Louisiana Student Standards for Science

Grade K-PS2

Motion and Stability: Forces and Interactions

Performance Expectation K-PS2-1

Students who demonstrate understanding can:

Plan and conduct an investigation to compare the effects of different strengths or different directions of pushes and pulls on the motion of an object.

Clarification Statement: Examples of pushes or pulls could include a string attached to an object being pulled, a person pushing an object, a person stopping a rolling ball, or two objects colliding and pushing on each other. Content includes contact forces with different relative strengths or different directions, but not both at the same time.

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Asking questions and defining problems **Planning and carrying out investigations** **Analyzing and interpreting data** **Using mathematics and computational thinking** **Constructing explanations and designing solutions** **Obtaining, evaluating, and communicating information**	**Force and Motion** Pushes and pulls can have different strengths and directions. (LE.PS2A.a) Pushing or pulling on an object can change the speed or direction of its motion and can start or stop it. (LE.PS2A.b) **Types of Interactions** When objects touch or collide, they push on one another and can change motion. (LE.PS2B.a) **Relationship Between Energy and Forces** A bigger push or pull makes things speed up or slow down more quickly. (LE.PS3C.a)	**Cause and Effect** Simple tests can be designed to gather evidence to support or refute student ideas about causes.

FOSS® NEXT GENERATION™ REFERENCES

The following **FOSS Next Generation** elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below.

Materials and Motion Investigations Guide:
Investigation 4, Parts 1-4

Materials and Motion *Science Resources* Book:
"*Pushes and Pulls*"
"*Collisions*"

Louisiana Student Standards for Science

Grade K-PS2

Motion and Stability: Forces and Interactions

Performance Expectation K-PS2-2

Students who demonstrate understanding can:

Analyze data to determine if a design solution works as intended to change the speed or direction of an object with a push or a pull.

Clarification Statement: Examples of problems requiring a solution could include having a marble or other object move a certain distance, follow a particular path, or knock down other objects. Examples of solutions could include tools such as a ramp to increase the speed of the object, a structure that would cause an object such as a marble or ball to turn or using a rope or string to pull an object. Content does not include friction as a mechanism for change in speed.

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Asking questions and defining problems **Planning and carrying out Investigations** **Analyzing and interpreting data** **Using mathematics and computational thinking** **Constructing explanations and designing solutions** **Obtaining, evaluating, and communicating information**	**Force and Motion** Pushes and pulls can have different strengths and directions. (LE.PS2A.a) Pushing or pulling on an object can change the speed or direction of its motion and can start or stop it. (LE.PS2A.b) **Types of Interactions** When objects touch or collide, they push on one another and can change motion. (LE.PS2B.a) **Relationship Between Energy and Forces** A bigger push or pull makes things speed up or slow down more quickly. (LE.PS3C.a)	**Cause and Effect** Simple tests can be designed to gather evidence to support or refute student ideas about causes.

FOSS® NEXT GENERATION™ REFERENCES

The following **FOSS Next Generation** elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below.

Materials and Motion Investigations Guide:
Investigation 4, Parts 1-4

Materials and Motion *Science Resources* Book:
"*Pushes and Pulls*"
"*Collisions*"

Louisiana Student Standards for Science

Grade K-PS3

Energy

Performance Expectation K-PS3-1

Students who demonstrate understanding can:

Make observations to determine the effect of sunlight on Earth's surface.

Clarification Statement: Sunlight heats Earth's natural surfaces including sand, soil, rocks, or water and the unnatural surfaces including man-made objects like plastics, asphalt, or concrete. Examples of observations could be relative changes in temperature of surfaces exposed to sunlight.

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Planning and carrying out investigations **Analyzing and interpreting data** **Constructing explanations and designing solutions** **Obtaining, evaluating, and communicating information**	**Conservation of Energy and Energy Transfer** Sunlight warms Earth's surface. (LE.PS3B.a)	**Cause and Effect** Events have causes that generate observable patterns.

FOSS® NEXT GENERATION™ REFERENCES

The following **FOSS Next Generation** elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below.

Trees and Weather Investigations Guide:
Investigation 3, Parts 1-3

Trees and Weather *Science Resources* Book:
"*Up in the Sky*"
"*Weather*"

Louisiana Student Standards for Science

Grade K-PS3

Energy

Performance Expectation K-PS3-2

Students who demonstrate understanding can:

Use tools and materials to design and build a structure that will reduce the warming effect of sunlight on an area.

Clarification Statement: Examples of structures could include umbrellas, canopies, or tents that minimize the warming effect of the sun

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Planning and carrying out investigations **Analyzing and interpreting data** **Constructing explanations and designing solutions** **Obtaining, evaluating, and communicating information**	**Conservation of Energy and Energy Transfer** Sunlight warms Earth's surface. (LE.PS3B.a)	**Cause and Effect** Events have causes that generate observable patterns.

FOSS® NEXT GENERATION™ REFERENCES

The following **FOSS Next Generation** elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below.

