

Grade 3 Learning Progression by Topic

Grade 3			
PHYSICAL SCIENCES	LIFE SCIENCES		EARTH and SPACE SCIENCES
Forces and Interactions	Interdependent Relationships in Ecosystems	Inheritance and Variation of Traits	Weather and Climate
3-PS2-1 AR	3-LS2-1 AR	3-LS1-1	3-ESS2-1
3-PS2-2	3-LS4-1	3-LS3-1	3-ESS2-2
3-PS2-3	3-LS4-3 AR	3-LS3-2	3-ESS3-1
3-PS2-4	3-LS4-4	3-LS4-2 AR	
ENGINEERING, TECHNOLOGY, and APPLICATIONS of SCIENCE Engineering Design 3-ETS1-1, 3-ETS1-2, 3-ETS1-3			

Arkansas Clarification Statement (**AR**)

Grade 3 Learning Progression by Disciplinary Core Idea

Grade 3						
PHYSICAL SCIENCES	LIFE SCIENCES				EARTH and SPACE SCIENCES	
Motion and Stability: Forces and Interactions	From Molecules to Organisms: Structures and Processes	Ecosystems: Interactions, Energy, and Dynamics	Heredity: Inheritance and Variation of Traits	Biological Evolution: Unity and Diversity	Earth's Systems	Earth and Human Activity
3-PS2-1 AR	3-LS1-1	3-LS2-1 AR	3-LS3-1	3-LS4-1	3-ESS2-1	3-ESS3-1
3-PS2-2			3-LS3-2	3-LS4-2 AR	3-ESS2-2	
3-PS2-3				3-LS4-3 AR		
3-PS2-4				3-LS4-4		
ENGINEERING, TECHNOLOGY, and APPLICATIONS of SCIENCE Engineering Design 3-ETS1-1, 3-ETS1-2, 3-ETS1-3						

Arkansas Clarification Statement (**AR**)

Third Grade Standards Overview

The Arkansas K-12 Science Standards are based on *A Framework for K-12 Science Education* (NRC 2012) and are meant to reflect a new vision for science education. The following conceptual shifts reflect what is new about these science standards. The Arkansas K-12 Science Standards

- reflect science as it is practiced and experienced in the real world,
- build logically from Kindergarten through Grade 12,
- focus on deeper understanding as well as application of content,
- integrate practices, crosscutting concepts, and core ideas, and
- make explicit connections to literacy and math.

Science and Engineering Practices

Students are expected to demonstrate grade-appropriate proficiency in

- asking questions and defining problems,
- developing and using models,
- planning and carrying out investigations,
- analyzing and interpreting data,
- constructing explanations and designing solutions,
- engaging in argument from evidence, and
- obtaining, evaluating, and communicating information.

Students are expected to use these science and engineering practices to demonstrate understanding of the disciplinary core ideas.

Crosscutting Concepts

Students are expected to demonstrate grade-appropriate understanding of

- patterns,
- cause and effect,
- scale, proportion, and quantity,
- systems and system models,
- interdependence of science, engineering, and technology, and
- influence of engineering, technology, and science on society and the natural world are called out as organizing concepts for the disciplinary core ideas.

Disciplinary Core Ideas

Students are expected to continually build on and revise their knowledge of

- PS2- Motion and Stability: Forces and Interactions,
- LS1- Molecules to Organisms: Structures and Processes,
- LS2- Ecosystem: Interactions, Energy, and Dynamics,
- LS3- Heredity: Inheritance and Variation of Traits,
- LS4- Biological Evolution: Unity and Diversity,
- ESS2- Earth's Systems,
- ESS3- Earth and Human Activity, and
- ETS1- Engineering Design in a 3-5 developmental learning progression.

Physical Sciences (PS)

The PS performance expectations in third grade help students formulate answers to the questions, “How do equal and unequal forces on an object affect the object?” and “How can magnets be used?” Students determine the effects of balanced and unbalanced forces on the motion of an object and the cause and effect relationships of electric or magnetic interactions between two objects not in contact with each other. Students are then able to apply their understanding of magnetic interactions to define a simple design problem that can be solved with magnets.

