Third Grade

South Carolina third-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 third grade help students engage in inquiry questions such as, **but not limited to:**

How do equal and unequal forces on an object affect the object? Students investigate the effects of balanced and unbalanced forces on the motion of an object and develop an understanding of the cause-and-effect relationships of electric and magnetic interactions between two objects not in contact with each other.	**What happens to organisms when their environment changes?** Students construct arguments from evidence to develop an understanding of the idea that when the environment changes some organisms survive and reproduce, some move to new locations, some move into the transformed environment, and some die.
How can magnets be used? Students apply their understanding of magnetic interactions to define a simple design problem that can be solved with magnets.	**How can the impact of weather-related hazards be reduced?** Students make a claim about the effectiveness of a design solution that reduces the impacts of a weather-related hazard by applying their understanding of weather-related hazards.
How are plants, animals, and environments of the past similar or different from current plants, animals, and environments? Students analyze and interpret data to develop an understanding of types of organisms that lived long ago and also about the nature of their environments.	**What is typical weather in different parts of the world and during different times of the year?** Students organize and use data to describe typical weather conditions expected during a particular season. An exploration of weather patterns over time enables students to understand various climates found around the world.
How do organisms vary in their traits? Students develop and use models to build an understanding of the similarities and differences of organisms' life cycles. An understanding that organisms have different inherited traits, and that the environment can also affect the traits that an organism develops, is developed by students at this level. In addition, students construct an explanation using evidence for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing.	

***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.**

Third Grade

Through the third-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 third grade, these **end-of-instruction SEPs**, **DCIs**, and **CCCs** include:

SEPs	DCIs	CCCs
• Asking Questions and Defining Solutions • Developing and Using Models • Planning and Carrying Out Investigations • Analyzing and Interpreting Data • Constructing Explanations and Designing Solutions • Engaging in Argument from Evidence • Obtaining, Evaluating, and Communicating Information	• Physical Science (PS2) • Life Science (LS1, LS2, LS3, LS4) • Earth and Space Science (ESS2, ESS3) • Engineering, Technology, and Applications of Science (ETS1, ETS2)	• Patterns • Cause and Effect • Scale, Proportion, and Quantity • Systems and System Models

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).

Motion and Stability: Forces and interactions (PS2)		
3-PS2-1. Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object. ***Clarification Statement:*** *Examples could include an unbalanced force on one side of a ball, which causes motion; and balanced forces pushing on a box from opposite sides, which does not cause motion.* ***State Assessment Boundary:*** *Assessment is limited to one variable at a time: number, size, or direction of forces. Assessment does not include quantitative force size, only qualitative and relative. Assessment is limited to gravity being addressed as a force that pulls objects down.*		
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 3-5 builds on K-2 experiences and progresses to include investigations that control variables and provide evidence to support explanations or design solutions. Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence, using fair tests in which variables are controlled, and the number of trials considered. NRC Framework Link	**PS2.A: Forces and Motion** Each force acts on one particular object and has both strength and a direction. An object at rest typically has multiple forces acting on it, but they add to give zero net force on the object. Forces that do not sum to zero can cause changes in the object's speed or direction of motion. NRC Framework Link **PS2.B: Types of Interactions** Objects in contact exert forces on each other. NRC Framework Link	**Cause and Effect** Cause-and-effect relationships are routinely identified, tested, and used to explain change. NRC Framework Link

Motion and Stability: Forces and interactions (PS2)		
3-PS2-2. Make observations and measurements of an object's motion to provide evidence that a pattern can be used to predict future motion. ***Clarification Statement:*** *Examples of motion with a predictable pattern could include a pendulum swinging, a ball rolling back and forth in a bowl, and two children on a seesaw.* ***State Assessment Boundary:*** *Assessment does not include technical terms such as period and frequency.*		
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 3-5 builds on K-2 experiences and progresses to include investigations that control variables and provide evidence to support explanations or design solutions. Make observations and/or measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon or test a design solution. NRC Framework Link	**PS2.A: Forces and Motion** The patterns of an object's motion in various situations can be observed and measured; when that past motion exhibits a regular pattern, future motion can be predicted from it. NRC Framework Link	**Patterns** Patterns of change can be used to make predictions. NRC Framework Link