Trees and Weather Investigations Guide:
Investigation 3, Parts 1-3

Trees and Weather *Science Resources* Book:
"*Up in the Sky*"
"*Weather*"

Louisiana Student Standards for Science

Grade K-LS-1

From Molecules to Organisms: Structures and Processes

Performance Expectation K-LS-1-1

Students who demonstrate understanding can:

Use observations to describe patterns of what plants and animals (including humans) need to survive.

Clarification Statement: Examples of patterns could include that plants make their own food while animals do not, the different kinds of food needed by different types of animals, the requirement of plants to have light, or that all living things need water.

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Asking questions and defining problems **Developing and using model** **Planning and carrying out Investigation** **Analyzing and interpreting data** **Constructing explanations and designing solutions** **Engaging in argument from evidence** **Obtaining, evaluating, and communicating information**	**Organization for Matter and Energy Flow in Organisms** All animals need food in order to live and grow. Animals obtain their food from plants or from other animals. Plants need water and light to live and grow. (LE.LS1C.a)	**Patterns** Patterns in the natural and human designed world can be observed, used to describe phenomena, and used as evidence.

FOSS® NEXT GENERATION™ REFERENCES

The following **FOSS Next Generation** elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below.

Animals Two by Two Investigations Guide:
- Investigation 1, Pts. 1-5
- Investigation 2, Pts. 1-3
- Investigation 3, Pts. 1-3
- Investigation 4, Pts. 1-4

Animals Two by Two *Science Resources* Book:
- "*Fish Same and Different*"
- "*Fish Live in Many Places*"
- "*Birds Outdoors*"
- "*Water and Land Snails*"
- "*Worms in Soil*"
- "*Isopods*"
- "*Animals All around Us*"
- "*Living and Nonliving*"

Louisiana Student Standards for Science

Grade K-ESS2

Earth's Systems

Performance Expectation K-ESS2-1

Students who demonstrate understanding can:

Use and share observations of local weather conditions to describe patterns over time.

Clarification Statement: Examples of qualitative observations could include descriptions of the weather (such as sunny, cloudy, rainy, or warm); examples of quantitative observations could include numbers of sunny, windy, or rainy days in a month. Examples of patterns could include that it is cooler in the morning than in the afternoon or the number of sunny days versus cloudy days in different months.

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Planning and carrying out investigations **Analyzing and interpreting data** **Constructing explanations and designing solutions** **Obtaining, evaluating, and communicating information**	**Weather and Climate** Weather is the combination of sunlight, wind, snow or rain, and temperature in a particular region at a particular time. People measure these conditions to describe and record the weather and to notice patterns over time. (LE.ESS2D.a)	**Patterns** Patterns in the natural and human designed world can be observed, used to describe phemonena, and used as evidence

FOSS® NEXT GENERATION™ REFERENCES

The following **FOSS Next Generation** elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below.

Trees and Weather Investigations Guide:
Investigation 3, Pts. 1-3
Investigation 4, Pts. 1-9

Trees and Weather *Science Resources* Book:
"*Up in the Sky*"
"*Weather*"
"*My Apple Tree*"
"*Orange Trees*"
"*Maple Trees*"

Louisiana Student Standards for Science

Grade K-ESS2

Earth's Systems

Performance Expectation K-ESS2-2

Students who demonstrate understanding can:

Construct an argument supported by evidence for how plants and animals (including humans) can change the environment to meet their needs.

Clarification Statement: Examples of plants and animals changing their environment could include a squirrel digging in the ground to hide its food, tree roots breaking concrete, or a dandelion spreading seeds to generate more dandelions.

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Asking questions and defining problems **Developing and using models** **Planning and carrying out Investigations** **Analyzing and interpreting data** **Using mathematics and computational thinking** **Constructing explanations and designing solutions** **Engaging in argument from evidence** **Obtaining, evaluating, and communicating information**	**Biogeology** Plants and animals can change their environment. (LE.ESS2E.a) **Human Impacts on Earth Systems** Things that people do to live comfortably can affect the world around them; but they can make choices that reduce their impacts on the land, water, air, and other living things. (LE.ESS3C.a)	**Systems and System Models** Systems in the natural and designed world have parts that work together.

FOSS® NEXT GENERATION™ REFERENCES

The following **FOSS Next Generation** elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below.

Trees and Weather Investigations Guide:

Investigation 1, Pts. 1-6
Investigation 4, Pts. 1-9

Trees and Weather *Science Resources* Book:

"*Where Do Trees Grow?*"
"*What Do Plants Need?*"
"*My Apple Tree*"
"*Orange Trees*"
"*Maple Trees*"

Louisiana Student Standards for Science

Grade K-ESS3

Earth and Human Activity

Performance Expectation K-ESS3-1

Students who demonstrate understanding can:

Use a model to represent the relationship between the needs of different plants or animals (including humans) and the places they live.

Clarification Statement: Examples of relationships could include that deer eat buds and leaves and therefore usually live in forested areas; grasses need sunlight so they often grow in meadows. Plants, animals, and their surroundings make up a system.

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Asking questions and defining problems **Developing and using models** **Planning and carrying out investigations** **Analyzing and interpreting data** **Using mathematics and computational thinking** **Constructing explanations and designing solutions** **Engaging in argument from evidence** **Obtaining, evaluating, and communicating information**	**Natural Resources** Living things need water, air, and resources from the land, and they live in places that have the things they need. Humans use natural resources for everything they do. (LE.ESS3A.a)	**Systems and System Models** Systems in the natural and designed world have parts that work together.