Life Sciences (LS)

The LS performance expectations in third grade help students explore the questions, “How do organisms vary in their traits?”, “How are plants, animals, and environments of the past similar or different from current plants, animals, and environments?”, and “What happens to organisms when their environment changes?” Third graders are expected 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. Students develop an understanding of the similarities and differences of organisms’ life cycles. Students at this level acquire an understanding that organisms have different inherited traits, and that the environment can also affect the traits that an organism develops. 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. Students are expected to develop an understanding of types of organisms that lived long ago and also about the nature of their environments.

Earth and Space Sciences (ESS)

The ESS performance expectations in third grade help students investigate the questions, “What is typical weather in different parts of the world and during different times of the year?” and “How can the impact of weather-related hazards be reduced?” Students organize and use data to describe typical weather conditions expected during a particular season. By applying their understanding of weather-related hazards, students make a claim about the merit of a design solution that reduces the impacts of such hazards.

Engineering, Technology, and Applications of Science (ETS)

Engineering design performance expectations in the earliest grades introduce students to “problems” as situations that people want to change. With increased maturity students in third through fifth grade are able to develop these capabilities in various scientific contexts. The engineering design process involves three stages:

- **Defining and delimiting engineering problems** involves stating the problem to be solved as clearly as possible in terms of criteria for success, and constraints or limits. In this grade range the additional step of specifying criteria and constraints.
- **Designing solutions to engineering problems** begins with generating a number of different possible solutions, and then evaluating potential solutions to see which ones best meet the criteria and constraints of the problem. In this grade range students generate several alternative solutions and compare them systematically to see which best meet the criteria and constraints of the problem.
- **Optimizing the engineering design** involves a process in which solutions are systematically tested and refined and the final design is improved by trading off less important features for those that are more important. In this grade range students build and test models or prototypes using controlled experiments in which only one variable is changed from trial to trial while all other variables are kept the same.

In the third grade students are beginning to develop the ability to achieve all three performance expectations (3-ETS1-1, 3-ETS1-2, 3-ETS1-3) related to a single problem in order to understand the interrelated processes of engineering design. Students can use tools and materials to solve simple problems, use visual or physical representations to convey solutions, and compare different solutions to a problem, test them, and determine which is best. These component ideas do not always follow in order. At any stage, a problem-solver can redefine the problem or generate new solutions to replace an idea that is not working.

GRADE THREE

Forces and Interactions

Students who demonstrate understanding can:

- 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.** [AR Clarification Statement: Examples could include an unbalanced force on one side of a box can make it start moving or balanced forces pushing on a box from both sides will not produce any motion at all.] [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.]
- 3-PS2-2 Make observations and/or 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 child swinging in a swing, a ball rolling back and forth in a bowl, and two children on a see-saw.] [Assessment Boundary: Assessment does not include technical terms such as period and frequency.]
- 3-PS2-3 Ask questions to determine cause and effect relationships of electric or magnetic interactions between two objects not in contact with each other.** [Clarification Statement: Examples of an electric force could include the force on hair from an electrically charged balloon or the electrical forces between a charged rod and pieces of paper; examples of a magnetic force could include the force between two permanent magnets, the force between an electromagnet and steel paperclips, and the force exerted by one magnet versus the force exerted by two magnets. Examples of cause and effect relationships could include how the distance between objects affects strength of the force or how the orientation of magnets affects the direction of the magnetic force.] [Assessment Boundary: Assessment is limited to forces produced by objects that can be manipulated by students, and electrical interactions are limited to static electricity.]
- 3-PS2-4 Define a simple design problem that can be solved by applying scientific ideas about magnets.*** [Clarification Statement: Examples of problems could include constructing a latch to keep a door shut and creating a device to keep two moving objects from touching each other.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
<p>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.</p> <ul style="list-style-type: none"> Ask questions that can be investigated based on patterns such as cause and effect relationships. (3-PS2-3) Define a simple problem that can be solved through the development of a new or improved object or tool. (3-PS2-4) <p>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.</p> <ul style="list-style-type: none"> 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. (3-PS2-1) 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. 	<p>PS2.A: Forces and Motion</p> <ul style="list-style-type: none"> 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. (Boundary: Qualitative and conceptual, but not quantitative addition of forces are used at this level.) (3-PS2-1) 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. (Boundary: Technical terms, such as magnitude, velocity, momentum, and vector quantity, are not introduced at this level, but the concept that some quantities need both size and direction to be described is developed.) (3-PS2-2) 	<p>Patterns</p> <ul style="list-style-type: none"> Patterns of change can be used to make predictions. (3-PS2-2) <p>Cause and Effect</p> <ul style="list-style-type: none"> Cause and effect relationships are routinely identified. (3-PS2-1) Cause and effect relationships are routinely identified, tested, and used to explain change. (3-PS2-3)

