First Grade

South Carolina first-grade students engage in thinking and solving problems the way scientists and engineers do to help them better see how science is relevant to their lives. To capitalize on the natural curiosity all students have about the world around them, learning experiences are built around the three dimensions of science: **Science and Engineering Practices (SEPs),** **Crosscutting Concepts (CCCs),** and **Disciplinary Core Ideas (DCIs).** This three-dimensional approach to teaching and learning helps educators provide meaningful learning experiences that offer varied entry points for students from diverse backgrounds.

The performance expectations in first grade help students engage in inquiry questions such as, **but not limited to:**

What happens when there is no light?

Students investigate the relationship between the presence or absence of light and the ability to see objects. The idea that light travels from place to place can be understood by students at this level through determining the effect of placing objects made with different materials in the path of a beam of light.

What are some ways plants and animals meet their needs in order to survive and grow?

Students develop an understanding of how plants and animals use their external parts to help them survive, grow, and meet their needs as well as how behaviors of parents and offspring help the offspring survive. Students also us mimicry to design solutions to a human problem.

What happens when materials vibrate?

Students plan and conduct investigations to develop an understanding of the relationship between sound and vibrating materials.

How are parents and their young similar and different?

Students make observations to support the understanding that young plants and animals are like, but not exactly the same as, their parents.

What objects are in the sky and how do they seem to move?

Students are able to observe, describe, and predict some patterns of the movement of objects in the sky.

***The PEs should be bundled to design classroom experiences. There are multiple ways to bundle the PEs to help students lead inquiry and see connections between ideas, and help teachers facilitate phenomenon-driven learning with efficient use of instructional time.**

First Grade

Through the first-grade performance expectations, students demonstrate grade-appropriate proficiency in each of three dimensions. When students explore **Disciplinary Core Ideas** (Dimension 3), they will do so by engaging in **Science and Engineering Practices** (Dimension 1) and should be supported in making connections to the **Crosscutting Concepts** (Dimension 2) to link their understanding across the four disciplinary core domains.

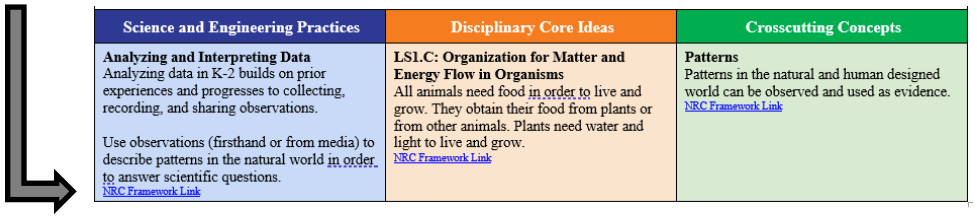
Each performance expectation contains one **SEP** and one **CCC** to be assessable and represents the student performance goal for the end of instruction; however, other **SEPs** and **CCCs** should be applied by students to support their progress leading up to the end of instruction. In first grade, these **end-of-instruction** **SEPs**, **DCIs**, and **CCCs** include:

SEPs	DCIs	CCCs
• Planning and Carrying Out Investigations • Analyzing and Interpreting Data • Constructing Explanations and Designing Solutions • Obtaining, Evaluating, and Communicating Information	• Physical Science (PS4) • Life Science (LS1, LS3) • Earth and Space Science (ESS1) • Engineering, Technology, and Applications of Science (ETS1, ETS2)	• Patterns • Cause and Effect • Systems and System Models • Structure and Function

Hyperlinks within the Standards Document

SC Conceptual Vertical Articulation links: Hover over the above underlined and hyperlinked titles to view links for all SEPs, DCIs, and CCCs.

A Framework for K-12 Science Education links: Hover over titles found within the foundation boxes under each PE to link the guiding research for all SEPs, DCIs, and CCCs.



Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Analyzing and Interpreting Data Analyzing data in K-2 builds on prior experiences and progresses to collecting, recording, and sharing observations. Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions. NRC Framework Link	**LS1.C: Organization for Matter and Energy Flow in Organisms** All animals need food in order to live and grow. They obtain their food from plants or from other animals. Plants need water and light to live and grow. NRC Framework Link	**Patterns** Patterns in the natural and human designed world can be observed and used as evidence. NRC Framework Link

*Equity in science education requires that all students are provided with equitable opportunities to learn science and become engaged in science and engineering practices; with access to quality space, equipment, and teachers to support and motivate that learning and engagement; and adequate time spent on science. In addition, the issue of connecting to students' interests and experiences is particularly important for broadening participation in science (NRC Framework, p. 28).