FOSS® NEXT GENERATION™ REFERENCES

The following **FOSS Next Generation** elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below.

Trees and Weather Investigations Guide:
- Investigation 1, Pts. 1-6
- Investigation 4, Pts. 1-9

Trees and Weather *Science Resources* Book:
- "*Where Do Trees Grow?*"
- "*What Do Plants Need?*"
- "*My Apple Tree*"
- "*Orange Trees*"
- "*Maple Trees*"

Louisiana Student Standards for Science

Grade K-ESS3

Earth and Human Activity

Performance Expectation K-ESS3-2

Students who demonstrate understanding can:

Ask questions to obtain information about the purpose of weather forecasting to prepare for and respond to severe weather.

Clarification Statement: Emphasis is on local forms of severe weather and safety precautions associated with that severe weather.

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Asking questions and defining problems **Developing and using models** **Constructing explanations and designing solutions** **Obtaining, evaluating, and communicating information**	**Natural Hazards** Some kinds of severe weather are more likely than others in a given region. Weather scientists forecast severe weather so that the communities can prepare for and respond to these events. (LE.ESS3B.a)	**Cause and Effect** Events have causes that generate observable patterns.

FOSS® NEXT GENERATION™ REFERENCES

The following **FOSS Next Generation** elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below.

Trees and Weather Investigations Guide:
Investigation 3, Pts. 1-3

Trees and Weather *Science Resources* Book:
"*Up in the Sky*"
"*Weather*"

Louisiana Student Standards for Science

Grade K-ESS3

Earth and Human Activity

Performance Expectation K-ESS3-3

Students who demonstrate understanding can:

Communicate solutions that will reduce the impact of humans on the land, water, air, and/or other living things in the local environment.

Clarification Statement: Examples of human impact on the land could include cutting trees to produce paper and using resources to produce bottles. Examples of solutions could include reusing paper and recycling cans and bottles.

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Asking questions and defining problems **Developing and using models** **Planning and carrying out investigations** **Analyzing and interpreting data** **Using mathematics and computational thinking** **Constructing explanations and designing solutions** **Engaging in argument from evidence** **Obtaining, evaluating, and communicating information**	**Human Impacts on Earth Systems** Things that people do to live comfortably can affect the world around them. But they can make choices that reduce their impacts on the land, water, air, and other living things. (LE.ESS3C.a)	**Cause and Effect** Events have causes that generate observable patterns.

FOSS® NEXT GENERATION™ REFERENCES

The following **FOSS Next Generation** elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below.

Materials and Motion Investigations Guide:
Investigation 3, Pts. 1-6

Materials and Motion *Science Resources* Book:
"*What Is Fabric Made From?*"
"*How Are Fabrics Used?*"
'*Land, Air, and Water*"
"*I Am Wood*"

Louisiana Student Standards for Science

Grade 1-PS4

Waves and Their Applications

Performance Expectation 1-PS4-1

Students who demonstrate understanding can:

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 or plucking a stretched string. Examples of how sound can make matter vibrate could include holding a piece of paper near a speaker making sound or holding an object near a vibrating tuning fork.

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Asking questions and defining problems **Developing and using models** **Planning and carrying out investigations.** **Analyzing and interpreting data**	**Wave Properties** Sound can make matter vibrate, and vibrating matter can make sound. (LE.PS4A.a)	**Cause and Effect** Simple tests can be designed to gather evidence to support or refute student ideas about causes.

FOSS® NEXT GENERATION™ REFERENCES

The following **FOSS Next Generation** elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below.

Sound and Light Investigations Guide:
Investigation 1, Parts 1-3
Investigation 2, Parts 1-4

Sound and Light *Science Resources* Book:
"*Vibrations and Sound*"
"*Listen to This*"
"*Animal Ears and Hearing*"
"*Strings in Motion*"
"*More Musical Instruments*"

Louisiana Student Standards for Science

Grade 1-PS4

Waves and Their Applications

Performance Expectation 1-PS4-2

Students who demonstrate understanding can:

Make observations to construct an evidence-based account that objects can be seen only when illuminated.

Clarification Statement: Examples of observations could include those made in a completely dark room, a pinhole box, or 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. This can be explored with light tables, 3-way mirrors, overhead projectors or flashlights

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Asking questions and defining problems **Developing and using models** **Planning and carrying out investigations** **Analyzing and interpreting data** **Constructing explanations and designing solutions** **Obtaining, evaluating, and communicating information**	**Electromagnetic Radiation** Objects can be seen if light is available to illuminate them or if they give off their own light. Some objects give off their own light. (LE.PS4B.a)	**Cause and Effect** Events have causes that generate observable patterns.

FOSS® NEXT GENERATION™ REFERENCES

The following **FOSS Next Generation** elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below.