<p>(3-PS2-2)</p> <hr/> <p>Connections to Nature of Science</p> <p>Science Knowledge is Based on Empirical Evidence</p> <ul style="list-style-type: none"> Science findings are based on recognizing patterns. (3-PS2-2) <p>Scientific Investigations Use a Variety of Methods</p> <ul style="list-style-type: none"> Science investigations use a variety of methods, tools, and techniques. (3-PS2-1) 	<p>PS2.B: Types of Interactions</p> <ul style="list-style-type: none"> Objects in contact exert forces on each other. (3-PS2-1) 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. (3-PS2-3, 3-PS2-4) 	<hr/> <p>Connections to Engineering, Technology, and Applications of Science</p> <p>Interdependence of Science, Engineering, and Technology</p> <ul style="list-style-type: none"> Scientific discoveries about the natural world can often lead to new and improved technologies, which are developed through the engineering design process. (3-PS2-4)
<p><i>Connections to other DCIs in third grade: N/A</i></p>		
<p><i>Connections to other DCIs across grade levels: K.PS2.A (3-PS2-1); K.PS2.B (3-PS2-1); K.PS3.C (3-PS2-1); K-2.ETS1.A (3-PS2-4); 1.ESS1.A (3-PS2-2); 4.PS4.A (3-PS2-2); 3-5.ETS1.A (3-PS2-4); 5.PS2.B (3-PS2-1); 7.ESS2.C (3-PS2-1); 8.PS2.A (3-PS2-1, 3-PS2-2); 8.PS2.B (3-PS2-3, 3-PS2-4); 8.ESS1.B (3-PS2-1, 3-PS2-2)</i></p>		
<p><i>Connections to the Arkansas English Language Arts Standards –</i></p> <p>RI.3.1 Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers. (3-PS2-1, 3-PS2-3)</p> <p>RI.3.3 Describe the relationship between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect. (3-PS2-3)</p> <p>RI.3.8 Describe the logical connection between particular sentences and paragraphs in a text (e.g., comparison, cause/effect, first/second/third in a sequence). (3-PS2-3)</p> <p>W.3.7 Conduct short research projects that build knowledge about a topic. (3-PS2-1, 3-PS2-2)</p> <p>W.3.8 Recall information from experiences or gather information from print and digital sources. Take brief notes on sources. Sort evidence into provided categories. (3-PS2-1, 3-PS2-2)</p> <p>SL.3.3 Ask and answer questions about information from a speaker in order to clarify comprehension, offering appropriate elaboration and detail. (3-PS2-3)</p> <p><i>Connections to the Arkansas Mathematics Standards –</i></p> <p>MP.2 Reason abstractly and quantitatively. (3-PS2-1)</p> <p>MP.5 Use appropriate tools strategically. (3-PS2-1)</p> <p>3.MD.A.2 Measure and estimate liquid volumes and masses of objects using standard units such as: grams (g), kilograms (kg), and liters (l); gallons (gal), quarts (qt), pints (pt), and cups (c). Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units (e.g., by using drawings (such as a beaker with a measurement scale) to represent the problem. (3-PS2-1)</p>		

GRADE THREE

Interdependent Relationships in Ecosystems

Students who demonstrate understanding can:

