisms and evolutionary processes.

Clarification 5: Instruction includes using drawings, diagrams, or models to represent an organism's traits and explain how those traits help the organism survive in its environment. Refer to Modeling Skills Supporting Mastery of K-5 Life Benchmarks.

SC.2.SL.1.2 Compare how living things use structures and behaviors to survive.

Benchmark Clarifications:

Clarification 1: Instruction includes examples of physical structures such as beaks for obtaining food, claws for climbing or obtaining food, shells for protection, roots for obtaining water, and leaves for obtaining sunlight.

Clarification 2: Instruction includes connecting structures and behaviors to obtaining resources and survival.

Clarification 3: Instruction includes structure-function relationships.

Clarification 4: Instruction includes comparing plants and animals using observable examples.

Clarification 5: Instruction includes organizing observations in tables, charts, or classification organizers. Refer to Mathematics Skills Supporting Mastery of K-5 Life Benchmarks.

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SC.2.SL.1.3 Describe how environmental conditions can influence the growth and survival of organisms.

Example: Two identical plants are grown in different locations. One receives enough sunlight and water while the other receives very little sunlight.

Student Task(s) –

Compare the growth of the two plants.

Identify environmental conditions that differed.

Explain how environmental conditions affected growth.

Benchmark Clarifications:

Clarification 1: Instruction includes environmental conditions such as sunlight, water, temperature, and available space for growth and movement.

Clarification 2: Instruction includes describing how changes in environmental conditions may affect growth and survival.

Clarification 3: Instruction includes comparing how the same type of organism may grow differently in different environments.

Clarification 4: Instruction includes recognizing that organisms survive best when their needs are met.

Clarification 5: Instruction includes examples of organisms living in a variety of environments such as forests, wetlands, grasslands, deserts, freshwater, and marine environments.

Clarification 6: Instruction includes collecting and comparing observations of organisms under different environmental conditions. Refer to Laboratory Practices Supporting Mastery of K-5 Life Benchmarks.

SC.2.SL.1.4 Describe how plants and animals respond to environmental changes to support survival.

Benchmark Clarifications:

Clarification 1: Instruction includes responses such as dormancy, reduced activity, or seeking shelter.

Clarification 2: Instruction includes examples such as seeds remaining dormant, bears becoming less active, and insects becoming inactive during unfavorable conditions.

Clarification 3: Instruction includes explaining how these responses help organisms survive environmental changes.

Clarification 4: Instruction excludes detailed physiological mechanisms.

SC.2.SL.1.5 Compare how observable traits, physical structures, and responses to environmental conditions help different organisms survive.

Example: Students compare a gopher tortoise, a mangrove tree, and a bird living in Florida environments. The gopher tortoise uses its shell and burrow to protect itself and avoid extreme heat, the mangrove tree has specialized roots that help it live in wet coastal conditions, and the bird seeks shelter during severe weather. Students compare how these different survival strategies and explain how each trait, structure, and response helps the organism survive in their environments.

Student Task(s) –

Identify the survival strategy used by each organism.

Compare how each strategy supports survival.

Explain why different organisms may survive in different ways.

Benchmark Clarifications:

Clarification 1: Instruction includes comparing physical and behavioral survival strategies among plants and animals.

Clarification 2: Instruction includes examples involving physical structures, observable traits, and responses to environmental conditions.

Clarification 3: Instruction includes recognizing that different organisms may survive similar challenges in different ways.

Clarification 4: Instruction includes organizing and comparing information about observable traits, physical structures and responses to environmental conditions to identify similarities and differences in how organisms survive. Refer to Mathematics Skills Supporting Mastery of K-5 Life Benchmarks.

Clarification 5: Instruction includes using observations, drawings, images, models, charts, and data to support comparisons. Refer to Modeling Skills Supporting Mastery of K-5 Life Benchmarks.

Grade 3

SC.3.SL.1 Explain how inherited traits, environmental influences, and behaviors affect an organism's growth, survival, and response to changing conditions.

SC.3.SL.1.1 Explain how inherited traits and environmental conditions influence an organism's growth and survival.

Example: Two orange trees grew from seeds produced by parent orange trees. Both trees have broad, oval-shaped leaves. One tree grows in a sunny area with nutrient-rich soil and plenty of water. The other tree grows in a shaded area with poor soil and limited water. As a result, the first tree grows taller, stays healthier, and produces more oranges, while the second tree grows more slowly and produces fewer oranges. Students also examine how Gregor Mendel's investigations contributed to scientific understanding that traits can be passed from parent organisms to offspring.

Student Task(s) –

Identify an inherited trait that both orange trees received from their parent trees.

Identify the environmental conditions that are different for each tree.

Explain how both factors influence the organism.

Describe how inherited traits and environmental conditions work together to affect the growth and survival of the orange trees.

Benchmark Clarifications:

Clarification 1: Instruction includes distinguishing between inherited traits and characteristics influenced by environmental conditions.

Clarification 2: Instruction includes explaining that inherited traits are passed from parent organisms to offspring.

Clarification 3: Instruction includes recognizing that environmental conditions can influence growth, health, and appearance.

Clarification 4: Instruction includes comparing examples of inherited traits and environmentally influenced characteristics in plants and animals.

Clarification 5: Instruction excludes genetic mechanisms and inheritance patterns.

Clarification 6: Instruction includes examining historical developments that contributed to scientific understanding of inherited traits, adaptations, and survival of organisms. Refer to the Timeline of Key Accomplishments Supporting Mastery of K-5 Life Benchmarks.

SC.3.SL.1.2 Explain how behaviors help organisms survive in their environments.

Benchmark Clarifications:

Clarification 1: Instruction includes identifying behaviors that help organisms obtain resources, avoid danger, and survive.

Clarification 2: Instruction includes examples such as hiding, warning behaviors, group behaviors, nest-building, and protective behaviors.

Clarification 3: Instruction includes predator-prey interactions, such as eagle-fish, Venus flytrap-insect, lion-zebra, or snake-mouse.

SC.3.SL.1.3 Explain how seasonal changes affect organisms and their behaviors.

Benchmark Clarifications:

Clarification 1: Instruction includes identifying seasonal changes such as changes in temperature, rainfall, and daylight.

Clarification 2: Instruction includes examples such as migration, hibernation, dormancy, and changes in activity levels.

Clarification 3: Instruction includes describing how these responses help organisms survive when environmental conditions change.

Clarification 4: Instruction includes recognizing that different organisms may respond differently to the same seasonal changes.

Clarification 5: Instruction excludes detailed physiological mechanisms.

Clarification 6: Instruction includes representing seasonal patterns using charts, calendars, graphs, or models. Refer to Mathematics Skills Supporting Mastery of K-5 Life Benchmarks.

SC.3.SL.1.4 Compare how different organisms use traits, behaviors, and environmental responses to survive.

Example: Students compare a rabbit, a turtle and a mangrove tree living in Florida environments. The rabbit uses camouflage and hides in vegetation to avoid predators, the turtle withdraws into its shell when threatened, and the mangrove tree has specialized roots that help it survive in wet coastal conditions. Students compare these different traits, behaviors and environmental responses as survival strategies and explain how each helps the organism survive in its environment.

Student Task(s) –

Identify a trait, behavior, or environmental response that helps each organism survive.

Compare the survival strategy used by the organisms.

Explain how each trait, behavior, or response helps the organism survive.

Use observations or evidence to support the comparison.

Benchmark Clarifications:

Clarification 1: Instruction includes comparing survival strategies among plants and animals.

Clarification 2: Instruction includes examples involving inherited traits, camouflage, mimicry, migration, hibernation, and dormancy.

Clarification 3: Instruction includes recognizing that different organisms may survive similar environmental challenges using different strategies.

Clarification 4: Instruction includes using observations and data to support comparisons and construct explanations. Refer to Mathematics Skills Supporting Mastery of K-5 Life Benchmarks.

Clarification 5: Instruction includes using diagrams, models, and images to support comparisons and construct explanations. Refer to Modeling Skills Supporting Mastery of K-5 Life Benchmarks.

Clarification 6: Instruction includes collecting and analyzing evidence from observations and investigations to support explanations about survival strategies. Refer to Laboratory Practices Supporting Mastery of K-5 Life Benchmarks.

SC.3.SL.1.5 Develop and use models to describe how food chains transfer energy among organisms.

Example: In a Florida marsh, grass is eaten by a grasshopper, which is eaten by a bird. When organisms die, decomposers break down the remains. Students use a model to show how energy moves through the food chain as organisms obtain food.

Student Task(s) –

Identify the producer and consumers.

Construct a model of the food chain.

Explain how energy moves through the food chain.

Benchmark Clarifications:

Clarification 1: Instruction includes producers, consumers, and decomposers as interacting components of a food-chain system.

Clarification 2: Instruction includes terrestrial and aquatic food chains.

Clarification 3: Instruction includes arrows representing the movement of energy among system components.

Clarification 4: Instruction excludes food webs.

Clarification 5: Instruction includes organizing and interpreting information about food chains to identify patterns in energy transfer among organisms. Refer to Mathematics Skills Supporting Mastery of K-5 Life Benchmarks.

Clarification 6: Instruction includes developing and using models to represent the movement of energy through food chains. Refer to Modeling Skills Supporting Mastery of K-5 Life Benchmarks.

Grade 4

SC.4.SL.1 Analyze how differences among individuals and responses to environmental change influence survival.

SC.4.SL.1.1 Explain how variations in traits among individuals of the same species can affect survival.

Benchmark Clarifications:

Clarification 1: Instruction includes recognizing that individuals within a species are not identical by identifying differences in observable traits among individuals of the same species.

Clarification 2: Instruction includes explaining how some trait variations may provide advantages or disadvantages in specific environments.

Clarification 3: Instruction includes using examples to explain how trait variations, such as beak shape, coloration patterns and markings, and coat thickness, can affect an organism's ability to obtain resources, avoid danger, or survive.

Clarification 4: Instruction excludes genetic mechanisms and inheritance patterns.

Clarification 5: Instruction includes organizing and comparing observable trait variations among individuals of the same species and using the information to identify patterns in how variations may affect survival in different environments. Refer to Mathematics Skills Supporting Mastery of K-5 Life Benchmarks.

SC.4.SL.1.2 Analyze how migration supports survival in changing environments.

Example: A flock of migratory birds travels through Florida during seasonal changes when food becomes difficult to find in other regions. The birds move to an area where resources are more available.

Student Task(s) –

Explain why the birds migrate.

Analyze how migration supports survival.

Benchmark Clarifications:

Clarification 1: Instruction includes analyzing patterns of seasonal movement.

Clarification 2: Instruction includes explaining how migration helps organisms access resources or avoid unfavorable environmental conditions.

Clarification 3: Instruction excludes detailed navigational mechanisms.

Clarification 4: Instruction includes organizing and comparing migration information, such as the timing, location or distance of seasonal movements, to identify patterns that support explanations of how migration helps organisms survive. Refer to Mathematics Skills Supporting Mastery of K-5 Life Benchmarks.

Clarification 5: Instruction includes using maps, models, diagrams, timelines, and data displays to identify and interpret migration patterns. Refer to Modeling Skills Supporting Mastery of K-5 Life Benchmarks.

Proposed DRAFT Standards

SC.4.SL.1.3 Analyze how different responses to environmental change help organisms survive.

Benchmark Clarifications:

Clarification 1: Instruction includes examples such as migration, hibernation, dormancy, and changes in activity levels.

Clarification 2: Instruction includes comparing different responses used by organisms to survive environmental changes.

Clarification 3: Instruction includes analyzing environmental conditions, such as temperature or resource availability, that trigger different responses.

Clarification 4: Instruction includes explaining why different organisms may respond differently to the same environmental change.

Clarification 5: Instruction excludes detailed physiological mechanisms.

Clarification 6: Instruction includes collecting and analyzing evidence to explain how different responses to environmental change help organisms survive. Refer to Laboratory Practices Supporting Mastery of K-5 Life Benchmarks.

SC.4.SL.1.4 Compare how different traits and behaviors support survival in changing environments.

Example: Students compare organisms that survive changing environmental conditions in different ways. One animal has a protective structure that helps it withstand environmental conditions, another uses camouflage to avoid predators, and a third migrates when seasonal conditions change. Students compare how these different traits and behaviors support survival in changing environments.

Student Task(s) –

Identify the survival strategy used by each organism.

Compare the advantages of the strategies.

Use evidence from the case study to support conclusions.

Benchmark Clarifications:

Clarification 1: Instruction includes comparing structural traits, behavioral traits, and environmental responses.

Clarification 2: Instruction includes examples such as camouflage, mimicry, migration, hibernation, dormancy, and protective structures.

Clarification 3: Instruction includes analyzing how specific traits or behaviors may be more effective in certain environments than others.

Clarification 4: Instruction includes organizing and comparing data about different traits and behaviors that support organism survival, including representing information in tables, charts, or graphs to identify similarities and differences among survival strategies. Refer to Mathematics Skills Supporting Mastery of K-5 Life Benchmarks.

Clarification 5: Instruction includes using evidence from observations, models, images, or data to support comparisons. Refer to Modeling Skills Supporting Mastery of K-5 Life Benchmarks.

Clarification 6: Instruction includes making observations, analyzing evidence from observations or investigations, and using evidence to support conclusions about how different traits and behaviors support survival in changing environments. Refer to Laboratory Practices Supporting Mastery of K-5 Life Benchmarks.

SC.4.SL.1.5 Analyze how organisms interact within food webs.

Example: In the Everglades, fish eat insects, wading birds eat fish, and alligators may eat birds or fish. These feeding relationships connect many organisms.

Student Task(s) –

Identify feeding relationships in the food web.

Trace two pathways through the food web.

Explain how a change in one population could affect another.

Benchmark Clarifications:

Clarification 1: Instruction includes food webs as systems composed of interacting producers, consumers, and decomposers that transfer energy through feeding relationships.

Clarification 2: Instruction includes recognizing that organisms may have multiple food sources.

Clarification 3: Instruction includes comparing food chains and food webs.

Clarification 4: Instruction includes Florida ecosystem examples.

Clarification 5: Instruction includes organizing and representing information about feeding relationships and population changes to analyze patterns within food webs. Refer to Mathematics Skills Supporting Mastery of K-5 Life Benchmarks.

Clarification 6: Instruction includes using and interpreting models, diagrams, or representations of food chains and food webs to analyze feeding relationships, trace pathways, and explain how changes in one population may affect other organisms. Refer to Modeling Skills Supporting Mastery of K-5 Life Benchmarks.