Sound and Light Investigations Guide:
Investigation 3, Parts 1-3
Investigation 4, Parts 1-4

Sound and Light *Science Resources* Book:
"*Playing in the Light*"
"*Reflections*"
"*Seeing the Light*"
"*Communicating with Light*"

Louisiana Student Standards for Science

Grade 1-PS4

WAVES AND THEIR APPLICATIONS

Performance Expectation 1-PS4-3

Students who demonstrate understanding can:

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 those that are transparent (such as clear plastic), translucent (such as wax paper), opaque (such as cardboard), or reflective (such as a mirror).

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Asking questions and defining problems **Developing and using models** **Planning and carrying out investigations** **Analyzing and interpreting data** **Constructing explanations and designing solutions** **Obtaining, evaluating, and communicating information**	**Electromagnetic Radiation** 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. (The idea that light travels from place to place is developed through experiences with light sources, mirrors, and shadows, but no attempt is made to discuss the speed of light.) (LE.PS4B.b)	**Cause and Effect** Simple tests can be designed to gather evidence to support or refute student ideas about causes.

FOSS® NEXT GENERATION™ REFERENCES

The following **FOSS Next Generation** elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below.

Sound and Light Investigations Guide:
Investigation 3, Parts 1-3
Investigation 4, Parts 1-4

Sound and Light *Science Resources* Book:
"*Playing in the Light*"
"*Reflections*"
"*Seeing the Light*"
"*Communicating with Light*"

Louisiana Student Standards for Science

Grade 1-PS4

Waves and Their Applications

Performance Expectation 1-PS4-4

Students who demonstrate understanding can:

Use tools and materials to design and build a device that uses light or sound to solve the problem of communicating over a distance.

Clarification Statement: Examples of devices could include a light source to send signals, paper cup and string "telephones," or a pattern of drumbeats.

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Asking questions and defining problems **Developing and using models** **Planning and carrying out investigations** **Analyzing and interpreting data** **Constructing explanations and designing solutions** **Obtaining, evaluating, and communicating information**	**Information Technologies and Instrumentation** People also use a variety of devices to communicate (send and receive information) over long distances. (LE.PS4C.a) **Developing Possible Solutions** A situation that people want to change or create can be approached as a problem to be solved through engineering. (LE.ETS1A.a)	**Systems and System Models** Systems in the natural and designed world have parts that work together.

FOSS® NEXT GENERATION™ REFERENCES

The following **FOSS Next Generation** elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below.

Sound and Light Investigations Guide:
Investigation 2, Parts 1-4
Investigation 4, Parts 1-4

Sound and Light *Science Resources* Book:
"*Animal Ears and Hearing*"
"*Strings in Motion*"
"*More Musical Instruments*"
"*Playing in the Light*"
"*Reflections*"
"*Seeing the Light*"
"*Communicating with Light*"

Louisiana Student Standards for Science

Grade 1-LS1

From Molecules to Organisms: Structures and Processes

Performance Expectation 1-LS1-1

Students who demonstrate understanding can:

Use tools and 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 or roots on plants; keeping out intruders by mimicking thorns on branches or animal quills; and detecting intruders by mimicking eyes or ears.

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Asking questions and defining problems **Developing and using models** **Planning and carrying out investigations** **Analyzing and interpreting data** **Using mathematics and computational thinking** **Constructing explanations and designing solutions** **Obtaining, evaluating, and communicating information**	**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. (LE.LS1A.a) **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. (LE.LS1D.a) **Developing Possible Solutions** Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for solutions to a problem. (LE.ETS1B.a) **Optimizing the Design Solution** Because there is always more than one possible solution to a problem, it is useful to compare and test designs. (LE.ETS1C.a)	**Structure and Function** The shape and stability of structures of natural and designed objects are related to their function(s).

FOSS® NEXT GENERATION™ REFERENCES

The following **FOSS Next Generation** elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below.

Plants and Animals Investigations Guide:
Investigation 3, Parts 1-4

Plants and Animals *Science Resources* Book:
"*What Do Animals Need?*"
"*Plants and Animals around the World*"
"*Learning from Nature*"

Louisiana Student Standards for Science

Grade 1-LS1

From Molecules to Organisms: Structures and Processes

Performance Expectation 1-LS1-2

Students who demonstrate understanding can:

Read grade-appropriate texts and use media to determine patterns in behavior of parents and offspring that help offspring survive.

Clarification Statement: Examples of patterns of behaviors could include the signals that offspring make (such as crying, cheeping, and other vocalizations) and the responses of the parents (such as feeding, comforting, and protecting the offspring).

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Asking questions and defining problems **Developing and using models** **Planning and carrying out investigations** **Analyzing and interpreting data** **Using mathematics and computational thinking** **Constructing explanations and designing solutions** **Engaging in argument from evidence** **Obtaining, evaluating, and communicating information**	**Growth and Development** Adult plants and animals can have offspring. In many kinds of animals, parents and the offspring themselves engage in behaviors that help the offspring to survive. (LE.LS1B.a)	**Patterns** Patterns in the natural and human designed world can be observed, used to describe phenomena, and used as evidence.

FOSS® NEXT GENERATION™ REFERENCES

The following **FOSS Next Generation** elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below.