- 3-LS2-1 Construct an argument that some animals form groups that help members survive.** [AR Clarification Statement: Examples could include ant colonies, herds of bison, or hives of bees.]
- 3-LS4-1 Analyze and interpret data from fossils to provide evidence of the organisms and the environments in which they lived long ago.** [Clarification Statement: Examples of data could include type, size, and distributions of fossilized organisms. Examples of fossils and environments could include marine fossils found on dry land, tropical plant fossils found in Arctic areas, and fossils of extinct organisms.] [Assessment Boundary: Assessment does not include identification of specific fossils or living plants and animals. Assessment is limited to major fossil types and relative ages.]
- 3-LS4-3 Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all.** [AR Clarification Statement: Examples of evidence could include needs and characteristics of the organisms and habitats involved. The organisms and their habitat make up a system in which the parts depend on each other for survival.]
- 3-LS4-4 Make a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change.*** [Clarification Statement: Examples of environmental changes could include changes in land characteristics, water distribution, temperature, food, and other organisms.] [Assessment Boundary: Assessment is limited to a single environmental change. Assessment does not include the greenhouse effect or climate change.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices

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. (3-LS4-1)

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 worlds.

- Construct an argument with evidence, data, and/or a model. (3-LS2-1)
- Construct an argument with evidence. (3-LS4-3)
- 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. (3-LS4-4)

Disciplinary Core Ideas

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. (3-LS4-4)

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. (3-LS2-1)

LS4.A: Evidence of Common Ancestry and Diversity

- Some kinds of plants and animals that once lived on Earth are no longer found anywhere. (3-LS4-1)
- Fossils provide evidence about the types of organisms that lived long ago and also about the nature of their environments. (3-LS4-1)

LS4.C: Adaptation

- For any particular environment, some kinds of organisms survive well, some survive less well, and some cannot survive at all. (3-LS4-3)

Crosscutting Concepts

Cause and Effect

- Cause and effect relationships are routinely identified and used to explain change. (3-LS2-1, 3-LS4-3)

Scale, Proportion, and Quantity

- Observable phenomena exist from very short to very long time periods. (3-LS4-1)

Systems and System Models

- A system can be described in terms of its components and their interactions. (3-LS4-4)

Connections to Engineering, Technology, and Applications of Science

Interdependence of Science, Engineering, and Technology

- Knowledge of relevant scientific concepts and research findings is important in engineering. (3-LS4-4)