Motion and Stability: Forces and interactions (PS2)		
3-PS2-3. Ask questions to determine cause-and-effect relationships of electric interactions and magnetic interactions between two objects not in contact with each other. ***Clarification Statement:*** *Examples could include the interactive force on hair from an electrically charged balloon or other instances of static electricity. Examples could include either the magnetic force between two permanent magnets or an electromagnet and steel paper clips. Examples of cause-and-effect relationships could include how the distance between objects affects strength of the force, how combining magnets affects the strength of the force, and how the orientation of magnets affects the direction of the force.* ***State Assessment Boundary:*** *Assessment does not include electric interactions other than static electricity.*		
Science and Engineering Practices	**Disciplinary Core Ideas**	**Crosscutting Concepts**
Asking Questions and Defining Problems Asking questions and defining problems in grades 3-5 builds on grades K-2 experiences and progresses to specifying qualitative relationships. Ask questions that can be investigated based on patterns such as cause and effect relationships. NRC Framework Link	**PS2.B: Types of Interactions** Electric and magnetic forces between a pair of objects do not require that the objects be in contact. The sizes of the forces in each situation depend on the properties of the objects and their distances apart and, for forces between two magnets, on their orientation relative to each other. NRC Framework Link	**Cause and Effect** Cause-and-effect relationships are routinely identified, tested, and used to explain change. NRC Framework Link

Motion and Stability: Forces and interactions (PS2)		
3-PS2-4. Develop possible solutions to a simple design problem by applying scientific ideas about magnets. ***Clarification Statement:*** *Examples could include latching a door to keep it shut or keeping objects apart, so they do not touch.*		
Science and Engineering Practices	**Disciplinary Core Ideas**	**Crosscutting Concepts**
Constructing Explanations and Designing Solutions Constructing explanations and designing solutions in 3-5 builds on K-2 experiences and progresses to the use of evidence in constructing explanations that specify variables that describe and predict phenomena and in designing multiple solutions to design problems. Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design solution. NRC Framework Link	**PS2.B: Types of Interactions** Electric and magnetic forces between a pair of objects do not require that the objects be in contact. The sizes of the forces in each situation depend on the properties of the objects and their distances apart and, for forces between two magnets, on their orientation relative to each other. NRC Framework Link **ETS1.B: Developing Possible Solutions** Testing a solution involves investigating how well it performs under a range of likely conditions. NRC Framework Link **ETS2.A: Interdependence of Science, Engineering, and Technology** Scientific discoveries about the natural world can often lead to new and improved technologies, which are developed through the engineering design process. NRC Framework Link	**Systems and System Models** A system can be described in terms of its components and their interactions NRC Framework Link

From Molecules to Organisms: Structures and Processes (LS1)

3-LS1-1. Develop and use models to describe how organisms change in predictable patterns during their unique and diverse life cycles.

Clarification Statement: *Changes organisms go through during their life cycles could include birth/sprouting, growth, reproduction, and death.*
State Assessment Boundary: *Assessment does not include human examples or details of reproduction beyond two ways animals are born: live from mother or hatched from eggs.*

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Developing and Using Models Modeling in 3-5 builds on K-2 experiences and progresses to building and revising simple models and using models to represent events and design solutions. Develop models to describe phenomena. NRC Framework Link	**LS1.B: Growth and Development of Organisms** Reproduction is essential to the continued existence of every kind of organism. Plants and animals have unique and diverse life cycles. NRC Framework Link	**Patterns** Patterns of change can be used to make predictions. NRC Framework Link