Plants and Animals Investigations Guide:
Investigation 1, Parts 1-4
Investigation 2, Parts 1-4
Investigation 4, Parts 1-3

Plants and Animals *Science Resources* Book:
"*What Do Plants Need?*"
"*The Story of Wheat*"
"*Variation*"
"*What Do Animals Need?*"
"*Plants and Animals around the World*"
"*Learning from Nature*"
"*Animals and Their Young*"

Louisiana Student Standards for Science

Grade 1-LS3

Heredity: Inheritance and Variation of Traits

Performance Expectation 1-LS3-1

Students who demonstrate understanding can:

Make observations to construct an evidence-based account that young plants and animals are similar, but not exactly like, their parents.

Clarification Statement: Examples of observations could include: leaves from the same kind of plant are similar in shape but can differ in size, or a particular breed of dog looks like its parents but is not exactly the same. Examples of patterns could include features that plants or animals share.

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Asking questions and defining problems **Developing and using models** **Planning and carrying out investigations** **Analyzing and interpreting data** **Using mathematics and computational thinking** **Constructing explanations and designing solutions** **Obtaining, evaluating, and communicating information**	**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. (LE.LS3A.a) **Variation of Traits** Individuals of the same kind of plant or animal are recognizable as similar but can also vary in many ways. (LE.LS3B.a)	**Patterns** Patterns in the natural and human designed world can be observed, used to describe phenomena, and used as evidence.

FOSS® NEXT GENERATION™ REFERENCES

The following **FOSS Next Generation** elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below.

Plants and Animals Investigations Guide:
- Investigation 1, Part 4
- Investigation 3, Parts 1-4
- Investigation 4, Parts 1-3

Plants and Animals *Science Resources* Book:
- "*Variation*"
- "*What Do Animals Need?*"
- "*Plants and Animals around the World*"
- "*Learning from Nature*"
- "*Animals and Their Young*"

Louisiana Student Standards for Science

Grade 1-ESS1

Earth's Place in the Universe

Performance Expectation 1-ESS1-1

Students who demonstrate understanding can:

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.

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Asking questions and defining problems **Planning and carrying out investigations** **Analyzing and interpreting data:** **Using mathematics and computational thinking** **Constructing explanations and designing solutions** **Obtaining, evaluating, and communicating information**	**The Universe and Its Stars** Patterns of the motion of the sun, moon, and stars in the sky can be observed, described, and predicted. (LE.ESS1A.a)	**Patterns** Patterns in the natural and human designed world can be observed, used to describe phenomena, and used as evidence.

FOSS® NEXT GENERATION™ REFERENCES

The following **FOSS Next Generation** elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below.

Air and Weather Investigations Guide:
Investigation 2, Parts 1-4
Investigation 4, Parts 1-3

Air and Weather *Science Resources* Book:
"*What Is the Weather Today?*"
"*Clouds*"
"*Water in the Air*"
"*Changes in the Sky*"
"*What's the Weather?*"
"*Changes in the Sky*"
"*Seasons*"
"*Getting through the Winter*"

Louisiana Student Standards for Science

Grade 1-ESS1

Earth's Place in the Universe

Performance Expectation 1-ESS1-2

Students who demonstrate understanding can:

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 to the amount in the spring, fall, or summer.

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Asking questions and defining problems **Planning and carrying out investigations:** **Analyzing and interpreting data** **Using mathematics and computational thinking** **Constructing explanations and designing solutions** **Obtaining, evaluating, and communicating information**	**Earth and the Solar System** Seasonal patterns of sunrise and sunset can be observed, described, and predicted. (LE.ESS1B.a)	**Patterns** Patterns in the natural and human designed world can be observed, used to describe phenomena, and used as evidence.

FOSS® NEXT GENERATION™ REFERENCES

The following **FOSS Next Generation** elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below.

Air and Weather Investigations Guide:
Investigation 2, Parts 1-4
Investigation 4, Parts 1-3

Air and Weather *Science Resources* Book:
"*What Is the Weather Today?*"
"*Clouds*"
"*Water in the Air*"
"*Changes in the Sky*"
"*What's the Weather?*"
"*Changes in the Sky*"
"*Seasons*"
"*Getting through the Winter*"

Louisiana Student Standards for Science

Grade 2-PS1

Matter and Its Interactions

Performance Expectation 2-PS1-1

Students who demonstrate understanding can:

Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties.

Clarification Statement: Observations could include color, texture, hardness, or flexibility. Patterns could include the similar properties that different materials share.

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Asking questions and defining problems **Developing and using models** **Planning and carrying out investigations** **Analyzing and interpreting data** **Using mathematics and computational thinking** **Constructing explanations and designing solutions** **Engaging in argument from evidence** **Obtaining, evaluating, and communicating information**	**Structures and Properties of Matter** Different kinds of matter exist and many of them can be either solid or liquid, depending on temperature. Matter can be described and classified by its observable properties. (LE.PS1A.c)	**Patterns** Patterns in the natural and human designed world can be observed, used to describe phenomena, and used as evidence.

FOSS® NEXT GENERATION™ REFERENCES

The following **FOSS Next Generation** elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below.