Grade 5

SC.5.SL.1 Analyze how traits, adaptations, life cycles, and environmental conditions influence survival and reproduction.

SC.5.SL.1.1 Explain how structural and behavioral adaptations help organisms survive in different environments.

Benchmark Clarifications:

Clarification 1: Instruction includes structural adaptations such as body coverings, beaks, claws, roots, stems, and leaves.

Clarification 2: Instruction includes behavioral adaptations such as mimicry, migration, nesting, hibernation, feeding behaviors, and shelter-seeking behaviors.

Clarification 3: Instruction includes comparing adaptations among organisms living in different environments.

Clarification 4: Instruction includes analyzing how specific adaptations help organisms meet their needs and survive.

Clarification 5: Instruction includes using models, diagrams, images, or other representations to compare structural and behavioral adaptations among organisms and explain how specific adaptations support survival in different environments. Refer to Modeling Skills Supporting Mastery of K-5 Life Benchmarks.

Clarification 6: Instruction includes making observations and using evidence to investigate how structural and behavioral adaptations help organisms meet their needs and survive in different environments. Refer to Laboratory Practices Supporting Mastery of K-5 Life Benchmarks.

SC.5.SL.1.2 Develop and use models to explain how behaviors and life cycle strategies contribute to survival and reproduction.

Example: Sea turtles lay eggs on Florida beaches, and hatchlings emerge from nests and move toward the ocean. These behaviors occur at specific stages of the sea turtle life cycle and increase the likelihood that offspring will survive and eventually reproduce. Students use a model to show how these behaviors contribute to survival at different stages of the life cycle.

Student Task(s) –

- Identify behaviors that support survival and reproduction.
- Develop a model showing the life cycle stages.
- Explain how the behaviors contribute to survival.

Benchmark Clarifications:

Clarification 1: Instruction includes behaviors such as nesting, feeding, migration, and hibernation that support survival and reproduction.

Clarification 2: Instruction includes life cycle strategies, such as parental care, timing of reproduction, and number of offspring, that support survival and reproduction.

Clarification 3: Instruction includes explaining cause-and-effect relationships between behaviors, life cycles, and environmental conditions.

Clarification 4: Instruction includes comparing survival and reproductive strategies among different organisms.

Clarification 5: Instruction excludes detailed genetic inheritance and natural selection mechanisms.

Clarification 6: Instruction includes developing and using conceptual models that illustrate relationships among environmental conditions, behaviors, life cycles, survival, and reproduction. Refer to Modeling Skills Supporting Mastery of K-5 Life Benchmarks.

SC.5.SL.1.3 Explain how environmental conditions influence growth, development, and survival.

Benchmark Clarifications:

Clarification 1: Instruction includes explaining how environmental factors, such as sunlight, water availability, temperature, food availability, and seasonal conditions affect growth and development.

Clarification 2: Instruction includes recognizing that organisms may respond differently to the same environmental conditions.

Clarification 3: Instruction includes cause-and-effect relationships between environmental conditions and organism survival.

Clarification 4: Instruction excludes genetic mechanisms.

Clarification 5: Instruction includes collecting and analyzing evidence to explain how environmental conditions influence growth, development, and survival. Refer to Laboratory Practices Supporting Mastery of K-5 Life Benchmarks.

SC.5.SL.1.4 Compare inherited traits and characteristics influenced by environmental conditions.

Benchmark Clarifications:

Clarification 1: Instruction includes distinguishing between inherited traits and characteristics influenced by environmental factors.

Clarification 2: Instruction includes examples of inherited traits, such as beak shape, coloration patterns and markings, and stem thickness and environmentally influenced characteristics, such as flower color, root depth, fur thickness, and size of plants and animals.

Clarification 3: Instruction includes recognizing that environmental conditions can influence growth, health, and appearance.

Clarification 4: Instruction excludes genes, DNA, genetic mechanisms and inheritance patterns beyond the grade-level understanding of inherited traits and characteristics influenced by environmental conditions.

Clarification 5: Instruction includes using evidence and examples to support comparisons. Refer to Mathematics Skills Supporting Mastery of K-5 Life Benchmarks.

SC.5.SL.1.5 Explain how environmental changes influence which traits are more likely to support survival and reproduction over time.

Example: A prolonged drought reduces water availability in an ecosystem. Organisms with traits that help conserve water are more likely to survive and reproduce.

Student Task(s) –

Explain which traits may provide an advantage.

Use evidence from the case study to explain survival outcomes.

Benchmark Clarifications:

Clarification 1: Instruction includes analyzing environmental factors such as food availability, predators, water availability, temperature, and seasonal patterns.

Clarification 2: Instruction includes explaining that certain traits may provide advantages under environmental conditions.

Clarification 3: Instruction includes recognizing that organisms with advantageous traits are more likely to survive and reproduce in specific environments.

Clarification 4: Instruction includes explaining that traits supporting survival may become more common within populations over time.

Clarification 5: Instruction includes recognizing that changes in ecosystems such as drought, flooding, wildfire, habitat loss, and invasive species can affect the survival of organisms.

Clarification 6: Instruction excludes detailed genetic mechanisms, DNA, Punnett squares, and formal natural selection models.

Clarification 7: Instruction includes analyzing datasets and graphs to support explanations. Refer to Mathematics Skills Supporting Mastery of K-5 Life Benchmarks.

Clarification 8: Instruction includes analyzing evidence and examples, such as observations and case studies to support explanations. Refer to Laboratory Practices Supporting Mastery of K-5 Life Benchmarks.

SC.5.SL.1.6 Explain how human actions can positively or negatively affect organisms and their environments.

Example: A coastal community restores native dune vegetation to reduce erosion and improve habitat for nesting sea turtles. As the habitat improves, more turtles successfully nest on the beach.

Student Task(s) –

Describe how the action affected the ecosystem.

Explain how the action influenced organism survival.

Benchmark Clarifications:

Clarification 1: Instruction includes habitat protection, conservation, restoration, and pollution reduction.

Clarification 2: Instruction includes examples from Florida ecosystems, such as sea turtle conservation, Everglades restoration, invasive species management, coral reef protection, and sustainable agricultural practices that help protect soil, water, and wildlife habitats.

Clarification 3: Instruction includes recognizing that humans can both harm and help living systems.

Clarification 4: Instruction excludes environmental policy analysis.

The Science of Cell Biology

How cells serve as the basic unit of life; how living things can be observed at different scales; and how cells, tissues, organs, and systems work together to support life.

Grade Kindergarten

SC.K.CB.1 Recognize that some objects and living things are too small to be easily observed.

SC.K.CB.1.1 Recognize that tools can help people observe very small objects and living things.

Benchmark Clarifications:

Clarification 1: Instruction includes observing objects that appear different when viewed with magnifying tools.

Clarification 2: Instruction includes recognizing that some living things and structures are too small to see clearly without tools.

Clarification 3: Instruction excludes cells and microscopic structures.

Clarification 4: Instruction includes making observations with magnifying tools and using evidence from those observations to describe objects and living things that are difficult to

see with the unaided eye. Refer to Laboratory Practices Supporting Mastery of K-5 Life Benchmarks.

Grade 1

SC.1.CB.1 Explain how magnifying tools help people observe details that are difficult to see.

SC.1.CB.1.1 Use observations to compare objects viewed with and without magnification.

Benchmark Clarifications:

Clarification 1: Instruction includes hand lenses and magnifiers.

Clarification 2: Instruction includes observing details that cannot be easily seen with the unaided eye.

Clarification 3: Instruction includes organizing and comparing observations of objects viewed with and without magnification, including identifying similarities and differences in the details observed using each viewing method. Refer to Mathematics Skills Supporting Mastery of K-5 Life Benchmarks.

Clarification 4: Instruction includes recording observations using drawings, diagrams, charts, or journals. Refer to Modeling Skills Supporting Mastery of K-5 Life Benchmarks.

Clarification 5: Instruction includes using appropriate tools to make and record observations, comparing evidence collected using different viewing methods, and communicating observations and conclusions. Refer to Laboratory Practices Supporting Mastery of K-5 Life Benchmarks.

Grade 2

Proposed DRAFT Standards

SC.2.CB.1 Explain how magnification allows scientists to observe living things and structures that are difficult to see.

SC.2.CB.1.1 Identify that some living things are too small to be seen without magnification.

Benchmark Clarifications:

Clarification 1: Instruction includes examples of microscopic organisms, such as bacteria and other microscopic living things.

Clarification 2: Instruction includes recognizing that scientists use specialized tools, such as microscopes, to observe very small living things.

Clarification 3: Instruction excludes detailed descriptions of microorganisms and cells.

Clarification 4: Instruction includes examining historical developments that contributed to scientific understanding of microscopic life. Refer to the Timeline of Key Accomplishments Supporting Mastery of K-5 Life Benchmarks.

SC.2.CB.1.2 Compare observations made with and without magnification.

Example: A student examines a leaf from a Florida live oak tree first with the unaided eye and then with a hand lens. The magnified view reveals veins, tiny surface textures, and details that were difficult to observe before.

Student Task(s) –

Compare observations made with and without magnification.

Record additional details observed using the hand lens.

Explain how magnification helps scientists make more detailed observations.

Benchmark Clarifications:

Clarification 1: Instruction includes observing different plant, animal, and nonliving materials.

Clarification 2: Instruction includes recognizing that magnification reveals additional details.

Clarification 3: Instruction includes organizing and comparing observations made with and without magnification to identify additional details revealed through magnification. Refer to Mathematics Skills Supporting Mastery of K-5 Life Benchmarks.

Clarification 4: Instruction includes recording and comparing observations using drawings, labeled diagrams, tables, or journals. Refer to Modeling Skills Supporting Mastery of K-5 Life Benchmarks.

Clarification 5: Instruction includes using appropriate tools and procedures to make observations, record and compare evidence, and communicate conclusions about how magnification affects what can be observed. Refer to Laboratory Practices Supporting Mastery of K-5 Life Benchmarks.

Grade 3

SC.3.CB.1 Explain that living things can be studied at different scales, including structures too small to observe directly.

SC.3.CB.1.1 Describe how microscopes help scientists investigate living things.

Benchmark Clarifications:

Clarification 1: Instruction includes recognizing that microscopes allow scientists to observe details of living things that cannot be easily seen with the unaided eye.

Clarification 2: Instruction includes examples of living things that can be observed using microscopes.

Clarification 3: Instruction excludes detailed cell structures.

Clarification 4: Instruction includes examining historical developments that contributed to scientific understanding of how microscopes help scientists investigate living things. Refer to the Timeline of Key Accomplishments Supporting Mastery of K-5 Life Benchmarks.

SC.3.CB.1.2 Recognize that some organisms consist of a single cell while others consist of many cells.

Example: A student observes microscope images of a single-celled paramecium and a multicellular fish. Both are living organisms, but they differ greatly in how they are organized.

Student Task(s) –

Identify which organism is unicellular and which is multicellular.

Compare the organization of the two organisms.

Explain how both organisms are able to carry out life processes.

Benchmark Clarifications:

Clarification 1: Instruction includes unicellular and multicellular organisms.

Clarification 2: Instruction includes recognizing that both organism types are living things.

Clarification 3: Instruction excludes detailed cellular processes.

Clarification 4: Instruction includes using diagrams, images, or models to compare unicellular and multicellular organisms. Refer to Modeling Skills Supporting Mastery of K-5 Life Benchmarks.

Grade 4

SC.4.CB.1 Explain that cells are the basic building blocks of living things.

SC.4.CB.1.1 Identify cells as the basic unit of life.

Benchmark Clarifications:

Clarification 1: Instruction includes recognizing that all living things are made of one or more cells.

Clarification 2: Instruction includes recognizing that cells carry out the functions necessary for life.

Clarification 3: Instruction excludes detailed organelle structures.

Clarification 4: Instruction includes examining historical developments that contributed to scientific understanding that living things are made up of cells. Refer to the Timeline of Key Accomplishments Supporting Mastery of K-5 Life Benchmarks.

SC.4.CB.1.2 Compare unicellular and multicellular organisms.

Benchmark Clarifications:

Clarification 1: Instruction includes recognizing that unicellular organisms consist of one cell.

Clarification 2: Instruction includes recognizing that multicellular organisms consist of many cells.

Clarification 3: Instruction includes comparing how unicellular and multicellular organisms carry out life processes and meet their needs.

SC.4.CB.1.3 Use models to explain that cells form larger living structures.

Example: A student uses a model showing muscle cells grouped together to form muscle tissue within an organism. The model demonstrates how many small living units contribute to larger structures.

Student Task(s) –

Identify the cells represented in the model.

Describe how cells combine to form larger structures.

Use the model to explain how living things are organized.

Benchmark Clarifications:

Clarification 1: Instruction includes recognizing that groups of cells can form tissues and contribute to larger structures in organisms.

Clarification 2: Instruction includes models showing that cells combine to form tissues and larger body structures.

Clarification 3: Instruction excludes detailed tissue, organ, and system functions.

Clarification 4: Instruction includes constructing and revising models representing the organization of living structures. Refer to Modeling Skills Supporting Mastery of K-5 Life Benchmarks.

Grade 5

SC.5.CB.1 Analyze how cells are organized and how their structures support life processes.

SC.5.CB.1.1 Identify cells as the basic unit of life and describe the structures and functions of plant and animal cells.

Example: A student examines diagrams of a plant cell and an animal cell. Both cells contain structures needed for life, but some structures are found only in plant cells.

Student Task(s) –

Identify structures found in both plant and animal cells.

Compare plant and animal cells using diagrams.

Explain how cell structures help support life processes.

Benchmark Clarifications:

Clarification 1: Instruction includes recognizing that all living things are composed of cells.

Clarification 2: Instruction includes observing cells using images, models, or magnification tools.

Clarification 3: Instruction includes using plant and animal cell models and diagrams to identify the nucleus, cell membrane, cytoplasm, cell wall, chloroplasts, and vacuole and describe their basic functions.

Clarification 4: Instruction includes comparing plant and animal cells.

Clarification 5: Instruction includes interpreting diagrams, models, and microscope images to compare plant and animal cells. Refer to Modeling Skills Supporting Mastery of K-5 Life Benchmarks.

SC.5.CB.1.2 Explain how cells are organized into tissues, organs, and systems.