	<p>LS4.D: Biodiversity and Humans</p> <ul style="list-style-type: none"> Populations live in a variety of habitats, and change in those habitats affects the organisms living there. (3-LS4-4) 	<p style="text-align: center;">Connections to Nature of Science</p> <p>Scientific Knowledge Assumes an Order and Consistency in Natural Systems</p> <ul style="list-style-type: none"> Science assumes consistent patterns in natural systems. (3-LS4-1)
<p><i>Connections to other DCIs in third grade:</i> 3.ESS2.D (3-LS4-3); 3.ESS3.B (3-LS4-4)</p>		
<p><i>Connections to other DCIs across grade levels:</i> K.ESS3.A (3-LS4-3, 3-LS4-4); K-2.ETS1.A (3-LS4-4); 1.LS1.B (3-LS2-1); 2.LS2.A (3-LS4-3, 3-LS4-4); 2.LS4.D (3-LS4-3, 3-LS4-4); 4.ESS1.C (3-LS4-1); 4.ESS3.B (3-LS4-4); 3-5.ETS1.A (3-LS4-4); 6.ESS3.C (3-LS4-4); 7.LS2.A (3-LS2-1, 3-LS4-1, 3-LS4-3, 3-LS4-4); 7.LS2.C (3-LS4-4); 7.ESS2.B (3-LS4-1); 8.LS4.A (3-LS4-1); 8.LS4.B (3-LS4-3); 8.LS4.C (3-LS4-3, 3-LS4-4); 8.ESS1.C (3-LS4-1, 3-LS4-3, 3-LS4-4)</p>		
<p><i>Connections to the Arkansas English Language Arts Standards –</i></p> <p>RI.3.1 Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers. (3-LS2-1, 3-LS4-1, 3-LS4-3, 3-LS4-4)</p> <p>RI.3.2 Determine the main idea of a text; recount the key details and explain how they support the main idea. (3-LS4-1, 3-LS4-3, 3-LS4-4)</p> <p>RI.3.3 Describe the relationship between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect. (3-LS2-1, 3-LS4-1, 3-LS4-3, 3-LS4-4)</p> <p>W.3.1 Write opinion pieces on topics or texts, supporting the opinion with reasons. (3-LS2-1, 3-LS4-1, 3-LS4-3, 3-LS4-4)</p> <p>W.3.2 Write informative/explanatory texts to examine a topic and convey ideas and information clearly. (3-LS4-1, 3-LS4-3, 3-LS4-4)</p> <p>W.3.8 Recall information from experiences or gather information from print and digital sources. Take brief notes on sources. Sort evidence into provided categories. (3-LS4-1)</p> <p>SL.3.4 Report on a topic or text, tell a story, or recount an experience with appropriate facts and relevant, descriptive details, speaking clearly at an understandable pace. (3-LS4-3, 3-LS4-4)</p>		
<p><i>Connections to the Arkansas Mathematics Standards –</i></p> <p>MP.2 Reason abstractly and quantitatively. (3-LS4-1, 3-LS4-3, 3-LS4-4)</p> <p>MP.4 Model with mathematics. (3-LS2-1, 3-LS4-1, 3-LS4-3, 3-LS4-4)</p> <p>MP.5 Use appropriate tools strategically. (3-LS4-1)</p> <p>3.NBT Number and Operations in Base Ten (3-LS2-1)</p> <p>3.MD.B.3 Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step “how many more” and “how many less” problems using information presented in scaled picture graphs and scaled bar graphs. (3-LS4-3)</p> <p>3.MD.B.4 Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units—whole numbers, halves, or quarters. (3-LS4-1)</p>		

GRADE THREE

Inheritance and Variation of Traits: Life Cycles and Traits

Students who demonstrate understanding can:

- 3-LS1-1** **Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death.** [Clarification Statement: Changes organisms go through during their life form a pattern.] [Assessment Boundary: Assessment of plant life cycles is limited to those of flowering plants. Assessment does not include details of human reproduction.]
- 3-LS3-1** **Analyze and interpret data to provide evidence that plants and animals have traits inherited from parents and that variation of these traits exists in a group of similar organisms.** [Clarification Statement: Patterns are the similarities and differences in traits shared between offspring and their parents, or among siblings. Emphasis is on organisms other than humans.] [Assessment Boundary: Assessment does not include genetic mechanisms of inheritance and prediction of traits. Assessment is limited to non-human examples.]
- 3-LS3-2** **Use evidence to support the explanation that traits can be influenced by the environment.** [Clarification Statement: Examples of the environment affecting a trait could include insufficient water stunting normally tall plants ; and, a pet dog becoming overweight that is given too much food and too little exercise.]
- 3-LS4-2** **Use evidence to construct an explanation for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing.** [AR Clarification Statement: Examples of cause and effect relationships could be plants of the same species with larger thorns may be less likely to be eaten; and, animals of the same species with more effective camouflage or coloration may be more likely to survive and produce offspring.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
<p>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.</p> <ul style="list-style-type: none"> ▪ Develop models to describe phenomena. (3-LS1-1) <p>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.</p> <ul style="list-style-type: none"> ▪ Analyze and interpret data to make sense of phenomena using logical reasoning. (3-LS3-1) <p>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.</p> <ul style="list-style-type: none"> ▪ Use evidence (e.g., observations, patterns) to support an explanation. (3-LS3-2) ▪ Use evidence (e.g., observations, patterns) to construct an explanation. (3-LS4-2) 	<p>LS1.B: Growth and Development of Organisms</p> <ul style="list-style-type: none"> ▪ Reproduction is essential to the continued existence of every kind of organism. Plants and animals have unique and diverse life cycles. (3-LS1-1) <p>LS3.A: Inheritance of Traits</p> <ul style="list-style-type: none"> ▪ Many characteristics of organisms are inherited from their parents. (3-LS3-1) ▪ Other characteristics result from individuals’ interactions with the environment, which can range from diet to learning. Many characteristics involve both inheritance and environment. (3-LS3-2) <p>LS3.B: Variation of Traits</p> <ul style="list-style-type: none"> ▪ Different organisms vary in how they look and function because they have different inherited information. (3-LS3-1) ▪ The environment also affects the traits that an organism develops. (3-LS3-2) <p>LS4.B: Natural Selection</p> <ul style="list-style-type: none"> ▪ Sometimes the differences in characteristics between individuals of the same species provide advantages in surviving, finding mates, and reproducing. (3-LS4-2) 	<p>Patterns</p> <ul style="list-style-type: none"> ▪ Similarities and differences in patterns can be used to sort and classify natural phenomena. (3-LS3-1) ▪ Patterns of change can be used to make predictions. (3-LS1-1) <p>Cause and Effect</p> <ul style="list-style-type: none"> ▪ Cause and effect relationships are routinely identified and used to explain change. (3-LS3-2, 3-LS4-2)