Solids and Liquids Investigations Guide:
- Investigation 1, Parts 1-5
- Investigation 2, Parts 1-4
- Investigation 3, Parts 1-5
- Investigation 4, Parts 1-5

Solids and Liquids *Science Resources* Book:
- "*Everything Matters*"
- "*Solid Objects and Materials*"
- "*Towers*"
- "*Bridges*"
- "*Liquids*"
- "*Pouring*"
- "*Comparing Solids and Liquids*"
- "*Mix It Up!*"
- "*Heating and Cooling*"
- "*Is Change Reversible?*"

Louisiana Student Standards for Science

Grade 2-PS1

Matter and Its Interactions

Performance Expectation 2-PS1-2

Students who demonstrate understanding can:

Analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose.

Clarification Statement: Examples of properties could include, strength, flexibility, hardness, texture, or absorbency

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Asking questions and defining problems **Developing and using models** **Planning and carrying out investigations** **Analyzing and interpreting data** **Using mathematics and computational thinking** **Constructing explanations and designing solutions** **Engaging in argument from evidence** **Obtaining, evaluating, and communicating information**	**Structures and Properties of Matter** Different properties are suited to different purposes. (LE.PS1A.a)	**Cause and Effect** Simple tests can be designed to gather evidence to support or refute student ideas about causes.

FOSS® NEXT GENERATION™ REFERENCES

The following **FOSS Next Generation** elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below.

Solids and Liquids Investigations Guide:
Investigation 4, Parts 1-5

Solids and Liquids *Science Resources* Book:
"*Mix It Up!*"
"*Heating and Cooling*"
"*Is Change Reversible?*"

Louisiana Student Standards for Science

Grade 2-PS1

Matter and Its Interactions

Performance Expectation 2-PS1-3

Students who demonstrate understanding can:

Make observations to construct an evidence-based account of how an object made of a small set of pieces can be disassembled and made into a new object.

Clarification Statement: Examples of pieces could include blocks, building bricks, or other assorted small objects. Provide students with the same number of objects to create a different object.

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
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** **Obtaining, evaluating, and communicating information**	**Structure and Properties of Matter** Different properties are suited to different purposes. (LE.PS1A.a) A great variety of objects can be built up from a small set of pieces. (LE.PS1A.b)	**Energy And Matter** Objects may break into smaller pieces, be put together into larger pieces, or change shapes.

FOSS® NEXT GENERATION™ REFERENCES

The following **FOSS Next Generation** elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below.

Solids and Liquids Investigations Guide:
Investigation 4, Parts 1-5

Solids and Liquids *Science Resources* Book:
"*Mix It Up!*"
"*Heating and Cooling*"
"*Is Change Reversible?*"

Louisiana Student Standards for Science

Grade 2-PS1

Matter and Its Interactions

Performance Expectation 2-PS1-4

Students who demonstrate understanding can:

Construct an argument with evidence that some changes caused by heating or cooling can be reversed and some cannot.

Clarification Statement: Demonstrations of reversible changes could include materials such as water, butter or crayons at different temperatures. Demonstrations of irreversible changes could include cooking an egg, freezing a plant leaf, or heating paper.

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Planning and carrying out investigations **Analyzing and interpreting data** **Using mathematics and computational thinking** **Constructing explanations and designing solutions** **Engaging in argument from evidence** **Obtaining, evaluating, and communicating information**	**Chemical Reactions** Heating or cooling a substance may cause changes that can be observed. Sometimes these changes are reversible, and sometimes they are not. (LE.PS1B.a)	**Cause and Effect** Events have causes that generate observable patterns.

FOSS® NEXT GENERATION™ REFERENCES

The following **FOSS Next Generation** elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below.

Solids and Liquids Investigations Guide:
Investigation 4, Part 4

Solids and Liquids *Science Resources* Book:
"*Mix It Up!*"
"*Heating and Cooling*"
"*Is Change Reversible?*"

Louisiana Student Standards for Science

Grade 2-LS2

Ecosystems: Interactions, Energy, and Dynamics

Performance Expectation 2-LS2-1

Students who demonstrate understanding can:

Plan and conduct an investigation to determine if plants need sunlight and water to grow.

Clarification Statement: Emphasis is on testing one variable at a time during investigations.

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
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** **Obtaining, evaluating, and communicating information**	**Interdependent Relationships in Ecosystems** Plants depend on water and light to grow. (LE.LS2A.a)	**Cause and Effect** Events have causes that generate observable patterns.

FOSS® NEXT GENERATION™ REFERENCES

The following **FOSS Next Generation** elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below.

Insects and Plants Investigations Guide:
Investigation 2, Parts 1-4

Insects and Plants *Science Resources* Book:
"*How Seeds Travel*"

Louisiana Student Standards for Science

Grade 2-LS2

Ecosystems: Interactions, Energy, and Dynamics

Performance Expectation 2-LS2-2

Students who demonstrate understanding can:

Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants.

Clarification Statement: Students could use the model to describe: (1) How the structure of the model gives rise to its function. (2) Structure-function relationships in the natural world that allow some animals to disperse seeds or pollinate plants.