Example: A student investigates how similar cells form muscle tissue, how different tissues work together to form an organ such as the heart and how organs work together in the circulatory system. The investigation demonstrates increasing levels of organization from cells to tissues, organs and systems.

Student Task(s) –

Sequence the levels of organization from cells to systems.

Identify examples of tissues, organs, and systems.

Explain how the levels of organization work together to support life.

Benchmark Clarifications:

Clarification 1: Instruction includes recognizing that similar cells form tissues, tissues form organs, and organs interact within systems to support life processes.

Clarification 2: Instruction includes examples from both plants and animals.

Clarification 3: Instruction includes using diagrams and models to represent organization from cells to tissues, organs, and systems. Refer to Modeling Skills Supporting Mastery of K-5 Life Benchmarks.

Proposed DRAFT Standards

SC.5.CB.1.3 Analyze how unicellular and multicellular organisms differ in organization and function.

Example: A student compares a microscopic unicellular protist collected from a Florida pond with a multicellular manatee. Although both are living organisms, they differ greatly in size, organization, and how their cells function.

Student Task(s) –

Identify which organism is unicellular and which is multicellular.

Compare how the organisms are organized.

Explain how cells support life in both organisms.

Benchmark Clarifications:

Clarification 1: Instruction includes recognizing that unicellular organisms perform all life processes within one cell.

Clarification 2: Instruction includes recognizing that multicellular organisms contain specialized cells that work together.

Clarification 3: Instruction excludes detailed cellular specialization and molecular processes.

Clarification 4: Instruction includes using observations and charts to compare unicellular and multicellular organisms. Refer to Mathematics Skills Supporting Mastery of K-5 Life Benchmarks.

Clarification 5: Instruction includes using charts, diagrams, and models to compare unicellular and multicellular organisms. Refer to Modeling Skills Supporting Mastery of K-5 Life Benchmarks.

Proposed DRAFT Standards

How plant structures support growth, reproduction, and survival; how plants obtain and use resources to produce food; and how plants are classified based on their characteristics and life cycles.

Grade Kindergarten

SC.K.P.1 Describe observable characteristics of plants and recognize that plants grow and change throughout their life cycles.

SC.K.P.1.1 Identify and describe observable characteristics of plants.

Benchmark Clarifications:

Clarification 1: Instruction includes comparing plants by observing characteristics such as leaf shape, leaf color, flower color, size, and overall plant form.

Clarification 2: Instruction includes recognizing that plants are living things.

Clarification 3: Instruction includes sorting plants into groups such as flowering and nonflowering plants, trees, and shrubs. Refer to Mathematics Skills Supporting Mastery of K-5 Life Benchmarks.

SC.K.P.1.2 Recognize that plants grow and change throughout their life cycles.

Benchmark Clarifications:

Clarification 1: Instruction includes recognizing that plants undergo predictable stages of growth and development.

Clarification 2: Instruction includes examples of the plant life cycle stages, such as seed, germination, seedling, and adult plant.

Clarification 3: Instruction includes identifying germination as the beginning of growth from a seed.

Clarification 4: Instruction excludes detailed reproductive structures and processes.

Clarification 5: Instruction may include using drawings, photographs, and models to represent stages of plant growth. Refer to Modeling Skills Supporting Mastery of K-5 Life Benchmarks.

Grade 1

SC.1.P.1 Explain how plant structures and resources support growth, survival, and reproduction.

SC.1.P.1.1 Identify and describe the basic parts of plants and their functions.

Example: A student examines a young Florida bean plant growing in a school garden. The student observes roots growing below the soil, a stem supporting the plant, and leaves reaching toward sunlight. Each structure helps the plant survive and grow.

Student Task(s) –

Identify the plant structures shown in the example.

Describe the function of each structure.

Explain how the structures help the plant survive.

Benchmark Clarifications:

Clarification 1: Instruction includes identifying roots, stems, leaves, flowers, and seeds, and recognizing that each structure has a specific function.

Clarification 2: Instruction includes explaining that roots absorb water and help anchor plants.

Clarification 3: Instruction includes explaining that stems support plants and transport materials.

Clarification 4: Instruction includes explaining that leaves help plants make food.

Clarification 5: Instruction includes recognizing that flowers are involved in plant reproduction and that seeds can develop from flowers.

Clarification 6: Instruction includes using diagrams and models to represent plant structures and their functions. Refer to Modeling Skills Supporting Mastery of K-5 Life Benchmarks.

SC.1.P.1.2 Compare plant structures and their functions.

Example: First grade students planted different types of seeds in a classroom garden to compare plant structures and functions. As the plants grew, the roots absorbed water from the soil, the stem held the plant upright, the leaves made food using sunlight, and the flower produced new seeds. These plant parts work together to help the plant live, grow, and make more plants.

Student Task(s) –

Identify the plant parts and their functions.

Develop a model showing the plant's parts.

Explain how each plant part helps the plant survive and grow.

Benchmark Clarifications:

Clarification 1: Instruction includes comparing characteristics of roots, stems, leaves, flowers, and seeds, such as size, shape, and color, among different plants.

Clarification 2: Instruction includes comparing how differences in plant structures relate to their functions.

Clarification 3: Instruction includes organizing and comparing information about plant structures and their functions to identify similarities and differences among plants. Refer to Mathematics Skills Supporting Mastery of K-5 Life Benchmarks.

SC.1.P.1.3 Describe the resources plants need for growth and survival.

Example: Two identical bean plants are grown in a classroom. One receives sunlight and water each day, while the other receives water but very little sunlight.

Student Task(s) –

Compare the growth of the two plants.

Identify the resource that differs between the plants.

Explain how resources support plant growth and survival.

Benchmark Clarifications:

Clarification 1: Instruction includes sunlight, water, air, soil, and sufficient space for growth.

Clarification 2: Instruction includes recognizing that plants require resources to grow and survive.

Clarification 3: Instruction excludes photosynthetic chemistry.

Clarification 4: Instruction includes collecting and comparing observations of plant growth under varying resource conditions. Refer to Laboratory Practices Supporting Mastery of K-5 Life Benchmarks.

SC.1.P.1.4 Describe the stages of a plant life cycle.

Example: A student observes a sunflower beginning as a seed, growing into a seedling, and later becoming an adult plant that produces seeds.

Student Task(s) –

Sequence the stages of the plant life cycle.

Explain how plants change through their life cycle and produce new plants from seeds.

Benchmark Clarifications:

Clarification 1: Instruction includes seed, germination, seedling, and adult plant.

Clarification 2: Instruction includes sequencing life-cycle stages.

Clarification 3: Instruction includes recognizing that new plants can grow from seeds.

Clarification 4: Instruction includes using diagrams, drawings, and models to represent life-cycle stages. Refer to Modeling Skills Supporting Mastery of K-5 Life Benchmarks.

Grade 2

SC.2.P.1 Explain how plant structures support reproduction and classification.

SC.2.P.1.1 Explain how plant structures support growth, reproduction, and survival.

Benchmark Clarifications:

Clarification 1: Instruction includes identifying roots, stems, leaves, flowers, fruit, and seeds and recognizing how these structures support plant growth, reproduction, and survival.

Clarification 2: Instruction includes labeling plant structures using models and diagrams. Refer to Modeling Skills Supporting Mastery of K-5 Life Benchmarks.

SC.2.P.1.2 Classify plants based on observable structures.

Benchmark Clarifications:

Clarification 1: Instruction includes structures such as flowers, cones, seeds, fruit, and spores.

Clarification 2: Instruction includes sorting plants based on shared characteristics.

Clarification 3: Instruction excludes formal taxonomic classification.

Clarification 4: Instruction includes sorting, classifying, and organizing information about plant structures using tables and graphs to identify patterns and shared characteristics among plants. Refer to Mathematics Skills Supporting Mastery of K-5 Life Benchmarks.

Proposed DRAFT Standards

SC.2.P.1.3 Develop and use models to explain the life cycle of a flowering plant.

Example: A Florida orange tree begins as a seed, grows into a mature tree, produces flowers, and later develops fruit containing seeds. These seeds can begin the life cycle again.

Student Task(s) –

Create or interpret a model of the life cycle.

Sequence the stages of growth and reproduction.

Explain how flowering plants produce new seeds.

Benchmark Clarifications:

Clarification 1: Instruction includes seed, germination, seedling, adult plant, flower, pollination, fruit, and seed production.

Clarification 2: Instruction includes sequencing life-cycle stages.

Clarification 3: Instruction includes recognizing that flowering plants produce seeds.

Clarification 4: Instruction includes identifying pollination as a step in plant reproduction.

Clarification 5: Instruction includes sequencing and organizing the stages of a flowering plant's life cycle to identify the order and repeating pattern of growth and reproduction. Refer to Mathematics Skills Supporting Mastery of K-5 Life Benchmarks.

Clarification 6: Instruction includes creating and revising life cycle models to communicate understanding of plant reproduction. Refer to Modeling Skills Supporting Mastery of K-5 Life Benchmarks.

Grade 3

Proposed DRAFT Standards

SC.3.P.1 Compare how different groups of plants reproduce and survive.

SC.3.P.1.1 Describe the life cycles of non-flowering plants.

Benchmark Clarifications:

Clarification 1: Instruction includes examples such as conifers and ferns.

Clarification 2: Instruction includes recognizing that some plants reproduce with spores and others reproduce with seeds.

Clarification 3: Instruction includes identifying major stages of nonflowering plant life cycles.

Clarification 4: Instruction includes examining historical developments that contributed to scientific understanding of life cycles of non-flowering plants. Refer to the Timeline of Key Accomplishments Supporting Mastery of K-5 Life Benchmarks.

SC.3.P.1.2 Classify flowering and non-flowering plants by their structures and reproductive characteristics.

Example: A student compares a flowering hibiscus plant with a pine tree that produces cones. Both reproduce, but they use different reproductive structures.

Student Task(s) –

Identify the reproductive structures of each plant.

Classify each plant as flowering or non-flowering.

Explain the evidence used for classification.

Benchmark Clarifications:

Clarification 1: Instruction includes flowers, cones, seeds, fruit, and spores.

Clarification 2: Instruction includes comparing reproductive structures among plant groups.

Clarification 3: Instruction includes sorting, classifying, and organizing observable evidence about plant structures and reproductive characteristics to identify patterns

among plant groups. Refer to Mathematics Skills Supporting Mastery of K-5 Life Benchmarks.

SC.3.P.1.3 Explain how seed dispersal supports plant survival and reproduction.

Example: Sea oat seeds on a Florida beach are carried by wind to new locations. As the seeds spread away from the parent plant, they can grow in new areas.

Student Task(s) –

Identify the seed dispersal method shown.

Explain how dispersal helps plant reproduction.

Compare this method to another method of seed dispersal.

Benchmark Clarifications:

Clarification 1: Instruction includes explaining how seed dispersal, such as by wind, water, animals, and gravity, helps plants reproduce and colonize new areas.

Clarification 2: Instruction includes examples of seeds attaching to fur or being transported after being eaten.

Clarification 3: Instruction includes organizing and comparing information about different seed dispersal methods, including identifying patterns. Refer to Mathematics Skills Supporting Mastery of K-5 Life Benchmarks.

Clarification 4: Instruction includes modeling and comparing different methods of seed dispersal.

Refer to Modeling Skills Supporting Mastery of K-5 Life Benchmarks.

Grade 4

SC.4.P.1 Explain how plants obtain resources, produce food, and reproduce.

SC.4.P.1.1 Explain how plants use sunlight, water, and carbon dioxide to produce food.

Example: A student observes healthy tomato or citrus plants growing in sunlight and compares them with plants growing under limited sunlight. The student then uses a diagram of a plant to trace sunlight, water, and carbon dioxide into the plant and food and oxygen produced by the plant. The student explains how these inputs and outputs are related to the plant's production of food.

Student Task(s) –

Identify the resources required for food production.

Explain how the resources are used by plants.

Describe why food production is important for plant growth.

Benchmark Clarifications:

Clarification 1: Instruction includes identifying sunlight, water, and carbon dioxide as inputs to the photosynthesis system.

Clarification 2: Instruction includes recognizing that plants produce food and release oxygen as outputs of photosynthesis.

Clarification 3: Instruction includes recognizing photosynthesis as a process plants use to produce food.

Clarification 4: Instruction includes using conceptual models and diagrams to represent photosynthesis. Refer to Modeling Skills Supporting Mastery of K-5 Life Benchmarks.

Clarification 5: Instruction includes examining historical developments that contributed to scientific understanding of how plants produce food. Refer to the Timeline of Key Accomplishments Supporting Mastery of K-5 Life Benchmarks.

SC.4.P.1.2 Use models to describe photosynthesis.

Example: A student uses a diagram showing sunlight, water, and carbon dioxide entering a plant and oxygen being released. The model represents how plants produce food.

Student Task(s) –

Identify the inputs and outputs shown in the model.

Explain how the model represents photosynthesis.

Use the model to describe how plants produce food.

Benchmark Clarifications:

Clarification 1: Instruction includes the word equation for photosynthesis. (Carbon dioxide + Water + Light energy → Glucose + Oxygen)

Clarification 2: Instruction includes recognizing that photosynthesis is a chemical change because new substances are formed.

Clarification 3: Instruction is limited to conceptual and word-equation models. Refer to Modeling Skills Supporting Mastery of K-5 Life Benchmarks.

SC.4.P.1.3 Compare flowering and nonflowering plant life cycles.

Example: A student compares the life cycle of a flowering sunflower with the life cycle of a non-flowering fern. One produces seeds through flowers, while the other reproduces using spores.

Student Task(s) –

Compare the stages of the two life cycles.

Identify how reproduction differs between the plants.

Explain one similarity and one difference between the life cycles.

Benchmark Clarifications:

Clarification 1: Instruction includes comparing seed-producing and spore-producing plants.

Clarification 2: Instruction includes comparing plant reproductive structures, such as flowers, cones, fruits, and seeds, and comparing plant life-cycle stages, such as seed, germination, seedling, and adult plant.

Clarification 3: Instruction includes using diagrams and models to compare life cycles. Refer to Modeling Skills Supporting Mastery of K-5 Life Benchmarks.

SC.4.P.1.4 Compare plants within and among groups using observable characteristics.

Example: A student examines plants growing in a Florida wetland. Among the plants, sawgrass, cattails, and mangroves have different observable characteristics such as leaf shape, root structure, and reproductive structures. Within the sawgrass population, some plants are taller, have longer leaves, or produce more flowering stalks than others.