<p style="text-align: center;">-----</p> <p style="text-align: center;">Connections to Nature of Science</p> <p>Scientific Knowledge is Based on Empirical Evidence</p> <ul style="list-style-type: none"> ▪ Science findings are based on recognizing patterns. (3-LS1-1) 		
<p><i>Connections to other DCIs in third grade:</i> 3.LS4.C (3-LS4-2)</p>		
<p><i>Connections to other DCIs across grade levels:</i> 1.LS3.A (3-LS3-1, 3-LS4-2); 1.LS3.B (3-LS3-1); 6.LS1.B (3-LS1-1, 3-LS3-2); 6.LS3.B (3-LS3-1, 3-LS4-2); 7.LS2.A (3-LS4-2); 8.LS3.A (3-LS3-1); 8.LS4.B (3-LS4-2)</p>		
<p><i>Connections to the Arkansas English Language Arts Standards –</i></p> <p>RI.3.1 Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers. (3-LS3-1, 3-LS3-2, 3-LS4-2)</p> <p>RI.3.2 Determine the main idea of a text; recount the key details and explain how they support the main idea. (3-LS3-1, 3-LS3-2, 3-LS4-2)</p> <p>RI.3.3 Describe the relationship between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect. (3-LS3-1, 3-LS3-2, 3-LS4-2)</p> <p>RI.3.7 Use information gained from illustrations (e.g., maps, photographs) and the words in a text to demonstrate understanding of the text (e.g., where, when, why, and how key events occur). (3-LS1-1)</p> <p>W.3.2 Write informative/explanatory texts to examine a topic and convey ideas and information clearly. (3-LS3-1, 3-LS3-2, 3-LS4-2)</p> <p>SL.3.4 Report on a topic or text, tell a story, or recount an experience with appropriate facts and relevant, descriptive details, speaking clearly at an understandable pace. (3-LS3-1, 3-LS3-2, 3-LS4-2)</p> <p>SL.3.5 Create engaging audio recordings of stories or poems that demonstrate fluid reading at an understandable pace; add visual displays when appropriate to emphasize or enhance certain facts or details. (3-LS1-1)</p> <p><i>Connections to the Arkansas Mathematics Standards –</i></p> <p>MP.2 Reason abstractly and quantitatively. (3-LS3-1, 3-LS3-2, 3-LS4-2)</p> <p>MP.4 Model with mathematics. (3-LS1-1, 3-LS3-1, 3-LS3-2, 3-LS4-2)</p> <p>3.NBT Number and Operations in Base Ten (3-LS1-1)</p> <p>3.NF Number and Operations—Fractions (3-LS1-1)</p> <p>3.MD.B.3 Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step “how many more” and “how many less” problems using information presented in scaled picture graphs and scaled bar graphs. (3-LS4-2)</p> <p>3.MD.B.4 Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units—whole numbers, halves, or quarters. (3-LS3-1, 3-LS3-2)</p>		