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
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** **Obtaining, evaluating, and communicating information**	**Interdependent Relationships** Plants may depend on animals for pollination or to move their seeds around. (LE.LS2A.b)	**Structure and Function** The shape and stability of structures of natural and designed objects are related to their function(s).

FOSS® NEXT GENERATION™ REFERENCES

The following **FOSS Next Generation** elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below.

Insects and Plants Investigations Guide:
Investigation 2, Parts 1-4

Insects and Plants *Science Resources* Book:
"*How Seeds Travel*"

Louisiana Student Standards for Science

Grade 2-LS4

Biological Evolution: Unity and Diversity

Performance Expectation 2-LS4-1

Students who demonstrate understanding can:

Make observations of plants and animals to compare the diversity of life in different habitats.

Clarification Statement: Emphasis is on the diversity of living things in each of a variety of different habitats. Students could explore different habitats in the community (e.g., school, aquariums, and neighborhoods).

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Asking questions and defining problems **Developing and using models** **Planning and carrying out investigations** **Analyzing and interpreting data** **Using mathematics and computational thinking** **Constructing explanations and designing solutions** **Engaging in argument from evidence** **Obtaining, evaluating, and communicating information**	**Biodiversity and Humans** There are many kinds of living things in any area, and they exist in different places on land, in water, and in air. (LE.LS4D.a)	**Patterns** Patterns in the natural and human designed world can be observed, used to describe phenomena, and used as evidence

FOSS® NEXT GENERATION™ REFERENCES

The following **FOSS Next Generation** elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below.

Insects and Plants Investigations Guide:
- Investigation 1, Parts 1-3
- Investigation 2, Parts 1-4
- Investigation 3, Parts 1-4
- Investigation 4, Parts 1-4
- Investigation 5, Parts 1-4

Insects and Plants *Science Resources* Book:
- "*Animals and Plants in Their Habitats*"
- "*Flowers and Seeds*"
- "*How Seeds Travel*"
- "*So Many Kinds, So Many Places*"
- "*Insect Shapes and Colors*"
- "*Insect Life Cycles*"
- "*Life Goes Around*"

Louisiana Student Standards for Science

Grade 2-ESS1

Earth's Place in the Universe

Performance Expectation 2-ESS1-1

Students who demonstrate understanding can:

Use information from several sources to provide evidence that Earth events can occur quickly or slowly.

Clarification Statement: Examples of events and timescales could include volcanic explosions and earthquakes, which happen quickly, and erosion of rocks, which occurs slowly.

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
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**	**The History of Planet Earth** Some events happen very quickly; others occur very slowly, over a time period much longer than one can observe. (LE.ESS1C.a)	**Stability and Change** Things may change slowly or rapidly.

FOSS® NEXT GENERATION™ REFERENCES

The following **FOSS Next Generation** elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below.

Pebbles, Sand, and Silt Investigations Guide:
Investigation 1, Parts 1-2
Investigation 2, Parts 3-4
Investigation 4, Part 4

Pebbles, Sand, and Silt *Science Resources* Book:
"*Rocks Move*"
"*Landforms*"
"*Preventing Erosion*"
"*Land and Water on Earth*"

Louisiana Student Standards for Science

Grade 2-ESS2

Earth's Systems

Performance Expectation 2-ESS2-1

Students who demonstrate understanding can:

Compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land.

Clarification Statement: Examples of solutions could include different designs of dikes and windbreaks to hold back wind and water, and different designs for using shrubs, grass, and trees to hold back the land.

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
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** **Obtaining, evaluating, and communicating information**	**Earth Materials and Systems** Wind and water can change the shape of the land. (LE.ESS2A.a) **Optimizing the Design Solution** Because there is always more than one possible solution to a problem, it is useful to compare and test designs. (LE.ETS1C.a)	**Stability and Change** Things may change slowly or rapidly.

FOSS® NEXT GENERATION™ REFERENCES

The following **FOSS Next Generation** elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below.

Pebbles, Sand, and Silt Investigations Guide:
Investigation 2, Part 4
Investigation 3, Parts 1-5
Investigation 4, Parts 1-4

Pebbles, Sand, and Silt *Science Resources* Book:
"*Landforms*"
"*Making Things with Rocks*"
"*What Are Natural Resources?*"
"*Where Is Water Found?*"
"*States of Water*"
"*Preventing Erosion*"
"*Land and Water on Earth*"

Louisiana Student Standards for Science

Grade 2-ESS2

Earth's Systems

Performance Expectation 2-ESS2-2

Students who demonstrate understanding can:

Develop a model to represent the shapes and kinds of land and bodies of water in an area.

Clarification Statement: Models do not have to be to scale.

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Developing and using models **Constructing explanations and designing solutions** **Obtaining, evaluating, and communicating information**	**Plate Tectonics and Large-Scale Interactions** Maps show where things are located. One can map the shapes and kinds of land and water in any area. (LE.ESS2B.a)	**Patterns** Patterns in the natural and human designed world can be observed, used to describe phenomena, and used as evidence.

FOSS® NEXT GENERATION™ REFERENCES

The following **FOSS Next Generation** elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below.