Ecosystems: Interactions, Energy, and Dynamics (LS2)		
3-LS2-1. Construct an argument that some animals form groups that help members survive.		
Science and Engineering Practices	**Disciplinary Core Ideas**	**Crosscutting Concepts**
Engaging in Argument from Evidence Engaging in argument from evidence in 3-5 builds on K-2 experiences and progresses to critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed world(s). Construct an argument with evidence, data, and/or a model. NRC Framework Link	**LS2.D: Social Interactions and Group Behavior** Being part of a group helps animals obtain food, defend themselves, and cope with changes. Groups may serve different functions and vary dramatically in size. Groups can be collections of equal individuals, hierarchies with dominant members, small families, groups of single or mixed gender, or groups composed of individuals similar in age. Some groups are stable over long periods of time; others are fluid, with members moving in and out. Some groups assign specialized tasks to each member; in others, all members perform the same or a similar range of functions. NRC Framework Link	**Cause and Effect** Cause-and-effect relationships are routinely identified and used to explain change. NRC Framework Link

Heredity: Inheritance and Variation of Traits (LS3)		
3-LS3-1. Analyze and interpret data to provide evidence that plants and animals have inherited traits that vary within a group of similar organisms. ***Clarification Statement:*** *Similarities and differences in shared traits form patterns among parents, siblings, and offspring.* ***State Assessment Boundary:*** *Assessment does not include genetic mechanisms of inheritance and prediction of traits. Assessment is limited to non-human examples.*		
Science and Engineering Practices	**Disciplinary Core Ideas**	**Crosscutting Concepts**
Analyzing and Interpreting Data Analyzing data in 3-5 builds on K-2 experiences and progresses to introducing quantitative approaches to collecting data and conducting multiple trials of qualitative observations. When possible and feasible, digital tools should be used. Analyze and interpret data to make sense of phenomena using logical reasoning. NRC Framework Link	**LS3.A: Inheritance of Traits** Many characteristics of organisms are inherited from their parents. NRC Framework Link **LS3.B: Variation of Traits** Different organisms vary in how they look and function because they have different inherited information. NRC Framework Link	**Patterns** Similarities and differences in patterns can be used to sort and classify natural phenomena. NRC Framework Link

Heredity: Inheritance and Variation of Traits (LS3)		
3-LS3-2. Use evidence to support the explanation that traits can be influenced by the environment. ***Clarification Statement:*** *Examples could include stunted growth in plants due to insufficient resources or obesity in animals that eat too much and get little exercise.* ***State Assessment Boundary:*** *Assessment is limited to non-human examples.*		
Science and Engineering Practices	**Disciplinary Core Ideas**	**Crosscutting Concepts**
Constructing Explanations and Designing Solutions Constructing explanations and designing solutions in 3-5 builds on K-2 experiences and progresses to the use of evidence in constructing explanations that specify variables that describe and predict phenomena and in designing multiple solutions to design problems. Use evidence (e.g., observations, patterns) to support an explanation. NRC Framework Link	**LS3.A: Inheritance of Traits** Some characteristics result from individuals' interactions with the environment, which can range from diet to learning. Many characteristics involve both inheritance and environment. NRC Framework Link **LS3.B: Variation of Traits** The environment affects the traits that an organism develops. NRC Framework Link	**Cause and Effect** Cause-and-effect relationships are routinely identified and used to explain change. NRC Framework Link

Biological Evolution: Unity and Diversity (LS4)		
3-LS4-1. Analyze and interpret data from fossils to provide evidence of organisms and the environments in which they lived long ago. ***Clarification Statement:*** *Examples could include marine fossils found on dry land and tropical plant fossils found in cold regions.* ***State Assessment Boundary:*** *Assessment does not include identification of specific fossils or fossils of organisms still in existence. Assessment is limited to major fossil types and relative ages.*		
Science and Engineering Practices	**Disciplinary Core Ideas**	**Crosscutting Concepts**
Analyzing and Interpreting Data Analyzing data in 3-5 builds on K-2 experiences and progresses to introducing quantitative approaches to collecting data and conducting multiple trials of qualitative observations. When possible and feasible, digital tools should be used. Analyze and interpret data to make sense of phenomena using logical reasoning. NRC Framework Link	**LS4.A: Evidence of Common Ancestry and Diversity** Some kinds of plants and animals that once lived on Earth are no longer found anywhere. Fossils provide evidence about the types of organisms that lived long ago and also about the nature of their environments. NRC Framework Link	**Scale, Proportion, and Quantity** Observable phenomena exist from very short to very long time periods. NRC Framework Link