GRADE THREE

Weather and Climate

Students who demonstrate understanding can:

- 3-ESS2-1** Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season. [Clarification Statement: Examples of data could include average temperature, precipitation, and wind direction.] [Assessment Boundary: Assessment of graphical displays is limited to pictographs and bar graphs. Assessment does not include climate change.]
- 3-ESS2-2** Obtain and combine information to describe climates in different regions of the world.
- 3-ESS3-1** Make a claim about the merit of a design solution that reduces the impacts of a weather-related hazard.* [Clarification Statement: Examples of design solutions to weather-related hazards could include barriers to prevent flooding, wind resistant roofs, and lightning rods.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices

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. (3-ESS2-1)

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. (3-ESS3-1)

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. (3-ESS2-2)

Disciplinary Core Ideas

ESS2.D: Weather and Climate

- 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. (3-ESS2-1)
- Climate describes a range of an area's typical weather conditions and the extent to which those conditions vary over years. (3-ESS2-2)

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. (3-ESS3-1)

Crosscutting Concepts

Patterns

- Patterns of change can be used to make predictions. (3-ESS2-1, 3-ESS2-2)

Cause and Effect

- Cause and effect relationships are routinely identified, tested, and used to explain change. (3-ESS3-1)

Connections to Engineering, Technology, and Applications of Science

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). (3-ESS3-1)

Connections to Nature of Science

Science is a Human Endeavor

- Science affects everyday life. (3-ESS3-1)

Connections to other DCIs in third grade: N/A

Connections to other DCIs across grade levels: **K.ESS2.D** (3-ESS2-1); **K.ESS3.B** (3-ESS3-1); **K-2.ETS1.A** (3-ESS3-1); **4.ESS2.A** (3-ESS2-1); **4.ESS3.B** (3-ESS3-1); **3-5.ETS1.A** (3-ESS3-1); **5.ESS2.A** (3-ESS2-1); **6.ESS2.D** (3-ESS2-1, 3-ESS2-2); **7.ESS2.C** (3-ESS2-1, 3-ESS2-2); **7.ESS3.B** (3-ESS3-1)

Connections to the Arkansas English Language Arts Standards –

- RI.3.1** Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers. (3-ESS2-2)
- RI.3.9 Compare and contrast the most important points and key details presented in two texts on the same topic. (3-ESS2-2)
- W.3.1 Write opinion pieces on topics or texts, supporting the opinion with reasons. (3-ESS3-1)
- W.3.7 Conduct short research projects that build knowledge about a topic. (3-ESS3-1)
- W.3.8 Recall information from experiences or gather information from print and digital sources. Take brief notes on sources. Sort evidence into provided categories. (3-ESS2-2)

Connections to the Arkansas Mathematics Standards –

- MP.2** Reason abstractly and quantitatively. (3-ESS2-1, 3-ESS2-2, 3-ESS3-1)
- MP.4** Model with mathematics. (3-ESS2-1, 3-ESS2-2, 3-ESS3-1)
- MP.5** Use appropriate tools strategically. (3-ESS2-1)
- 3.MD.A.2** Measure and estimate liquid volumes and masses of objects using standard units such as: grams (g), kilograms (kg), and liters (l); gallons (gal), quarts (qt), pints (pt), and cups (c). Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units (e.g., by using drawings (such as a beaker with a measurement scale) to represent the problem. (3-ESS2-1)
- 3.MD.B.3** Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step “how many more” and “how many less” problems using information presented in scaled picture graphs and scaled bar graphs. (3-ESS2-1)