Student Task(s) –

Identify observable characteristics of each plant.

Compare similarities and differences among the plants.

Use evidence to explain how the plants can be grouped.

Benchmark Clarifications:

Clarification 1: Instruction includes recognizing similarities and differences within plant groups.

Clarification 2: Instruction includes recognizing that many different plant species can live within the same ecosystem.

Clarification 3: Instruction includes organizing observations and data using tables, charts, drawings, and graphical displays to support comparisons. Refer to Mathematics Skills Supporting Mastery of K-5 Life Benchmarks.

Clarification 4: Instruction includes using observations, diagrams, models, and images to compare plants within and among groups and support explanations of similarities and differences. Refer to Modeling Skills Supporting Mastery of K-5 Life Benchmarks.

Proposed DRAFT Standards

Grade 5

SC.5.P.1 Analyze how plant structures, reproduction, classification, and adaptations support survival.

SC.5.P.1.1 Use evidence-based comparisons to justify why a plant belongs to a particular group.

Example: A student examines a fern and a flowering wildflower. Observations show that the fern reproduces with spores while the wildflower produces seeds.

Student Task(s) –

Identify characteristics of each plant.

Classify each plant into the appropriate group.

Use evidence to justify the classification.

Benchmark Clarifications:

Clarification 1: Instruction includes using observable evidence to support classification as flowering or non-flowering and seed-producing or spore-producing.

Clarification 2: Instruction excludes formal botanical taxonomy beyond grade-level.

Clarification 3: Instruction includes organizing and comparing observable evidence about plant characteristics to identify similarities and differences and support evidence-based classification. Refer to Mathematics Skills Supporting Mastery of K-5 Life Benchmarks.

Clarification 4: Instruction includes using and interpreting diagrams, models, and other representations to support classification into groups. Refer to Modeling Skills Supporting Mastery of K-5 Life Benchmarks.

SC.5.P.1.2 Explain how pollination supports plant reproduction.

Example: A bee moves pollen between flowers while collecting nectar from orange blossoms. Later, the flowers develop fruit containing seeds.

Student Task(s) –

Identify the pollinator in the example.

Explain how pollen is transferred.

Explain how pollination contributes to seed production.

Benchmark Clarifications:

Clarification 1: Instruction includes recognizing pollination as the transfer of pollen between flowers.

Clarification 2: Instruction includes animal, wind, and water pollination examples.

Clarification 3: Instruction includes explaining how pollination contributes to seed production.

Clarification 4: Instruction includes examples of animals that pollinate plants, such as bees, butterflies, birds, and bats.

Clarification 5: Instruction includes explaining how pollinators support seed and fruit production in natural ecosystems and agricultural systems.

Clarification 6: Instruction includes collecting and analyzing evidence from observations and investigations to explain how pollination supports plant reproduction and seed production. Refer to Laboratory Practices Supporting Mastery of K-5 Life Benchmarks.

SC.5.P.1.3 Investigate flower structures and explain their roles in reproduction.

Example: A student examines a lily flower and identifies petals, sepals, stamens, and pistils. Each structure plays a role in reproduction.

Student Task(s) –

Identify the flower structures.

Describe the function of each structure.

Explain how the structures support reproduction.

Benchmark Clarifications:

Clarification 1: Instruction includes identifying petals, sepals, stamens, pistils, and ovaries and describing their basic roles in reproduction.

Clarification 2: Instruction includes explaining how structures contribute to pollination and seed formation.

Clarification 3: Instruction excludes detailed cellular reproduction processes.

Clarification 4: Instruction includes developing and using models to represent flower structures and explaining their roles in reproduction. Refer to Modeling Skills Supporting Mastery of K-5 Life Benchmarks.

Clarification 5: Instruction includes making observations and collecting evidence from flower dissections, models, or images to explain how flower structures support reproduction. Refer to Laboratory Practices Supporting Mastery of K-5 Life Benchmarks.

SC.5.P.1.4 Explain how plant structures help plants survive in different environments.

Example: A cactus growing in a dry environment has thick stems and a waxy coating, while a mangrove growing along a Florida shoreline has specialized roots. Each plant has structures that help it survive where it lives.

Student Task(s) –

Identify the survival structures of each plant.

Compare how the structures function in different environments.

Explain how each structure helps the plant survive.

Benchmark Clarifications:

Clarification 1: Instruction includes plant structures that help plants survive environmental conditions, such as deep roots, broad leaves, waxy coatings, thorns, and needles.

Clarification 2: Instruction includes relating plant structures to resource acquisition, protection, and survival within different environmental systems.

Clarification 3: Instruction excludes evolutionary mechanisms.

Clarification 4: Instruction includes organizing, comparing, and interpreting data about plant structures to identify patterns in how plants survive in different environments. Refer to Mathematics Skills Supporting Mastery of K-5 Life Benchmarks.

Clarification 5: Instruction includes comparing plant adaptations among different environments using observations, diagrams, models, and data. Refer to Modeling Skills Supporting Mastery of K-5 Life Benchmarks.

The Science of Animals

How animal structures, behaviors, and life cycles support survival and reproduction; and how animals are classified based on shared characteristics and patterns of development.

Grade Kindergarten

SC.K.A.1 Observe and describe animals based on their characteristics, behaviors, and growth.

SC.K.A.1.1 Explore how animals can be sorted based on their observable characteristics and behaviors.

Benchmark Clarifications:

Clarification 1: Instruction includes observing characteristics such as body coverings, number of legs, wings, tails, size, and shape.

Clarification 2: Instruction includes observing behaviors such as flying, swimming, hopping, crawling, running, nesting, or feeding.

Clarification 3: Instruction includes recognizing that animals are living things.

Clarification 4: Instruction includes sorting animals based on shared observable characteristics and behaviors. Refer to Mathematics Skills Supporting Mastery of K-5 Life Benchmarks.

SC.K.A.1.2 Recognize that animals grow and change over time.

Benchmark Clarifications:

Clarification 1: Instruction includes recognizing that young animals grow and develop into adults over time.

Clarification 2: Instruction includes examples such as chicks and chickens, puppies and dogs, or hatchling and adult sea turtles.

Clarification 3: Instruction excludes detailed life-cycle stages and reproductive processes.

SC.K.A.1.3 Recognize that animals pass through stages of growth and development.

Benchmark Clarifications:

Clarification 1: Instruction includes recognizing that animals pass through predictable stages of growth and development.

Clarification 2: Instruction includes observing examples of animal life cycles.

Clarification 3: Instruction excludes metamorphosis terminology and detailed reproductive processes.

Clarification 4: Instruction includes sequencing growth patterns from young to adult. Refer to Mathematics Skills Supporting Mastery of K-5 Life Benchmarks.

Clarification 5: Instruction includes drawings, photographs, and models representing stages of growth. Refer to Modeling Skills Supporting Mastery of K-5 Life Benchmarks.

Proposed DRAFT Standards

SC.1.A.1 Describe how animals are classified and how life cycles and behaviors support survival.

SC.1.A.1.1 Group animals using observable characteristics.

Benchmark Clarifications:

Clarification 1: Instruction includes observable characteristics such as fur, feathers, scales, skin, and number of legs.

Clarification 2: Instruction includes comparing and grouping animals that live on land, in water, or in both environments based on observable characteristics of their habitats.

Clarification 3: Instruction includes sorting, classifying, and organizing information about animal characteristics to identify patterns and group animals based on observable traits. Refer to Mathematics Skills Supporting Mastery of K-5 Life Benchmarks.

SC.1.A.1.2 Describe stages in animal life cycles.

Example: A student observes the life cycle of a sea turtle and identifies the egg, hatchling, juvenile and adult stages. The student sequences photographs of the stages and describes how the turtle grows and changes as it develops.

Student Task(s) –

Identify and sequence stages of an animal's life cycle using photographs, illustrations or models.

Describe how the animal grows and changes from one stage to the next.

Compare the life cycles of two different animals and identify similarities and differences in their stages.

Use a diagram or model to represent the stages of an animal's life cycle.

Benchmark Clarifications:

Clarification 1: Instruction includes sequencing stages of growth and development.

Clarification 2: Instruction includes comparing life cycles of different animals.

Clarification 3: Instruction includes recognizing that adults produce offspring.

Clarification 4: Instruction excludes metamorphosis.

Clarification 5: Instruction includes using diagrams and models to represent life-cycle stages. Refer to Modeling Skills Supporting Mastery of K-5 Life Benchmarks.

SC.1.A.1.3 Explain how movement helps animals meet their needs and survive.

Benchmark Clarifications:

Clarification 1: Instruction includes movement used to obtain food, water or shelter and to avoid danger.

Clarification 2: Instruction includes common animal examples such as birds flying, fish swimming, and squirrels climbing.

Grade 2

SC.2.A.1 Explain how animal structures and developmental patterns support growth, survival, and classification.

SC.2.A.1.1 Recognize that animals can be classified as vertebrates or invertebrates.

Benchmark Clarifications:

Clarification 1: Instruction includes recognizing that vertebrates such as fish, amphibians, reptiles, birds, and mammals have backbones.

Clarification 2: Instruction includes recognizing that invertebrates such as insects, spiders, snails, shrimp, jellyfish, and worms do not have backbones.

Clarification 3: Instruction includes sorting and classifying animals based on observable evidence. Refer to Mathematics Skills Supporting Mastery of K-5 Life Benchmarks.

Clarification 4: Instruction includes examining historical developments that contributed to scientific understanding of vertebrates and invertebrates. Refer to the Timeline of Key Accomplishments Supporting Mastery of K-5 Life Benchmarks.

SC.2.A.1.2 Develop and use models to describe incomplete metamorphosis.

Benchmark Clarifications:

Clarification 1: Instruction includes observing and comparing animal life cycles as a sequence of stages that include birth, growth, reproduction, and death.

Clarification 2: Instruction includes identifying and sequencing the stages of incomplete metamorphosis as egg, nymph, and adult.

Clarification 3: Instruction includes examples such as grasshoppers, crickets, cockroaches, and dragonflies.

Clarification 4: Instruction includes recognizing that the nymph resembles the adult but is smaller and continues to grow and change until adulthood.

Clarification 5: Instruction includes comparing incomplete metamorphosis with other patterns of animal growth and development and recognizing that different animals develop in different ways.

Clarification 6: Instruction includes using observations, photographs, diagrams, illustrations, and models to identify and describe the stages of incomplete metamorphosis. Refer to Modeling Skills Supporting Mastery of K-5 Life Benchmarks.

SC.2.A.1.3 Compare body structures of vertebrates and invertebrates.

Benchmark Clarifications:

Clarification 1: Instruction includes structures such as backbones, exoskeletons, shells, wings, and legs.

Clarification 2: Instruction includes comparing structures used for movement, protection, and obtaining food and relating those structures to animal survival.

Clarification 3: Instruction includes sorting, classifying, and organizing information about vertebrate characteristics to identify patterns and group animals based on observable traits. Refer to Mathematics Skills Supporting Mastery of K-5 Life Benchmarks.

Clarification 4: Instruction includes organizing observations using charts, diagrams, and classification organizers. Refer to Modeling Skills Supporting Mastery of K-5 Life Benchmarks.

Grade 3

SC.3.A.1 Compare how different groups of animals grow, develop, and are classified.

SC.3.A.1.1 Compare vertebrates and invertebrates.

Benchmark Clarifications:

Clarification 1: Instruction includes the presence or absence of a backbone.

Clarification 2: Instruction includes comparing body structures, movement patterns, and other observable characteristics of vertebrates and invertebrates and identifying characteristics shared by all animals.

Clarification 3: Instruction includes using observations, diagrams, and models to support comparisons. Refer to Modeling Skills Supporting Mastery of K-5 Life Benchmarks.

SC.3.A.1.2 Develop and use models to explain complete metamorphosis.

Example: A monarch butterfly living in Florida changes from an egg to a larva, then a pupa, and finally an adult butterfly. Each stage differs in structure and function.

Student Task(s) –

Sequence the stages of complete metamorphosis.

Develop or interpret a model representing the life cycle.

Explain how the organism changes throughout development.

Benchmark Clarifications:

Clarification 1: Instruction includes egg, larva, pupa, and adult stages.

Clarification 2: Instruction includes examples such as butterflies, moths, beetles, and flies.

Clarification 3: Instruction includes recognizing that organisms change dramatically during development.

Clarification 4: Instruction includes comparing complete and incomplete metamorphosis.

Clarification 5: Instruction includes constructing and revising models representing life-cycle stages. Refer to Modeling Skills Supporting Mastery of K-5 Life Benchmarks.

Clarification 6: Instruction includes examining historical developments that contributed to scientific understanding of metamorphosis. Refer to the Timeline of Key Accomplishments Supporting Mastery of K-5 Life Benchmarks.

SC.3.A.1.3 Classify animals using observable characteristics.

Benchmark Clarifications:

Clarification 1: Instruction includes classifying animals as vertebrates or invertebrates.

Clarification 2: Instruction includes classifying vertebrates as mammals, birds, reptiles, amphibians, or fish.

Clarification 3: Instruction includes constructing explanations supported by evidence.

Clarification 4: Instruction includes classifying animals using observable characteristics such as body coverings, body structures, methods of movement and developmental patterns. Refer to Mathematics Skills Supporting Mastery of K-5 Life Benchmarks.

Clarification 5: Instruction includes organizing evidence using charts, tables, and classification organizers. Refer to Modeling Skills Supporting Mastery of K-5 Life Benchmarks.

Proposed DRAFT Standards

Grade 4

SC.4.A.1 Analyze similarities and differences among animal groups and their developmental patterns.

SC.4.A.1.1 Compare life cycle patterns among animals.

Benchmark Clarifications:

Clarification 1: Instruction includes comparing complete and incomplete metamorphosis.

Clarification 2: Instruction includes comparing animals that hatch from eggs and animals born live.

Clarification 3: Instruction includes comparing parental-care strategies among animal groups.

Clarification 4: Instruction includes using models, diagrams, and observations to support comparisons. Refer to Modeling Skills Supporting Mastery of K-5 Life Benchmarks.

SC.4.A.1.2 Compare animals within and among major groups using observable characteristics.

Benchmark Clarifications:

Clarification 1: Instruction includes body coverings such as fur, feathers, scales, and skin.

Clarification 2: Instruction includes movement patterns such as walking, swimming, flying, slithering, and hopping.

Clarification 3: Instruction includes habitats, diets, body size, and recognizing biodiversity by comparing the variety of animals within local ecosystems.