Biological Evolution: Unity and Diversity (LS4)		
3-LS4-2. Use evidence to construct an explanation for how the variations in traits among individuals of the same species may provide advantages in surviving and producing offspring. ***Clarification Statement:*** *Examples could include plants that have larger thorns than other plants may be less likely to be eaten, or animals that have better camouflage may be more likely to survive and produce offspring.*		
Science and Engineering Practices	**Disciplinary Core Ideas**	**Crosscutting Concepts**
Constructing Explanations and Designing Solutions Constructing explanations and designing solutions in 3-5 builds on K-2 experiences and progresses to the use of evidence in constructing explanations that specify variables that describe and predict phenomena and in designing multiple solutions to design problems. Use evidence (e.g., observations, patterns) to construct an explanation. NRC Framework Link	**LS4.B: Natural Selection** Sometimes the differences in characteristics between individuals of the same species provide advantages in surviving, finding mates, and reproducing. NRC Framework Link	**Cause and Effect** Cause-and-effect relationships are routinely identified and used to explain change. NRC Framework Link

Biological Evolution: Unity and Diversity (LS4)		
3-LS4-3. Construct an argument with evidence that in a particular habitat some organisms can thrive, struggle to survive, or fail to survive. ***Clarification Statement:*** *Examples could include needs and characteristics of the organisms and habitats involved. Changes in a habitat are sometimes beneficial, sometimes neutral, or sometimes harmful to an organism.*		
Science and Engineering Practices	**Disciplinary Core Ideas**	**Crosscutting Concepts**
Engaging in Argument from Evidence Engaging in argument from evidence in 3-5 builds on K-2 experiences and progresses to critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed world(s). Construct an argument with evidence. NRC Framework Link	**LS4.C: Adaptation** Adaptation can lead to organisms that are better suited for their environment. For any particular environment, some kinds of organisms survive well, some survive less well, and some cannot survive at all. NRC Framework Link	**Cause and Effect** Cause-and-effect relationships are routinely identified and used to explain change. NRC Framework Link

Biological Evolution: Unity and Diversity (LS4)

3-LS4-4. Make a claim about the effectiveness of a solution to a problem caused when the environment changes and affects organisms living there.

Clarification Statement: *Examples could include changes within a system such as land characteristics, water distribution, temperature, food, and other organisms.*
State Assessment Boundary: *Assessment is limited to a single environmental change. Assessment does not include the greenhouse effect or climate change.*

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Engaging in Argument from Evidence Engaging in argument from evidence in 3-5 builds on K-2 experiences and progresses to critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed world(s). Make a claim about the merit of a solution to a problem by citing relevant evidence about how it meets the criteria and constraints of the problem. NRC Framework Link	**LS2.C: Ecosystem Dynamics, Functioning, and Resilience** When the environment changes in ways that affect a place's physical characteristics, temperature, or availability of resources, some organisms survive and reproduce, others move to new locations, yet others move into the transformed environment, and some die. *(secondary)* NRC Framework Link **LS4.D: Biodiversity and Humans** Populations live in a variety of habitats and change in those habitats affects the organisms living there. NRC Framework Link **ETS1.C: Optimizing the Design Solution** Different solutions need to be tested in order to determine which of them best solves the problem, given the criteria and the constraints. NRC Framework Link (continued on next page)	**Systems and System Models** A system can be described in terms of its components and their interactions. NRC Framework Link

	 **ETS2.A: Interdependence of Science, Engineering, and Technology** Knowledge of relevant scientific concepts and research findings is important in engineering. NRC Framework Link	