Waves and their Applications in Technologies for Information Transfer (PS4)		
1-PS4-1. Plan and conduct investigations to provide evidence that vibrating materials can make sound and that sound can make materials vibrate. ***Clarification Statement:*** *Examples of vibrating materials that make sound could include tuning forks and a stretched string that is plucked. Examples of how sound can make matter vibrate could include holding a piece of paper near a speaker making sound and holding an object near a vibrating tuning fork.*		
Science and Engineering Practices	**Disciplinary Core Ideas**	**Crosscutting Concepts**
Planning and Carrying Out Investigations Planning and carrying out investigations to answer questions or test solutions to problems in K-2 builds on prior experiences and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions. Plan and conduct investigations collaboratively to produce data to serve as the basis for evidence to answer a question. NRC Framework Link	**PS4.A: Wave Properties** Sound can make matter vibrate and vibrating matter can make sound. NRC Framework Link	**Cause and Effect** Simple tests can be designed to gather evidence to support or refute student ideas about causes. NRC Framework Link

Waves and their Applications in Technologies for Information Transfer (PS4)		
1-PS4-2. Make observations to support an evidence-based claim that objects in darkness can be seen only when illuminated by light sources. ***Clarification Statement:*** *Examples of observations could include those made in a completely dark room, a pinhole box, and a video of a cave explorer with a flashlight. Illumination could be from an external light source or by an object giving off its own light.*		
Science and Engineering Practices	**Disciplinary Core Ideas**	**Crosscutting Concepts**
Constructing Explanations and Designing Solutions Constructing explanations and designing solutions in K-2 builds on prior experiences and progresses to the use of evidence and ideas in constructing evidence-based accounts of natural phenomena and designing solutions. Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena. NRC Framework Link	**PS4.B: Electromagnetic Radiation** Objects can only be seen if light is available to illuminate them or if they give off their own light. NRC Framework Link	**Cause and Effect** Simple tests can be designed to gather evidence to support or refute student ideas about causes. NRC Framework Link

Waves and their Applications in Technologies for Information Transfer (PS4)		
1-PS4-3. Plan and conduct an investigation to determine the effect of placing objects made with different materials in the path of a beam of light. ***Clarification Statement:*** *Examples of materials could include clear plastic (transparent), wax paper (translucent), cardboard (opaque), and mirrors (reflective).* ***State Assessment Boundary:*** *Assessment does not include the speed of light, or the terms transparent, translucent, opaque, and reflective.*		
Science and Engineering Practices	**Disciplinary Core Ideas**	**Crosscutting Concepts**
Planning and Carrying Out Investigations Planning and carrying out investigations to answer questions or test solutions to problems in K-2 builds on prior experiences and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions. Plan and conduct investigations collaboratively to produce data to serve as the basis for evidence to answer a question. NRC Framework Link	**PS4.B: Electromagnetic Radiation** Light travels from place to place. Some materials allow light to pass through them, others allow only some light through, and others block all the light and create a dark shadow on any surface beyond them, where the light cannot reach. Mirrors can be used to redirect a light beam. NRC Framework Link	**Cause and Effect** Simple tests can be designed to gather evidence to support or refute student ideas about causes. NRC Framework Link

Waves and their Applications in Technologies for Information Transfer (PS4)

1-PS4-4. Use tools and materials to design and build a device that uses light or sound to communicate over a distance.

State Assessment Boundary: *Assessment does not include technological details for how communication devices work.*

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Constructing Explanations and Designing Solutions Constructing explanations and designing solutions in K-2 builds on prior experiences and progresses to the use of evidence and ideas in constructing evidence-based accounts of natural phenomena and designing solutions. Use tools and materials provided to design a device that solves a specific problem. NRC Framework Link	**PS4.C: Information Technologies and Instrumentation** People also use a variety of devices to communicate (send and receive information) over long distances. NRC Framework Link **ETS1.B: Developing Possible Solutions** Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem's solutions to other people. To design something complicated, one may need to break the problem into parts and attend to each part separately, then bring the parts together to test the overall solution. NRC Framework Link **ETS2.B: Influence of Engineering, Technology, and Science on Society and the Natural World** Every human-made product is designed by applying some knowledge of the natural world and is built using materials derived from the natural world. NRC Framework Link	**Systems and System Models** Systems in the natural and designed world have parts that work together. NRC Framework Link

From Molecules to Organisms: Structures and Processes (LS1)

1-LS1-1. Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs.

Clarification Statement: *Examples of human problems that can be solved by mimicking plant or animal solutions could include designing clothing or equipment to protect bicyclists by mimicking turtle shells, acorn shells, or animal scales; stabilizing structures by mimicking animal tails and roots on plants; keeping out intruders by mimicking thorns on branches or animal quills; or detecting intruders by mimicking eyes or ears.*

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Constructing Explanations and Designing Solutions Constructing explanations and designing solutions in K-2 builds on prior experiences and progresses to the use of evidence and ideas in constructing evidence-based accounts of natural phenomena and designing solutions. Use materials to design a device that solves a specific problem or a solution to a specific problem. NRC Framework Link	**LS1.A: Structure and Function** All organisms have external parts. Different animals use their body parts in different ways to see, hear, grasp objects, protect themselves, move from place to place, and seek, find, and take in food, water, and air. Plants also have different parts (roots, stems, leaves, flowers, fruits) that help them survive and grow. NRC Framework Link **LS1.D: Information Processing** Animals have body parts that capture and convey different kinds of information needed for growth and survival. Animals respond to these inputs with behaviors that help them survive. Plants also respond to some external inputs. NRC Framework Link **ETS1.B: Developing Possible Solutions** Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem's solutions to other people. NRC Framework Link (continued on next page)	**Structure and Function** The shape and stability of structures and natural and designed objects are related to their function(s). NRC Framework Link