Clarification 4: Instruction includes organizing observations and data using tables, charts, and graphical displays. Refer to Mathematics Skills Supporting Mastery of K-5 Life Benchmarks.

Clarification 5: Instruction includes using observations, photographs, diagrams, models, and data to compare animals within and among groups. Refer to Modeling Skills Supporting Mastery of K-5 Life Benchmarks.

SC.4.A.1.3 Analyze how animal structures and behaviors support survival.

Benchmark Clarifications:

Clarification 1: Instruction includes structures such as claws, beaks, teeth, shells, wings, and body coverings and behaviors such as migration, nesting, hunting, camouflage, and parental care.

Clarification 2: Instruction includes relating structures and behaviors to obtaining resources, avoiding predators, reproduction, and survival.

Clarification 3: Instruction includes comparing survival strategies among animals.

Clarification 4: Instruction includes organizing, comparing, and interpreting data about animal structures and behaviors to identify patterns in survival strategies. Refer to Mathematics Skills Supporting Mastery of K-5 Life Benchmarks.

Clarification 5: Instruction includes using observations, models, images, and data to compare survival strategies and support explanations. Refer to Modeling Skills Supporting Mastery of K-5 Life Benchmarks.

Clarification 6: Instruction includes collecting and analyzing evidence from observations and investigations to explain how animal structures and behaviors support survival. Refer to Laboratory Practices Supporting Mastery of K-5 Life Benchmarks.

Grade 5

SC.5.A.1 Use evidence to classify animals and explain how structures, behaviors, and developmental patterns support survival and reproduction.

Proposed DRAFT Standards

SC.5.A.1.1 Use evidence-based comparisons to justify why an animal belongs to a particular group.

Example: A student observes a Florida green anole and a Florida scrub-jay. The animals differ in body covering, reproduction, and physical characteristics, but both are vertebrates.

Student Task(s) –

Identify observable characteristics of each animal.

Classify each animal into the appropriate animal group.

Use evidence to justify each classification.

Benchmark Clarifications:

Clarification 1: Instruction includes classifying animals using shared characteristics and distinguishing characteristics relevant to classification.

Clarification 2: Instruction excludes formal taxonomic naming beyond grade-level animal group categories.

Clarification 3: Instruction includes organizing, comparing, and interpreting data about animal characteristics to identify patterns and support classification decisions. Refer to Mathematics Skills Supporting Mastery of K-5 Life Benchmarks.

Clarification 4: Instruction includes observations, data, photographs, diagrams, and models as evidence. Refer to Modeling Skills Supporting Mastery of K-5 Life Benchmarks.

Clarification 5: Instruction includes collecting and analyzing evidence from observations and investigations to justify why an animal belongs to a particular group. Refer to Laboratory Practices Supporting Mastery of K-5 Life Benchmarks.

SC.5.A.1.2 Compare how animal structures and behaviors support survival in different environments.

Example: A Florida manatee uses paddle-shaped flippers to move through water, while a gopher tortoise uses strong legs and claws to dig burrows on land. Each organism has structures and behaviors suited to its environment.

Student Task(s) –

Identify structures and behaviors that help each animal survive.

Compare how the structures function in different environments.

Explain how the structures and behaviors increase survival.

Benchmark Clarifications:

Clarification 1: Instruction includes structural adaptations, such as body coverings, feeding structures, locomotion structures, and reproductive structures, and behavioral adaptations, such as migration, nesting, camouflage, and parental care.

Clarification 2: Instruction includes comparing adaptations among organisms living in different environments and using evidence to explain how adaptations support survival.

Clarification 3: Instruction includes organizing, comparing, and interpreting data to identify patterns in survival across different environments. Refer to Mathematics Skills Supporting Mastery of K-5 Life Benchmarks.

Clarification 4: Instruction includes using diagrams, models, and representations to compare how structures and behaviors support survival in different environments. Refer to Modeling Skills Supporting Mastery of K-5 Life Benchmarks.

Clarification 5: Instruction includes collecting and analyzing evidence from observations and investigations to explain how animal structures and behaviors support survival in different environments. Refer to Laboratory Practices Supporting Mastery of K-5 Life Benchmarks.

SC.5.A.1.3 Analyze how developmental patterns support survival and reproduction.

Benchmark Clarifications:

Clarification 1: Instruction includes complete and incomplete metamorphosis, egg laying, and live birth.

Clarification 2: Instruction includes comparing developmental strategies among animal groups.

Clarification 3: Instruction includes analyzing how developmental patterns increase survival and reproductive success.

Clarification 4: Instruction includes constructing evidence-based explanations using observations, diagrams, and models. Refer to Modeling Skills Supporting Mastery of K-5 Life Benchmarks.

SC.5.A.1.4 Compare reproductive and developmental patterns among major animal groups.

Example: Students compare the reproductive and developmental patterns of a frog, a butterfly, and a mammal. They identify similarities and differences in how each animal reproduces, develops from offspring to adult, and provides care or protection for offspring.

Student Task(s) –

Identify reproductive and developmental patterns for each animal.

Compare similarities and differences among the three animal groups.

Organize observations using a comparison chart, diagram, or model.

Use evidence from observations, models, or data to support comparisons.

Explain how the reproductive and developmental patterns of the animals are similar and different.

Benchmark Clarifications:

Clarification 1: Instruction includes egg laying, live birth, parental care, and metamorphic development.

Clarification 2: Instruction includes analyzing how reproductive strategies influence offspring survival.

Clarification 3: Instruction includes invertebrates and vertebrates, such as mammals, birds, reptiles, amphibians, or fish.

Clarification 4: Instruction includes organizing, comparing, and interpreting data about animal reproductive and developmental patterns. Refer to Mathematics Skills Supporting Mastery of K-5 Life Benchmarks.

Clarification 5: Instruction includes using observations, models, and data to support comparisons.

Refer to Modeling Skills Supporting Mastery of K-5 Life Benchmarks.

SC.5.A.1.5 Compare structural and functional similarities between plants and animals.

Benchmark Clarifications:

Clarification 1: Instruction includes comparing how plant and animal structures perform similar functions related to support, resource acquisition, transport, growth and reproduction.

Clarification 2: Instruction includes recognizing that both plants and animals require energy, materials, and specialized structures to survive.

Clarification 3: Instruction includes comparing how plants and animals obtain and use resources.

Clarification 4: Instruction includes organizing, comparing, and interpreting data about plant and animal structures and functions to identify patterns of similarity and difference. Refer to Mathematics Skills Supporting Mastery of K-5 Life Benchmarks.

Clarification 5: Instruction includes using evidence from observations, diagrams, models, and data to support comparisons. Refer to Modeling Skills Supporting Mastery of K-5 Life Benchmarks.

The Science of Human Body

How the human body is organized and how its structures and systems work together to support movement, sensing, transport, digestion, waste removal, growth, and survival.

Proposed DRAFT Standards

Grade Kindergarten

SC.K.HB.1 Describe how body structures help humans sense and respond to their environment.

SC.K.HB.1.1 Identify the five senses and the body parts used for each sense.

Benchmark Clarifications:

Clarification 1: Instruction includes the five senses: sight, hearing, smell, taste, and touch.

Clarification 2: Instruction includes identifying the eyes, ears, nose, tongue, and skin as body parts associated with the senses.

Clarification 3: Instruction includes observing, describing, and comparing sensory experiences using different senses.

Clarification 4: Instruction includes safe and appropriate sensory investigations. Refer to Laboratory Practices Supporting Mastery of K-5 Life Benchmarks.

SC.K.HB.1.2 Recognize that the brain and nerves help the body sense and respond to its environment.

Benchmark Clarifications:

Clarification 1: Instruction includes identifying the brain as a body structure that helps control actions and responses.

Clarification 2: Instruction includes recognizing that the brain and nerves help humans think, feel, move, and respond to stimuli such as sound, heat, movement, light, and touch.

Clarification 3: Instruction excludes detailed nervous system anatomy.

Grade 1

Proposed DRAFT Standards

SC.1.HB.1 Explain how the skeletal and muscular systems support, protect, and move the body.

SC.1.HB.1.1 Identify muscles as body structures that help the body move.

Benchmark Clarifications:

Clarification 1: Instruction includes recognizing that muscles help produce movement and that nerves carry messages between the brain and body.

Clarification 2: Instruction includes examples such as walking, running, writing, smiling, and lifting objects and identifying muscles in different parts of the body that support these movements.

Clarification 3: Instruction includes recognizing that muscles work with bones to produce movement.

Clarification 4: Instruction includes comparing movements that use different muscles.

SC.1.HB.1.2 Identify bones and the skeleton as structures that support and protect the body.

Benchmark Clarifications:

Clarification 1: Instruction includes recognizing that bones form the skeleton.

Clarification 2: Instruction includes identifying major skeletal structures such as the skull, spine, ribs, arms, and legs.

Clarification 3: Instruction includes explaining that the skeleton provides support, shape, and protection, including protecting important organs such as the brain, heart, and lungs.

Clarification 4: Instruction includes observing how bones and muscles work together to produce movement.

Clarification 5: Instruction may include using models and diagrams to represent skeletal structures. Refer to Modeling Skills Supporting Mastery of K-5 Life Benchmarks.

Proposed DRAFT Standards

Grade 2

SC.2.HB.1 Explain how the digestive system breaks down food and provides nutrients for growth and energy.

SC.2.HB.1.1 Identify the organs of the digestive system.

Benchmark Clarifications:

Clarification 1: Instruction includes identifying the mouth, esophagus, stomach, small intestine, and large intestine.

Clarification 2: Instruction includes tracing the path food takes through the digestive system.

Clarification 3: Instruction includes sequencing stages in the digestive process.

Clarification 4: Instruction includes using diagrams, flowcharts, and models to represent digestion. Refer to Modeling Skills Supporting Mastery of K-5 Life Benchmarks.

SC.2.HB.1.2 Describe how the organs of the digestive system work together to process food.

Benchmark Clarifications:

Clarification 1: Instruction includes recognizing that digestion breaks food into forms the body can use.

Clarification 2: Instruction includes recognizing that the small intestine absorbs nutrients.

Clarification 3: Instruction includes recognizing that the large intestine removes water and prepares waste for elimination.

Clarification 4: Instruction includes connecting digestion to growth, repair, and energy needs.

Clarification 5: Instruction includes using diagrams, flowcharts, and models to represent digestion. Refer to Modeling Skills Supporting Mastery of K-5 Life Benchmarks.

Proposed DRAFT Standards

Grade 3

SC.3.HB.1 Explain how the circulatory and respiratory systems work together to transport materials throughout the body.

SC.3.HB.1.1 Identify the heart, blood, and blood vessels as parts of the circulatory system.

Benchmark Clarifications:

Clarification 1: Instruction includes recognizing that the heart pumps blood through blood vessels and that blood transports oxygen and nutrients throughout the body.

Clarification 2: Instruction includes observing changes in heart rate during activity and rest.

Clarification 3: Instruction includes collecting, organizing, and comparing heart-rate data. Refer to Mathematics Skills Supporting Mastery of K-5 Life Benchmarks.

Clarification 4: Instruction includes collecting and analyzing evidence from observations and investigations to explain how the circulatory system functions. Refer to Laboratory Practices Supporting Mastery of K-5 Life Benchmarks.

SC.3.HB.1.2 Identify the lungs as organs that help the body obtain oxygen.

Benchmark Clarifications:

Clarification 1: Instruction includes identifying the lungs as organs of the respiratory system.

Clarification 2: Instruction includes recognizing that breathing brings oxygen into the body and that the circulatory system transports oxygen throughout the body.

Clarification 3: Instruction includes describing how the circulatory and respiratory systems work together.

Clarification 4: Instruction excludes alveoli and gas-exchange mechanisms.

Clarification 5: Instruction includes using diagrams and models to represent the movement of oxygen through the body. Refer to Modeling Skills Supporting Mastery of K-5 Life Benchmarks.

Grade 4

SC.4.HB.1 Explain how the excretory system removes wastes and helps maintain balance within the body.

SC.4.HB.1.1 Identify the organs of the excretory system and explain how they work together to remove wastes.

Benchmark Clarifications:

Clarification 1: Instruction includes identifying the kidneys, ureters, bladder, and liver.

Clarification 2: Instruction includes recognizing that the kidneys filter waste and excess water from the blood and produce urine.

Clarification 3: Instruction includes recognizing that the bladder stores urine before elimination, and that the liver helps process substances in the blood and prepares some waste for removal from the body.

Clarification 4: Instruction includes explaining that the excretory system helps maintain water balance within the body and interacts with the circulatory system to remove wastes.

Clarification 5: Instruction includes tracing the movement of waste through the body.

Clarification 6: Instruction includes using diagrams and models to represent waste removal pathways. Refer to Modeling Skills Supporting Mastery of K-5 Life Benchmarks.

Grade 5

Proposed DRAFT Standards

SC.5.HB.1 Analyze how major body systems interact to support growth, maintenance, and survival.

SC.5.HB.1.1 Explain how major body systems work together to maintain life.

Example: During a soccer game, a student's respiratory system takes in oxygen while the circulatory system transports it throughout the body. At the same time, the muscular and skeletal systems work together to produce movement.

Student Task(s) –

Identify the body systems involved in the activity.

Describe how the systems interact.

Explain why the systems must work together to maintain life.

Benchmark Clarifications:

Clarification 1: Instruction includes the nervous, skeletal, muscular, circulatory, respiratory, digestive, and excretory systems.

Clarification 2: Instruction includes describing how systems obtain, transport, transform, use, and remove materials.

Clarification 3: Instruction includes recognizing that body systems depend on one another to function effectively, such as the respiratory and circulatory systems working together to transport oxygen and the digestive and circulatory systems working together to deliver nutrients.

Clarification 4: Instruction includes using observations and case studies to explain system interactions.

Clarification 5: Instruction includes constructing and revising models representing interactions among body systems. Refer to Modeling Skills Supporting Mastery of K-5 Life Benchmarks.

Clarification 6: Instruction includes analyzing evidence to explain how body systems interact to maintain life. Refer to Laboratory Practices Supporting Mastery of K-5 Life Benchmarks.

Proposed DRAFT Standards

SC.5.HB.1.2 Analyze how changes in one body system can affect other body systems.

Example: A student becomes dehydrated after spending the day outdoors in Florida's summer heat. The reduced water available in the body affects circulation, muscle performance, and waste removal.