GRADE THREE

Engineering, Technology, and Applications of Science		
<p>Students who demonstrate understanding can:</p> <p>3-ETS1-1 Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.</p> <p>3-ETS1-2 Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.</p> <p>3-ETS1-3 Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.</p>		
<p>The performance expectations above were developed using the following elements from the NRC document <i>A Framework for K-12 Science Education</i>:</p>		
Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
<p>Asking Questions and Defining Problems</p> <p>Asking questions and defining problems in 3–5 builds on grades K–2 experiences and progresses to specifying qualitative relationships.</p> <ul style="list-style-type: none"> Define a simple design problem that can be solved through the development of an object, tool, process, or system and includes several criteria for success and constraints on materials, time, or cost. (3-ETS1-1) <p>Planning and Carrying Out Investigations</p> <p>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.</p> <ul style="list-style-type: none"> 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. (3-ETS1-3) <p>Constructing Explanations and Designing Solutions</p> <p>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.</p> <ul style="list-style-type: none"> Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design problem. (3-ETS1-2) 	<p>ETS1.A: Defining and Delimiting Engineering Problems</p> <ul style="list-style-type: none"> Possible solutions to a problem are limited by available materials and resources (constraints). The success of a designed solution is determined by considering the desired features of a solution (criteria). Different proposals for solutions can be compared on the basis of how well each one meets the specified criteria for success or how well each takes the constraints into account. (3-ETS1-1) <p>ETS1.B: Developing Possible Solutions</p> <ul style="list-style-type: none"> Research on a problem should be carried out before beginning to design a solution. Testing a solution involves investigating how well it performs under a range of likely conditions. (3-ETS1-2) At whatever stage, communicating with peers about proposed solutions is an important part of the design process, and shared ideas can lead to improved designs. (3-ETS1-2) Tests are often designed to identify failure points or difficulties, which suggest the elements of the design that need to be improved. (3-ETS1-3) <p>ETS1.C: Optimizing the Design Solution</p> <ul style="list-style-type: none"> Different solutions need to be tested in order to determine which of them best solves the problem, given the criteria and the constraints. (3-ETS1-3) 	<p>Influence of Science, Engineering, and Technology on Society and the Natural World</p> <ul style="list-style-type: none"> People’s needs and wants change over time, as do their demands for new and improved technologies. (3-ETS1-1) Engineers improve existing technologies or develop new ones to increase their benefits, decrease known risks, and meet societal demands. (3-ETS1-2)

Connections to 3-5-ETS1.A: Defining and Delimiting Engineering Problems include: Fourth Grade: (4-PS3-4)
Connections to 3-5-ETS1.B: Designing Solutions to Engineering Problems include: Fourth Grade: (4-ESS3-2)
Connections to 3-5-ETS1.C: Optimizing the Design Solution include: Fourth Grade: (4-PS4-3)

Connections to other DCIs across grade levels: K-2.ETS1.A (3-ETS1-1, 3-ETS1-2, 3-ETS1-3); K-2.ETS1.B (3-ETS1-2); K-2.ETS1.C (3-ETS1-2, 3-ETS1-3); 6-8.ETS1.A (3-ETS1-1); 6-8.ETS1.B (3-ETS1-1, 3-ETS1-2, 3-ETS1-3); 6-8.ETS1.C (3-ETS1-2, 3-ETS1-3)

Connections to the Arkansas English Language Arts Standards –

- RI.3.1** Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers. (3-ETS1-2)
- RI.3.7 Use information gained from illustrations (e.g., maps, photographs) and the words in a text to demonstrate understanding of the text (e.g., where, when, why, and how key events occur). (3-ETS1-2)
- RI.3.9 Compare and contrast the most important points and key details presented in two texts on the same topic. (3-ETS1-2)
- W.3.7 Conduct short research projects that build knowledge about a topic. (3-ETS1-1, 3-ETS1-3)
- W.3.8** Recall information from experiences or gather information from print and digital sources. Take brief notes on sources. Sort evidence into provided categories. (3-ETS1-1, 3-ETS1-3)

Connections to the Arkansas Mathematics Standards –

- MP.2** Reason abstractly and quantitatively. (3-ETS1-1, 3-ETS1-2, 3-ETS1-3)
- MP.4** Model with mathematics. (3-ETS1-1, 3-ETS1-2, 3-ETS1-3)
- MP.5** Use appropriate tools strategically. (3-ETS1-1, 3-ETS1-2, 3-ETS1-3)
- 3-5.OA** Operations and Algebraic Thinking (3-ETS1-1, 3-ETS1-2)