	 **ETS2.B: Influence of Engineering, Technology, and Science on Society and the Natural World** Every human-made product is designed by applying some knowledge of the natural world and is built using materials derived from the natural world. NRC Framework Link	

From Molecules to Organisms: Structures and Processes (LS1)		
1-LS1-2. Obtain information from multiple sources to determine patterns in parent and offspring behavior that help offspring survive. ***Clarification Statement:*** *Examples of patterns of behaviors could include the signals that offspring make (such as crying, cheeping, or other vocalizations) and the responses of the parents (such as feeding, comforting, or protecting the offspring). Information may be obtained through observation, field study, text, media, etc.*		
Science and Engineering Practices	**Disciplinary Core Ideas**	**Crosscutting Concepts**
Obtaining, Evaluating, and Communicating Information Obtaining, evaluating, and communicating information in K-2 builds on prior experiences and uses observations and texts to communicate new information. Read grade-appropriate texts and use media to obtain scientific information to determine patterns in the natural world. NRC Framework Link	**LS1.B: Growth and Development of Organisms** Adult plants and animals can have young. In many kinds of animals, parents, and the offspring themselves engage in behaviors that help the offspring to survive. NRC Framework Link	**Patterns** Patterns in the natural and human designed world can be observed, used to describe phenomena, and used as evidence. NRC Framework Link

Heredity: Inheritance and Variation of Traits (LS3)

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1-LS3-1. Make observations to support an evidence-based claim that most young are like, but not exactly like, their parents.

Clarification Statement: *Emphasis is on identifying patterns of shared features between young and adult plants or animals. Examples of observations could include leaves from the same kind of plant are the same shape but can differ in size, and a particular breed of dog looks like its parents but is not exactly the same.*
State Assessment Boundary: *Assessment does not include inheritance or animals that undergo metamorphosis or hybrids.*

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Constructing Explanations and Designing Solutions Constructing explanations and designing solutions in K-2 builds on prior experiences and progresses to the use of evidence and ideas in constructing evidence-based accounts of natural phenomena and designing solutions. Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena. NRC Framework Link	**LS3.A: Inheritance of Traits** Young animals are very much, but not exactly, like their parents. Plants also are very much, but not exactly, like their parents. NRC Framework Link **LS3.B: Variation of Traits** Individuals of the same kind of plant or animal are recognizable as similar but can also vary in many ways. NRC Framework Link	**Patterns** Patterns in the natural world can be observed, used to describe phenomena, and used as evidence. NRC Framework Link

Earth's Place in the Universe (ESS1)

1-ESS1-1. Use observations of the sun, moon, and stars to describe patterns that can be predicted.

Clarification Statement: *Examples of patterns could include that the sun and moon appear to rise in one part of the sky, move across the sky, and set; and stars other than our sun are visible at night but not during the day.*
State Assessment Boundary: *Assessment of star patterns is limited to stars being seen at night and not during the day.*

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Analyzing and Interpreting Data Analyzing data in K-2 builds on prior experiences and progresses to collecting, recording, and sharing observations. Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions. NRC Framework Link	**ESS1.A: The Universe and Its Stars** Patterns of the motion of the sun, moon, and stars in the sky can be observed, described, and predicted. NRC Framework Link **ETS2.A: Interdependence of Science, Engineering, and Technology** People encounter questions about the natural world every day. There are many types of tools produced by engineering that can be used in science to help answer these questions through observation or measurement. Observations and measurements are also used in engineering to help test and refine design ideas. NRC Framework Link	**Patterns** Patterns in the natural world can be observed, used to describe phenomena, and used as evidence. NRC Framework Link

Earth's Place in the Universe (ESS1)		
1-ESS1-2. Make observations at different times of year to relate the amount of daylight to the time of year. ***Clarification Statement:*** *Emphasis is on relative comparisons of the amount of daylight in the winter or summer to the amount in the spring or fall.* ***State Assessment Boundary:*** *Assessment is limited to relative amounts of daylight, not quantifying the hours or time of daylight.*		
Science and Engineering Practices	**Disciplinary Core Ideas**	**Crosscutting Concepts**
Planning and Carrying Out Investigations Planning and carrying out investigations to answer questions or test solutions to problems in K-2 builds on prior experiences and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions. Make observations (firsthand or from media) to collect data that can be used to make comparisons. NRC Framework Link	**ESS1.B: Earth and the Solar System** Seasonal patterns of sunrise and sunset can be observed, described, and predicted. NRC Framework Link	**Patterns** Patterns in the natural world can be observed, used to describe phenomena, and used as evidence. NRC Framework Link