Student Task(s) –

Identify the body systems affected by dehydration.

Explain how changes in one system influence other systems.

Use evidence from the case study to support your explanation.

Benchmark Clarifications:

Clarification 1: Instruction includes examples involving injuries, illness, dehydration, changes in activity level, and reduced system performance.

Clarification 2: Instruction includes analyzing how changes in one system may influence the function of another system and recognizing that body systems function as interconnected systems.

Clarification 3: Instruction excludes detailed disease mechanisms and cellular pathology.

Clarification 4: Instruction includes using evidence from observations, diagrams, models, and case studies. Refer to Modeling Skills Supporting Mastery of K-5 Life Benchmarks.

Clarification 5: Instruction includes collecting and analyzing evidence to construct explanations. Refer to Laboratory Practices Supporting Mastery of K-5 Life Benchmarks.

The Science of Nutrition

Proposed DRAFT Standards

How food and water provide energy and materials for the human body; how food is eaten, digested, and used in daily life; and how everyday food choices support growth, balance, and basic life processes.

Grade Kindergarten

SC.K.NT.1 Explain that humans need food and water to live and grow, that food provides energy for the body, and that food can be identified and described using the senses and grouped into basic categories.

SC.K.NT.1.1 Identify food as a basic need for humans.

Example: A kindergarten student discusses what people need to live and grow and identifies food as one of these basic needs. The student examines pictures of people eating different foods and explains that people need food to live and grow.

Student Task(s) –

Identify food as a basic need for humans.

Identify examples of foods people eat.

Benchmark Clarifications:

Clarification 1: Instruction includes recognizing that humans need food to live and grow.

Clarification 2: Instruction includes making observations and using evidence to identify food as a basic need for humans. Refer to Laboratory Practices Supporting Mastery of K-5 Life Benchmarks.

SC.K.NT.1.2 Recognize that food provides energy for the human body.

Example: A kindergarten student recognizes that different foods can provide different amounts of energy for the human body. The student considers which food might provide energy that lasts longer during an activity and explains that food provides energy the body uses for moving, playing, and growing.

Proposed DRAFT Standards

Student Task(s) –

Identify foods that provide energy for the human body.

Compare two foods based on the amount of energy they provide.

Explain that food provides energy the human body uses for activities such as moving, playing and growing.

Use observations or a model to represent how food provides energy for the human body.

Benchmark Clarifications:

Clarification 1: Instruction includes that food provides energy that helps the human body do activities such as moving, playing, and growing.

Clarification 2: Instruction includes using models to represent that food provides energy for movement and growth. Refer to Modeling Skills Supporting Mastery of K-5 Life Benchmarks.

Clarification 3: Instruction includes making observations and using evidence to explain how food provides energy for the human body. Refer to Laboratory Practices Supporting Mastery of K-5 Life Benchmarks.

SC.K.NT.1.3 Describe foods using the five senses.

Example: Observe and describe safe, allergy-approved foods using sight, smell, taste, hearing, and touch. Through guided exploration and discussion, use informal language to explain what foods look like, smell like, feel like, sound like, and taste like.

Student Tasks(s) –

Sight: What color is it? What shape do you see?

Smell: Does it smell sweet, fresh, or strong?

Touch: Is it soft, hard, smooth, or bumpy?

Hear: What sound do you hear when you break or chew it?

Taste: Does it taste sweet, salty, or plain?

Benchmark Clarifications:

Clarification 1: Instruction includes safe and appropriate sensory exploration of foods to describe, compare, and group foods based on observable properties.

Clarification 2: Instruction includes sorting, classifying, and comparing foods based on observable properties identified through the five senses. Refer to Mathematics Skills Supporting Mastery of K-5 Life Benchmarks.

Clarification 3: Instruction includes making and recording observations using the five senses to describe and compare foods. Refer to Laboratory Practices Supporting Mastery of K-5 Life Benchmarks.

SC.K.NT.1.4 Explain why water is important for the human body.

Example: A kindergarten student compares water to other drinks, such as milk or juice, using observations such as color, appearance, and other noticeable characteristics. The student explains that although people drink different types of beverages, water is necessary for the human body to function. Through observations and comparisons, the student recognizes the importance of water for the human body.

Student Task(s) –

Identify water as necessary for the human body to function.

Compare water to other drinks based on how they help the body function.

Use observations to describe similarities and differences between water and other drinks.

Benchmark Clarifications:

Clarification 1: Instruction includes identifying water as essential for proper body function.

Clarification 2: Instruction includes comparing water to other drinks based on how they help the body function.

Clarification 3: Instruction includes making observations and using evidence to explain why water is important for the human body. Refer to Laboratory Practices Supporting Mastery of K-5 Life Benchmarks.

SC.K.NT.1.5 Identify different types of foods and group foods into basic categories.

Example: Students sort familiar foods into groups, such as fruits and vegetables, and discuss how different foods are prepared before eating. Students identify foods that can be eaten without cooking, such as an apple, and foods that are commonly cooked before eating, such as an egg, and discuss basic practices for handling foods safely.

Student Task(s) –

Identify and group familiar foods into basic categories.

Identify foods that can be eaten without cooking and foods that are prepared or cooked before eating.

Describe basic practices for handling foods safely.

Explain why foods should be handled safely before eating.

Benchmark Clarifications:

Clarification 1: Instruction includes recognizing that foods can be different types and can be grouped into basic categories.

Clarification 2: Instruction includes familiar food categories such as fruits and vegetables and recognizes that these food are grown on farms and in home or school gardens.

Clarification 3: Instruction includes recognizing that fruits and vegetables come from plants.

Clarification 4: Instruction includes recognizing that not all plants are safe for humans to consume.

Clarification 5: Instruction includes sorting, classifying, and organizing foods into categories based on shared characteristics. Refer to Mathematics Skills Supporting Mastery of K-5 Life Benchmarks.

Clarification 6: Instruction includes making observations and using evidence to classify foods and describe safe food-handling practices. Refer to Laboratory Practices Supporting Mastery of K-5 Life Benchmarks.

Grade 1

SC.1.NT.1 Explain that humans and animals need food to survive and grow; that different foods help support body parts such as muscles, bones, and the brain; and that foods come from plants and animals and may be eaten in different ways.

SC.1.NT.1.1 Identify that food supports muscles, bones, and the brain.

Benchmark Clarifications:

Clarification 1: Instruction includes recognizing that food provides materials and energy that help the muscles, bones, and brain function.

Clarification 2: Instruction includes observable human body parts and behaviors.

Clarification 3: Instruction includes using diagrams, models, or other representations to explain how food supports human body parts and functions. Refer to Modeling Skills Supporting Mastery of K-5 Life Benchmarks.

SC.1.NT.1.2 Explain how food supports survival and growth in humans and animals.

Benchmark Clarifications:

Clarification 1: Instruction includes that food supports growth and strength.

Clarification 2: Instruction includes that not all foods provide the same benefits or support for the human body.

Clarification 3: Instruction includes comparing foods based on how they support the human body.

Clarification 4: Instruction includes identifying patterns in how foods support growth and strength. Refer to Mathematics Skills Supporting Mastery of K-5 Life Benchmarks.

Clarification 5: Instruction includes making observations and using evidence to explain how food supports survival and growth in humans and animals. Refer to Laboratory Practices Supporting Mastery of K-5 Life Benchmarks.

SC.1.NT.1.3 Compare foods eaten by humans and animals.

Example: Students compare foods eaten by humans and different animals. They observe that some foods are eaten by both humans and animals, while other foods are more commonly eaten by particular animals, such as a cow eating grass.

Identify foods eaten by humans and different animals.

Compare foods eaten by humans and animals.

Sort or classify foods according to which organisms eat them.

Use observations to describe similarities and differences.

Benchmark Clarifications:

Clarification 1: Instruction includes sorting and classifying foods eaten by humans and animals. Refer to Mathematics Skills Supporting Mastery of K-5 Life Benchmarks.

SC.1.NT.1.4 Explain that foods come from plants and animals.

Benchmark Clarifications:

Clarification 1: Instruction includes plant-based and animal-based foods and their agricultural sources.

Clarification 2: Instruction includes examples showing that people eat different combinations of plant-based and animal-based foods.

Clarification 3: Instruction includes that foods from plants and animals may be eaten in natural or prepared forms.

Clarification 4: Instruction includes recognizing that foods can be prepared in different ways before they are eaten.

Clarification 5: Instruction includes classifying the source of a food as either animal or plant. Refer to Mathematics Skills Supporting Mastery of K-5 Life Benchmarks.

Grade 2

SC.2.NT.1 Explain how food moves through the digestive system; is broken down to provide energy and support growth; and how food travels from where it is grown to where it is eaten, including ways people can reduce food waste.

SC.2.NT.1.1 Identify the stomach and intestines as parts of the digestive system.

Benchmark Clarifications:

Clarification 1: Instruction includes that food moves through a sequence of human body parts including the mouth, stomach, and intestines.

Clarification 2: Instruction includes the mouth as the starting point of digestion through chewing before food moves to the stomach and intestines.

Clarification 3: Instruction includes sequencing and organizing information about how food moves through the digestive system using diagrams, charts, or other visual representations. Refer to Mathematics Skills Supporting Mastery of K-5 Life Benchmarks.

Clarification 4: Instruction includes using sequence diagrams to represent how food moves through the human body. Refer to Modeling Skills Supporting Mastery of K-5 Life Benchmarks.

SC.2.NT.1.2 Describe digestion as the process of breaking down food.

Benchmark Clarifications:

Clarification 1: Instruction includes that digestion changes food into forms the human body can absorb and use.

Clarification 2: Instruction includes recognizing that the human body breaks down foods differently depending on their form.

Clarification 3: Instruction includes using models, simulations, or other representations to explain how food breaks down during digestion. Refer to Modeling Skills Supporting Mastery of K-5 Life Benchmarks.

Clarification 4: Instruction includes collecting and using observations and evidence from investigations to explain how food breaks down during digestion. Refer to Laboratory Practices Supporting Mastery of K-5 Life Benchmarks.

SC.2.NT.1.3 Recognize that the human body uses nutrients from food for energy and growth.

Benchmark Clarifications:

Clarification 1: Instruction includes using models to represent how nutrients from food support energy and growth. Refer to Modeling Skills Supporting Mastery of K-5 Life Benchmarks.

SC.2.NT.1.4 Explain how food gets from where it is grown to where it is eaten.

Example: Observe, discuss, and draw the path food takes from where it is grown on a farm, to a market, and finally to a home. Student drawings should include the method of transportation for each part of the path and an explanation of why refrigeration is required or not required to keep the food fresh and reduce spoilage.

Teacher Modeling – The teacher models a drawing on the board that includes:

a farm with food growing;

a truck carrying food;

a market with refrigerators; and

a home with food inside.

Benchmark Clarifications:

Clarification 1: Instruction includes farms, ranches, gardens, markets, and homes.

Clarification 2: Instruction includes refrigeration and transportation.

Clarification 3: Instruction is limited to observations of food systems and does not include the cost of food.

Clarification 4: Instruction includes identifying that foods may be changed through growing, cooking, or preparing before they are eaten.

Clarification 5: Instruction includes sequencing steps in food pathways. Refer to Mathematics Skills Supporting Mastery of K-5 Life Benchmarks.

Clarification 6: Instruction includes using flow diagrams to represent food systems from farm to home. Refer to Modeling Skills Supporting Mastery of K-5 Life Benchmarks.

SC.2.NT.1.5 Identify ways people can reduce food waste.

Benchmark Clarifications:

Clarification 1: Instruction includes composting and saving leftovers.

Clarification 2: Instruction includes preserving food to eat at a later time.

Clarification 3: Instruction includes comparing methods of reducing food waste.

Clarification 4: Instruction includes collecting, organizing, and comparing information about methods of reducing food waste to identify patterns and evaluate their effectiveness. Refer to Mathematics Skills Supporting Mastery of K-5 Life Benchmarks.

Grade 3

Proposed DRAFT Standards

SC.3.NT.1 Explain how nutrients in food support growth, repair, and energy use in the human body; how nutrients help body structures such as muscles, bones, and blood; how the circulatory system transports nutrients; and how types of food and preparation methods can affect nutrients.

SC.3.NT.1.1 Identify nutrients as parts of food that help the human body.

Benchmark Clarifications:

Clarification 1: Instruction includes nutrients as materials that build, repair, and maintain human body tissues.

Clarification 2: Instruction includes that some nutrients are needed in small amounts but are still important for the human body to function properly.

Clarification 3: Instruction includes that nutrients come from foods and may be affected by how foods are prepared.

Clarification 4: Instruction includes classifying foods by nutrient content and comparing the number of foods in each category.

Clarification 5: Instruction includes organizing, comparing, and interpreting information about nutrients in foods. Refer to Mathematics Skills Supporting Mastery of K-5 Life Benchmarks.

Clarification 6: Instruction includes organizing and comparing data about nutrients in foods using tables, charts, or graphs. Refer to Modeling Skills Supporting Mastery of K-5 Life Benchmarks.

SC.3.NT.1.2 Explain that nutrients support muscles, bones, and blood.

Benchmark Clarifications:

Clarification 1: Instruction includes identifying which nutrients help support muscles (proteins), bones (calcium), and blood (iron).

Clarification 2: Instruction includes food examples from plants and animals that provide nutrients to support muscles, bones, and blood.

Clarification 3: Instruction is limited to basic functions of nutrients in the human body.

Clarification 4: Instruction includes using diagrams and models to represent how nutrients support human body structures. Refer to Modeling Skills Supporting Mastery of K-5 Life Benchmarks.

SC.3.NT.1.3 Describe how the circulatory system moves nutrients in the human body.

Benchmark Clarifications:

Clarification 1: Instruction includes blood as a transport system for nutrients.

Clarification 2: Instruction includes using system models or other representations to explain how the circulatory system transports nutrients through the human body. Refer to Modeling Skills Supporting Mastery of K-5 Life Benchmarks.

SC.3.NT.1.4 Identify carbohydrates, proteins, and fats as types of nutrients.

Example: Students review a picture or menu of a school lunch and identify which foods are carbohydrates, proteins, and fats using a class anchor chart with food examples. Students then draw or list their lunch and label at least one food for each nutrient to explain what nutrients they are eating.

Benchmark Clarifications:

Clarification 1: Instruction includes that carbohydrates provide energy for the human body.

Clarification 2: Instruction includes foods that help build and repair the human body (proteins).