Earth's Systems (ESS2) 		
3-ESS2-1. Represent data in tables and graphical displays of typical weather conditions during a particular season to identify patterns and make predictions. ***Clarification Statement:*** *Examples could include making predictions about weather conditions based on average temperature, precipitation, and wind direction.* ***State Assessment Boundary:*** *Assessment of graphical displays is limited to pictographs and bar graphs. Assessment does not include climate change.*		
Science and Engineering Practices	**Disciplinary Core Ideas**	**Crosscutting Concepts**
Analyzing and Interpreting Data Analyzing data in 3-5 builds on K-2 experiences and progresses to introducing quantitative approaches to collecting data and conducting multiple trials of qualitative observations. When possible and feasible, digital tools should be used. Represent data in tables and various graphical displays (bar graphs and pictographs) to reveal patterns that indicate relationships. NRC Framework Link	**ESS2.D: Weather and Climate** Weather, which varies from day to day and seasonally throughout the year, is the condition of the atmosphere at a given place and time. Scientists record patterns of the weather across different times and areas so that they can make predictions about what kind of weather might happen next. NRC Framework Link	**Patterns** Patterns of change can be used to make predictions. NRC Framework Link

Earth's Systems (ESS2)		
3-ESS2-2. Obtain and combine information to describe climate patterns in different regions of the world.		
Science and Engineering Practices	**Disciplinary Core Ideas**	**Crosscutting Concepts**
Obtaining, Evaluating, and Communicating Information Obtaining, evaluating, and communicating information in 3-5 builds on K-2 experiences and progresses to evaluating the merit and accuracy of ideas and methods. Obtain and combine information from books and other reliable media to explain phenomena. NRC Framework Link	**ESS2.D: Weather and Climate** Climate describes a range of an area's typical weather conditions and the extent to which those conditions vary over years. NRC Framework Link	**Patterns** Similarities and differences in patterns can be used to sort and classify natural phenomena. NRC Framework Link

Earth and Human Activity (ESS3) 		
 **3-ESS3-1. Make a claim about the effectiveness of a design solution that reduces the impacts of a weather related hazard.** ***Clarification Statement:*** *Examples of design solutions could include barriers to prevent flooding, wind resistant roofs, and lighting rods.*		
Science and Engineering Practices	**Disciplinary Core Ideas**	**Crosscutting Concepts**
Engaging in Argument from Evidence Engaging in argument from evidence in 3-5 builds on K-2 experiences and progresses to critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed world(s). Make a claim about the merit of a solution to a problem by citing relevant evidence about how it meets the criteria and constraints of the problem. NRC Framework Link	**ESS3.B: Natural Hazards** A variety of natural hazards result from natural processes. Humans cannot eliminate natural hazards but can take steps to reduce their impacts. NRC Framework Link **ETS1.C: Optimizing the Design Solution** Different solutions need to be tested in order to determine which of them best solves the problem, given the criteria and the constraints. NRC Framework Link  **ETS2.B: Influence of Engineering, Technology, and Science on Society and the Natural World** Engineers improve existing technologies or develop new ones to increase their benefits (e.g., better artificial limbs), decrease known risks (e.g., seatbelts in cars), and meet societal demands (e.g., cell phones). NRC Framework Link	**Cause and Effect** Cause-and-effect relationships are routinely identified, tested, and used to explain change. NRC Framework Link

Fourth Grade

South Carolina fourth-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 fourth grade help students engage in inquiry questions such as, **but not limited to:**

What are waves and what are some things they can do?
Students use a model of waves to describe patterns of waves in terms of amplitude and wavelength, and that waves can cause objects to move.

What is energy and how is it related to motion?
Students use evidence to construct an explanation of the relationship between the speed of an object and the energy of that object.

What patterns of Earth's features can be determined with the use of maps?
Students analyze and interpret data from maps to describe patterns of Earth's features.

How can energy be used to solve a problem?
Students apply their understanding of energy to design, test, and refine a device that converts energy from one form to another.

How is energy transferred?
Students ask questions and make observations to develop an understanding that energy can be transferred from place to place by sound, light, heat, and electric currents or from object to object through collisions.

How can water, ice, wind and vegetation change the land?
Students develop an understanding of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation. They apply their knowledge of natural Earth processes to generate and compare multiple solutions to reduce the impacts of such processes on humans.

How do internal and external structures support the survival, growth, behavior, and reproduction of plants and animals? Students develop an understanding that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction. By developing a model, they describe that an object can be seen when light reflected from its surface enters the eye.

***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.**