Clarification 3: Instruction includes that fats help store energy for later use.

Clarification 4: Instruction includes that foods with similar nutrients may differ in how the human body uses them based on how they are prepared or processed.

Clarification 5: Instruction includes organizing, comparing, and identifying patterns in nutrient types across foods. Refer to Mathematics Skills Supporting Mastery of K-5 Life Benchmarks.

Clarification 6: Instruction includes collecting and using evidence to compare foods based on nutrient composition. Refer to Laboratory Practices Supporting Mastery of K-5 Life Benchmarks.

SC.3.NT.1.5 Explain that food preparation methods can affect nutrients.

Benchmark Clarifications:

Clarification 1: Instruction includes cooking, freezing, and preserving foods.

Clarification 2: Instruction includes that preparation methods can change the amount or availability of nutrients.

Clarification 3: Instruction includes that some foods are closer to their natural form while others are more processed.

Clarification 4: Instruction includes that differences in food preparation and processing can influence how the human body uses nutrients.

Clarification 5: Instruction includes comparing foods before and after preparation.

Clarification 6: Instruction includes organizing, comparing, and identifying patterns in how food preparation methods affect nutrients. Refer to Mathematics Skills Supporting Mastery of K-5 Life Benchmarks.

Clarification 7: Instruction includes collecting and using evidence from observations and investigations to compare how food preparation methods affect nutrients. Refer to Laboratory Practices Supporting Mastery of K-5 Life Benchmarks.

Grade 4

SC.4.NT.1 Explain how the digestive, circulatory, and excretory systems work together as a system to absorb and transport nutrients from food and remove waste; and how nutrients can interact and be influenced by food preparation methods to help the human body use food effectively.

Proposed DRAFT Standards

SC.4.NT.1.1 Describe absorption as nutrients moving from the intestines into the bloodstream.

Example: After eating lunch, digested nutrients move from the small intestine into the bloodstream. The circulatory system then transports the nutrients to human body cells.

Student Task(s) –

Identify where nutrient absorption occurs.

Describe how nutrients enter the bloodstream.

Explain why absorption is important for human body functions.

Benchmark Clarifications:

Clarification 1: Instruction includes absorption as the movement of nutrients from the intestines into the bloodstream for use by the human body.

Clarification 2: Instruction includes using models or other representations to explain how nutrients move from the intestines into the bloodstream. Refer to Modeling Skills Supporting Mastery of K-5 Life Benchmarks.

SC.4.NT.1.2 Explain how nutrients are transported within human body systems.

Benchmark Clarifications:

Clarification 1: Instruction includes the digestive, circulatory, and excretory systems of the human body.

Clarification 2: Instruction is limited to how human body systems interact to transport nutrients.

Clarification 3: Instruction includes that nutrients must be in forms the human body can absorb and transport.

Clarification 4: Instruction includes using system models or other representations to explain interactions among the digestive, circulatory, and excretory systems. Refer to Modeling Skills Supporting Mastery of K-5 Life Benchmarks.

Proposed DRAFT Standards

SC.4.NT.1.3 Identify waste products produced by the human body from food.

Benchmark Clarifications:

Clarification 1: Instruction includes recognizing that the intestines eliminate undigested material and the kidneys remove wastes from the blood and produce urine.

Clarification 2: Instruction includes that some waste is produced after the human body uses nutrients from food.

Clarification 3: Instruction includes identifying input-output patterns of food and waste. Refer to Mathematics Skills Supporting Mastery of K-5 Life Benchmarks.

SC.4.NT.1.4 Explain that some nutrients work together to help the human body use food.

Example: Using the table below, examine a sample meal and explain how vitamin C helps the human body absorb iron by identifying foods that work better together. Students then compare raw and cooked foods to explain how cooking can help the human body absorb nutrients more easily or reduce the nutrient value.

Nutrients Work Better Together

Vitamin C + Iron Vitamin C helps the body use iron.

Example: Oranges help the body use iron from beans.

Foods that Work Together Iron foods: beans, spinach, and meat

Vitamin C foods: oranges, strawberries, and peppers

Raw Versus Cooked Food Cooking some foods makes it easier to chew and digest.

Why Cooking Helps Easier digestion helps nutrients get absorbed by the body.

Benchmark Clarifications:

Clarification 1: Instruction includes examples such as Vitamin C helping the human body absorb iron.

Clarification 2: Instruction includes that nutrients from foods with different levels of processing, preparing, and cooking may be used and absorbed differently by the human body.

Clarification 3: Instruction includes comparing foods based on preparation and nutrient use.

Clarification 4: Instruction includes diagrams showing how preparation affects nutrient absorption. Refer to Modeling Skills Supporting Mastery of K-5 Life Benchmarks.

Clarification 5: Instruction includes collecting and using evidence from observations and investigations to explain how nutrients work together and how food preparation affects nutrient use and absorption. Refer to Laboratory Practices Supporting Mastery of K-5 Life Benchmarks.

Grade 5

SC.5.NT.1 Explain how food is broken down into molecules that cells use for energy, growth, and repair; how energy in food originates from plants and the Sun and moves through food webs to humans; and how food choices and access to food can influence nutrition and the human body over time.

SC.5.NT.1.1 Describe cells as the basic unit of life.

Benchmark Clarifications:

Clarification 1: Instruction includes cells as the smallest units of living things that carry out life processes.

Clarification 2: Instruction excludes identifying and describing internal cell structure.

Clarification 3: Instruction includes models showing cells as basic units that use nutrients. Refer to Modeling Skills Supporting Mastery of K-5 Life Benchmarks.

SC.5.NT.1.2 Explain that nutrients are used by cells.

Proposed DRAFT Standards

Benchmark Clarifications:

Clarification 1: Instruction includes that nutrients are small molecules or substances that cells use.

Clarification 2: Instruction includes that cells may use energy from nutrients immediately or store it for later use.

Clarification 3: Instruction includes that nutrients must be broken down into forms that cells can use.

Clarification 4: Instruction includes that the form of food can influence how nutrients are used by cells.

Clarification 5: Instruction includes using diagrams, models, or other representations to explain how nutrients move into and are used by cells. Refer to Modeling Skills Supporting Mastery of K-5 Life Benchmarks.

SC.5.NT.1.3 Connect human nutrition to plants, photosynthesis, and food webs.

Example: Case Study – Clarissa eats a lunch of rice, black beans, grilled vegetables, and fruit before her soccer game. The next day in science class, she wonders where the energy in her food came from. Her teacher explains that the plants in Clarissa's meal used energy from the Sun to make food through photosynthesis. That energy moved from plants to Clarissa through a food web and was then transferred to her body cells, where it helped her muscles move during the game.

Student Task(s) –

Create a diagram that shows how energy moves: the Sun → plants (photosynthesis) → food → human cells.

Explain how the energy in food starts with the Sun.

Using the food in Clarissa's lunch, identify which foods came directly from plants and which foods came from animals that ate plants, showing how humans are part of food webs.

Benchmark Clarifications:

Clarification 1: Instruction includes that energy in food originates from the Sun.

Clarification 2: Instruction includes that energy is transferred from food to cells where it is used for movement and other life processes.

Clarification 3: Instruction includes that foods differ in how much energy they can provide to the human body.

Clarification 4: Instruction includes organizing, comparing, and interpreting information using data, charts, and diagrams to identify patterns in energy transfer from the Sun to plants, food, and humans. Refer to Mathematics Skills Supporting Mastery of K-5 Life Benchmarks.

Clarification 5: Instruction includes identifying patterns in energy flow using models and flowcharts illustrating energy transfer, such as from the Sun to food to cells. Refer to Modeling Skills Supporting Mastery of K-5 Life Benchmarks.

SC.5.NT.1.4 Explain how food can affect the human body over time.

Example: A student eats a variety of nutrient-rich foods for several months. Then, for a similar period of time, the student eats more foods that provide fewer nutrients.

Student Task(s) –

Compare the nutrient values of nutrient-rich foods to the food with fewer nutrients.

Identify possible long-term effects of each pattern.

Explain why food choices may affect the human body gradually over time.

Benchmark Clarifications:

Clarification 1: Instruction includes positive and negative outcomes related to nutrition.

Clarification 2: Instruction includes that effects over time may be gradual and not immediate.

Clarification 3: Instruction includes that people may respond differently to the same foods due to differences in biology and environment.

Clarification 4: Instruction includes understanding that the foods people eat on a regular basis impacts the availability of nutrients and energy needed for the human body to function effectively over time.

Clarification 5: Instruction includes comparing nutrient data to identify patterns and trends in how certain foods affect the human body over time. Refer to Mathematics Skills Supporting Mastery of K-5 Life Benchmarks.

SC.5.NT.1.5 Explain how different types of foods can influence nutrition.

Benchmark Clarifications:

Clarification 1: Instruction includes the availability of fresh, canned, and frozen foods and how agricultural production, transportation, and access can affect food choices.

Clarification 2: Instruction includes that available foods may differ in composition and level of processing and may influence how nutrients support the human body over time.

Clarification 3: Instruction includes analyzing examples of food access and availability.

Clarification 4: Instruction includes comparing food types and availability data to identify patterns in how food choices can influence nutrition. Refer to Mathematics Skills Supporting Mastery of K-5 Life Benchmarks.

The Science of Fungi

How fungi obtain resources, grow, reproduce, and interact with living systems; and how fungi contribute to decomposition, nutrient cycling, ecosystem stability, and plant survival.

Grade Kindergarten

Proposed DRAFT Standards

SC.K.FG.1 Recognize fungi as living things with observable characteristics.

SC.K.FG.1.1 Identify fungi as living things.

Benchmark Clarifications:

Clarification 1: Instruction includes examples of fungi such as mushrooms and molds.

Clarification 2: Instruction includes recognizing that fungi grow and change over time.

Clarification 3: Instruction includes observing and comparing colors, shapes, sizes, and locations of fungi.

Clarification 4: Instruction includes comparing observable characteristics of fungi with those of plants and animals.

Clarification 5: Instruction excludes microscopic fungi, fungal structures, and reproduction.

Grade 1

SC.1.FG.1 Describe observable characteristics and basic needs of fungi.

SC.1.FG.1.1 Describe observable characteristics of fungi and the resources they need to grow.

Benchmark Clarifications:

Clarification 1: Instruction includes observing fungal characteristics such as size, shape, color, texture, and location.

Clarification 2: Instruction includes recognizing that fungi require factors to grow such as water, air, and nutrients.

Clarification 3: Instruction includes recognizing that fungi do not make their own food like plants.

Clarification 4: Instruction includes comparing fungi and plants based on how they obtain resources from their surroundings.

Clarification 5: Instruction includes organizing and comparing observations of fungi by their characteristics and growing locations. Refer to Mathematics Skills Supporting Mastery of K-5 Life Benchmarks.

Clarification 6: Instruction includes observing and comparing fungi in different environments to identify the resources they need to grow. Refer to Laboratory Practices Supporting Mastery of K-5 Life Benchmarks.

Grade 2

SC.2.FG.1 Explain how fungi obtain resources and reproduce.

SC.2.FG.1.1 Explain how fungi obtain resources from their surroundings.

Example: During a nature walk around a Florida schoolyard, a second-grade student observes mushrooms growing on a fallen log, mold growing on an old orange peel, and fungi growing in leaf litter beneath trees. The student also observes a tree with a fungal growth attached to its trunk. The student learns that fungi do not make their own food like plants. Instead, they absorb nutrients from materials in their surroundings. The student compares how a fungus growing on a living tree obtains nutrients from the tree while a nearby plant uses sunlight to make its own food.

Student Task(s) –

Observe examples of fungi growing on logs, fallen leaves, fruit, soil, or other decaying materials.

Identify the material from which each fungus obtains nutrients.

Explain that fungi obtain resources from living or once-living materials.

Create a diagram or model showing a fungus obtaining nutrients from a decaying log, leaf, or fruit.

Benchmark Clarifications:

Clarification 1: Instruction includes recognizing that fungi obtain nutrients from living or once-living materials.

Clarification 2: Instruction includes locations where fungi grow on logs, fallen leaves, fruit, soil, and decaying organisms.

Clarification 3: Instruction includes recognizing that fungi do not produce their own food.

Clarification 4: Instruction includes comparing how fungi obtain resources differently from plants.

Clarification 5: Instruction includes using diagrams and models to represent resource acquisition. Refer to Modeling Skills Supporting Mastery of K-5 Life Benchmarks.

SC.2.FG.1.2 Recognize that fungi reproduce using spores.

Benchmark Clarifications:

Clarification 1: Instruction includes identifying spores as structures that can develop into new fungi.

Clarification 2: Instruction includes recognizing that spores may be carried by wind, water, and animals.

Clarification 3: Instruction includes comparing spores with seeds as reproductive structures.

Clarification 4: Instruction excludes detailed reproductive mechanisms.

Clarification 5: Instruction includes using models and diagrams to represent spore dispersal. Refer to Modeling Skills Supporting Mastery of K-5 Life Benchmarks.

Grade 3

Proposed DRAFT Standards

SC.3.FG.1 Explain how fungi contribute to ecosystems and interact with plants.

SC.3.FG.1.1 Describe how fungi help break down dead organisms and organic materials.

Benchmark Clarifications:

Clarification 1: Instruction includes recognizing fungi as decomposers.

Clarification 2: Instruction includes recognizing that fungi obtain nutrients from dead organisms and other once-living organic materials, such as dead trees, animal remains, and fallen leaves.

Clarification 3: Instruction includes explaining that decomposition breaks down dead organisms and returns nutrients to the environment.

Clarification 4: Instruction includes recognizing that decomposition contributes to soil formation.

Clarification 5: Instruction includes using models and diagrams to represent decomposition. Refer to Modeling Skills Supporting Mastery of K-5 Life Benchmarks.

SC.3.FG.1.2 Recognize that fungi can live in association with plants.

Example: A fungus can live closely together with a plant, such as on or near the plant's roots. The fungus helps the plant get water and nutrients from the soil, while the plant provides sugars to the fungus. This shows that fungi and plants can live closely together in a relationship that benefits both organisms.

Student Tasks:

Observe fungi and plants living closely together.

Recognize that fungi can live on or near plant roots.

Identify how the plant and fungus benefit from the relationship.

Explain how living closely together can benefit both organisms.

Benchmark Clarifications:

Clarification 1: Instruction includes observing examples of fungi living with plants, such as fungi near plant roots and mushrooms growing near trees.

Clarification 2: Instruction includes recognizing that some fungi live closely with plants, especially near their roots, and that these relationships can be beneficial.

Clarification 3: Instruction excludes detailed nutrient-exchange processes.

Clarification 4: Instruction includes using diagrams and models to represent relationships between fungi and plants. Refer to Modeling Skills Supporting Mastery of K-5 Life Benchmarks.

Grade 4

SC.4.FG.1 Analyze how fungi support plant growth and nutrient cycling.

SC.4.FG.1.1 Explain how fungi and plants can benefit from living together.

Example: Longleaf pine trees grow in many parts of Florida where the soil is sandy and contains few nutrients. Tiny fungi live in the soil and attach to the roots of these trees. The fungi help the trees absorb more water and nutrients from the soil than the roots could absorb alone. In return, the trees provide the fungi with food (sugars) that the trees make through photosynthesis. This beneficial relationship helps both organisms survive and grow, especially during dry periods when water is difficult to find.

Student Task(s) –

Draw a longleaf pine tree and fungi living around its roots. Use arrows to show:

Water moving from the soil to the fungi and then to the tree

Nutrients moving from the soil to the fungi and then to the tree

Food (sugars) moving from the tree to the fungi

Benchmark Clarifications:

Clarification 1: Instruction includes recognizing that some fungi live on or around plant roots.

Clarification 2: Instruction includes explaining that fungi can help plants obtain water and nutrients from soil.

Clarification 3: Instruction includes recognizing that plants provide sugars and other resources for fungi.

Clarification 4: Instruction includes describing the relationship as beneficial to both organisms.

Clarification 5: Instruction includes examples of relationships within forests, wetlands, gardens, and agricultural systems.

Clarification 6: Instruction excludes detailed biochemical mechanisms.

Clarification 7: Instruction includes developing and using models representing the movement of water, nutrients, and sugars between fungi and plants. Refer to Modeling Skills Supporting Mastery of K-5 Life Benchmarks.

SC.4.FG.1.2 Analyze how fungi contribute to nutrient cycling.

Example: After leaves fall from a live oak tree in a Florida forest, fungi begin breaking them down. As decomposition occurs, nutrients from the leaves are returned to the soil.

Student Task(s) –

Identify the role of fungi in the example.

Describe how nutrients move through the system.

Explain how nutrient cycling supports other organisms.

Benchmark Clarifications:

Clarification 1: Instruction includes explaining how decomposition recycles materials through ecosystems.

Clarification 2: Instruction includes recognizing that nutrients become available for use by plants and other organisms.

Clarification 3: Instruction includes tracing the movement of materials through ecosystems such as forests, gardens, wetlands, and agricultural systems.

Clarification 4: Instruction includes interpreting diagrams and models showing nutrient cycling. Refer to Modeling Skills Supporting Mastery of K-5 Life Benchmarks.

Grade 5

SC.5.FG.1 Analyze how fungi support ecosystems through reproduction, decomposition, and interactions with other organisms.

SC.5.FG.1.1 Compare how fungi reproduce and spread in different environments.

Benchmark Clarifications:

Clarification 1: Instruction includes the production and dispersal of spores.

Clarification 2: Instruction includes environmental conditions such as moisture, temperature, and available nutrients.

Clarification 3: Instruction includes analyzing how fungal growth and reproduction are impacted by environmental conditions such as warm and moist, dry and nutrient-poor, or cool and damp.

Clarification 4: Instruction includes organizing, representing, and interpreting datasets about fungal growth and reproduction in different environmental conditions. Refer to Mathematics Skills Supporting Mastery of K-5 Life Benchmarks.

Clarification 5: Instruction includes using observations, models, graphs, and datasets to support comparisons. Refer to Modeling Skills Supporting Mastery of K-5 Life Benchmarks.

SC.5.FG.1.2 Analyze how fungal interactions support ecosystem stability.

Benchmark Clarifications:

Clarification 1: Instruction includes mycorrhizal relationships between fungi and plant roots.

Clarification 2: Instruction includes decomposition and nutrient cycling.

Clarification 3: Instruction includes explaining how fungi support plant growth and survival in natural ecosystems and agricultural systems.

Clarification 4: Instruction includes analyzing how fungi contribute to healthy ecosystems.

Clarification 5: Instruction includes recognizing that ecosystem changes may affect fungal populations and the organisms that depend on them.

Clarification 6: Instruction excludes detailed cellular and molecular processes.

Clarification 7: Instruction includes analyzing observations, datasets, graphs, and case studies involving fungal interactions and ecosystem stability. Refer to Mathematics Skills Supporting Mastery of K-5 Life Benchmarks.

Clarification 8: Instruction includes using models and diagrams to represent fungal interactions and ecosystem stability. Refer to Modeling Skills Supporting Mastery of K-5 Life Benchmarks.

Clarification 9: Instruction includes collecting and analyzing evidence from observations and investigations to explain how fungi support ecosystem stability. Refer to Laboratory Practices Supporting Mastery of K-5 Life Benchmarks.

The Science of Microorganisms

How microorganisms grow, reproduce, and survive; how they interact with living systems; and how microorganisms influence ecosystems, food production, and human health.

Grade Kindergarten

Proposed DRAFT Standards

SC.K.MO.1 Recognize that some living things are too small to be easily observed.

SC.K.MO.1.1 Recognize that some living things are too small to be seen without tools.

Benchmark Clarifications:

Clarification 1: Instruction includes recognizing that some living things are much smaller than plants and animals that can be easily observed.

Clarification 2: Instruction includes examples of tiny living things found in water, soil, and on living organisms.

Clarification 3: Instruction includes recognizing that scientists use tools to observe very small living things.

Clarification 4: Instruction includes comparing how magnification changes what can be observed.

Clarification 5: Instruction excludes classification and cellular structures.

Clarification 6: Instruction includes examining historical developments that contributed to scientific understanding of microorganisms. Refer to the Timeline of Key Accomplishments Supporting Mastery of K-5 Life Benchmarks.

Grade 1

SC.1.MO.1 Describe microorganisms as living things found in many different environments.

SC.1.MO.1.1 Identify places where microorganisms may live.

Benchmark Clarifications:

Clarification 1: Instruction includes comparing environments where microorganisms may be found such as soil, water, plants, animals, and food.

Clarification 2: Instruction includes recognizing that microorganisms have basic needs such as water and nutrients.

Clarification 3: Instruction includes recognizing that microorganisms are found almost everywhere.

Clarification 4: Instruction excludes microscopic structures and reproduction.

Grade 2

SC.2.MO.1 Explain that microorganisms are living things that are often too small to be seen without magnification.

SC.2.MO.1.1 Identify microorganisms as living things that may require magnification to observe.

Benchmark Clarifications:

Clarification 1: Instruction includes examples such as bacteria, protozoa, and microscopic algae.

Clarification 2: Instruction includes recognizing that magnification tools can be used to observe microorganisms.

Clarification 3: Instruction includes distinguishing microorganisms from larger plants and animals.

Clarification 4: Instruction includes recognizing that microorganisms are living things that carry out life processes.

Clarification 5: Instruction excludes detailed cell structures.

Clarification 6: Instruction includes examining historical developments that contributed to scientific understanding of the existence of microscopic life. Refer to the Timeline of Key Accomplishments Supporting Mastery of K-5 Life Benchmarks.

SC.2.MO.1.2 Compare characteristics of microorganisms and larger organisms.

Benchmark Clarifications:

Clarification 1: Instruction includes recognizing that both microorganisms and larger organisms grow, obtain resources, and reproduce.

Clarification 2: Instruction includes comparing observable differences in size.

Clarification 3: Instruction includes recognizing that all living things have basic needs.

Clarification 4: Instruction includes organizing, comparing, and representing differences in the sizes of microorganisms and larger organisms. Refer to Mathematics Skills Supporting Mastery of K-5 Life Benchmarks.

Clarification 5: Instruction includes organizing observations using charts, diagrams, and comparison tables. Refer to Modeling Skills Supporting Mastery of K-5 Life Benchmarks.

Grade 3

SC.3.MO.1 Explain how microorganisms affect living things and their environments.

SC.3.MO.1.1 Describe ways microorganisms can be helpful or harmful.

Benchmark Clarifications:

Clarification 1: Instruction includes helpful microorganisms involved in decomposition and food production.

Clarification 2: Instruction includes microorganisms that may cause disease.

Clarification 3: Instruction includes recognizing that many microorganisms are beneficial.

Clarification 4: Instruction includes comparing the beneficial and harmful effects of microorganisms.

Clarification 5: Instruction excludes detailed disease processes.

Clarification 6: Instruction includes examining historical developments that contributed to scientific understanding of microorganisms and health. Refer to the Timeline of Key Accomplishments Supporting Mastery of K-5 Life Benchmarks.

SC.3.MO.1.2 Describe how microorganisms contribute to decomposition.

Benchmark Clarifications:

Clarification 1: Instruction includes microorganisms breaking down dead plants, dead animals, and waste.

Clarification 2: Instruction includes recognizing that decomposition returns nutrients to the environment.

Clarification 3: Instruction includes connections to soil formation and nutrient recycling.

Clarification 4: Instruction includes using diagrams and models to represent decomposition processes. Refer to Modeling Skills Supporting Mastery of K-5 Life Benchmarks.

Grade 4

SC.4.MO.1 Analyze how microorganisms support ecosystems, food production, and survival.

SC.4.MO.1.1 Explain how microorganisms are used in food production.

Benchmark Clarifications:

Clarification 1: Instruction includes recognizing that microorganisms can change ingredients into new foods.

Clarification 2: Instruction includes examples such as yogurt, cheese, bread, fermented foods, composting systems, and agricultural food systems.

Clarification 3: Instruction includes comparing foods produced with the help of microorganisms.

Clarification 4: Instruction includes using diagrams and models to represent food-production processes. Refer to Modeling Skills Supporting Mastery of K-5 Life Benchmarks.

Clarification 5: Instruction includes examining historical developments that contributed to scientific understanding of microorganisms used in food production. Refer to the Timeline of Key Accomplishments Supporting Mastery of K-5 Life Benchmarks.

SC.4.MO.1.2 Explain how microorganisms grow and reproduce under favorable conditions.

Example: Two containers of bread are stored under different conditions. One is kept in a warm, moist location while the other is kept in a cool, dry location. Mold typically appears more quickly on bread stored in warm, moist conditions than on bread stored in cool, dry conditions.

Students connect their observations to historical investigations by Antonie van Leeuwenhoek and Louis Pasteur that advanced scientific understanding of microorganisms.

Student Task(s) –

Compare the conditions in the two environments.

Identify which environment supported greater microorganism growth.

Use evidence from the investigation to explain how environmental conditions affect microorganism populations.

Explain how historical investigations contributed to understanding microorganisms.

Benchmark Clarifications:

Clarification 1: Instruction includes recognizing that microorganisms increase in number when resources are available.

Clarification 2: Instruction includes examples involving food, moisture, and temperature.

Clarification 3: Instruction includes recognizing that microbial populations can change over time.

Clarification 4: Instruction excludes detailed cellular reproduction processes.

Clarification 5: Instruction includes collecting, organizing, graphing, and interpreting data showing changes in microorganism populations over time. Refer to Mathematics Skills Supporting Mastery of K-5 Life Benchmarks.

Clarification 6: Instruction includes conducting investigations and making observations to determine how environmental conditions affect microorganism growth and reproduction. Refer to Laboratory Practices Supporting Mastery of K-5 Life Benchmarks.

Clarification 7: Instruction includes examining historical developments that contributed to scientific understanding of how microorganisms grow and reproduce. Refer to the Timeline of Key Accomplishments Supporting Mastery of K-5 Life Benchmarks.

Grade 5

SC.5.MO.1 Analyze how microorganisms influence ecosystems, food systems, and human health.

SC.5.MO.1.1 Compare major groups of microorganisms based on observable characteristics and functions.

Benchmark Clarifications:

Clarification 1: Instruction includes bacteria, protozoa, microscopic algae, and microscopic fungi.

Clarification 2: Instruction includes recognizing that different groups of microorganisms perform different roles in nature.

Clarification 3: Instruction includes comparing similarities and differences among microorganism groups.

Clarification 4: Instruction excludes detailed taxonomy.

Clarification 5: Instruction includes using observations, models, diagrams, and data to support comparisons. Refer to Modeling Skills Supporting Mastery of K-5 Life Benchmarks.

SC.5.MO.1.2 Analyze how microorganisms affect ecosystems, food systems, and human health.

Example: Microorganisms help produce yogurt and cheese, break down waste in compost piles and wastewater treatment systems, and decompose dead organisms in ecosystems. Some microorganisms can spoil food or cause disease. Humans use sanitation, food-safety practices, and beneficial microorganisms in food production to reduce harmful effects and support helpful microorganisms. Students connect these roles to scientific developments, including Pasteur's work on microorganisms in food and health and later microbiome research.

Student Task(s) –

Identify beneficial and harmful roles of microorganisms.

Compare how microorganisms affect ecosystems and human systems.

Classify examples as natural systems or human-designed systems and explain how microorganisms function in each.

Explain how people can reduce the spread of harmful microorganisms.

Explain how scientific discoveries have contributed to understanding the roles of microorganisms in food, health, and ecosystems.

Benchmark Clarifications:

Proposed DRAFT Standards

Clarification 1: Instruction includes beneficial roles such as decomposition, nutrient cycling, and food production.

Clarification 2: Instruction includes harmful effects such as food spoilage and disease.

Clarification 3: Instruction includes recognizing that microorganisms are important components of ecosystems.

Clarification 4: Instruction includes explaining how microorganisms influence both natural and human-designed systems.

Clarification 5: Instruction includes practices that reduce the spread of harmful microorganisms, such as handwashing and safe food handling.

Clarification 6: Instruction excludes detailed immune-system responses and disease mechanisms.

Clarification 7: Instruction includes analyzing observations, datasets, graphs, and case studies involving microorganisms. Refer to Mathematics Skills Supporting Mastery of K-5 Life Benchmarks.

Clarification 8: Instruction includes observing, investigating, and classifying the roles of microorganisms in ecosystems, food systems, and human health. Refer to Laboratory Practices Supporting Mastery of K-5 Life Benchmarks.

Clarification 9: Instruction includes examining how scientific discoveries have advanced understanding of microorganisms in food, human health, and ecosystems. Refer to the Timeline of Key Accomplishments Supporting Mastery of K-5 Life Benchmarks.