Pebbles, Sand, and Silt Investigations Guide:
Investigation 4, Part 4

Pebbles, Sand, and Silt *Science Resources* Book:
"*Preventing Erosion*"
"*Land and Water on Earth*"

Louisiana Student Standards for Science

Grade 2-ESS2

Earth's Systems

Performance Expectation 2-ESS2-3

Students who demonstrate understanding can:

Obtain and communicate information to identify where water is found on Earth and that it can be solid or liquid.

Clarification Statement: Students use reliable sources to identify the patterns of where water is found and its natural form (solid or liquid). Examples of how water can be found on Earth as water or ice could include a frozen pond, a liquid pond, a frozen lake, or a liquid lake.

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Constructing explanations and designing solutions **Obtaining, evaluating, and communicating information** **Developing and using models** **Planning and carrying out investigations** **Analyzing and interpreting data** **Engaging in argument from evidence**	**The Role of Water in Earth's Surface Processes** Water is found in the ocean, rivers, lakes, and ponds. Water exists as solid ice and in liquid form. (LE.ESS2C.a)	**Patterns** Patterns in the natural and human designed world can be observed, used to describe phenomena, and used as evidence.

FOSS® NEXT GENERATION™ REFERENCES

The following **FOSS Next Generation** elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below.

Pebbles, Sand, and Silt Investigations Guide:
Investigation 2, Parts 3-4
Investigation 4, Parts 3-4

Pebbles, Sand, and Silt *Science Resources* Book:
"*Rocks Move*"
"*Landforms*"
"*Preventing Erosion*"
"*Land and Water on Earth*"

Louisiana Student Standards for Science

Grade 3-PS2

Motion and Stability: Forces and Interactions

Performance Expectation 3-PS2-1

Students who demonstrate understanding can:

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 an object that can make it start moving, or balanced forces pushing on an object from opposite sides will not produce any motion at all. Investigations include one variable at a time: number, size, or direction of forces.

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Asking questions and defining problems **Developing and using models** **Planning and carrying out investigations** **Analyzing and interpreting data** **Using mathematics and computational thinking** **Constructing explanations and designing solutions** **Obtaining, evaluating, and communicating information**	**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. (UE.PS2A.a) Forces that do not sum to zero can cause changes in the object's speed or direction of motion. (Qualitative and conceptual, but not quantitative addition of forces are used at this level.) (UE.PS2A.b) **Types of Interactions** Objects in contact exert forces on each other. (UE.PS2B.a)	**Cause and Effect** Cause and effect relationships are routinely identified, tested, and used to explain change.

FOSS® NEXT GENERATION™ REFERENCES

The following **FOSS Next Generation** elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below.

Motion and Matter Investigations Guide:
Investigation 1, Parts 1-3
Investigation 2, Parts 1-4

Motion and Matter *Science Resources* Book:
"*Magnetism and Gravity*"
"*What Scientists Do*"
"*Change of Motion*"
"*Patterns of Motion*"
"*What Goes Around*"

Louisiana Student Standards for Science

Grade 3-PS2

Motion and Stability: Forces and Interactions

Performance Expectation 3-PS2-2

Students who demonstrate understanding can:

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, or two children on a see-saw.

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Asking questions and defining problems **Developing and using models** **Planning and carrying out investigations** **Analyzing and interpreting data** **Using mathematics and computational thinking** **Constructing explanations and designing solutions** **Obtaining, evaluating, and communicating information**	**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. (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.) (UE.PS2A.c)	**Patterns** Patterns of change can be used to make predictions.

FOSS® NEXT GENERATION™ REFERENCES

The following **FOSS Next Generation** elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below.

Motion and Matter Investigations Guide:
Investigation 1, Parts 1-3
Investigation 2, Parts 1-4

Motion and Matter *Science Resources* Book:
"*Magnetism and Gravity*"
"*What Scientists Do*"
"*Change of Motion*"
"*Patterns of Motion*"
"*What Goes Around*"

Louisiana Student Standards for Science

Grade 3-PS2

Motion and Stability: Forces and Interactions

Performance Expectation 3-PS2-3

Students who demonstrate understanding can:

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 paper clips, or 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 the strength of the force or how the orientation of magnets affects the direction of the magnetic force. Examples could include forces produced by objects that can be manipulated by students, or electrical interactions could include static electricity.

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Asking questions and defining problems **Developing and using models** **Planning and carrying out investigations** **Analyzing and interpreting data** **Using mathematics and computational thinking** **Constructing explanations and designing solutions** **Obtaining, evaluating, and communicating information**	**Types of Interaction** 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. (UE.PS2B.b)	**Cause and Effect** Cause and effect relationships are routinely identified, tested, and used to explain change.

FOSS NEXT GENERATION REFERENCES

The following **FOSS Next Generation** elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below.

Motion and Matter Investigations Guide:
Investigation 1, Parts 1-3

Motion and Matter *Science Resources* Book:
"*Magnetism and Gravity*"
"*What Scientists Do*"
"*Change of Motion*"

Louisiana Student Standards for Science

Grade 3-PS2

Motion and Stability: Forces and Interactions

Performance Expectation 3-PS2-4

Students who demonstrate understanding can:

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 or creating a device to keep two moving objects from touching each other.

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Asking questions and defining problems **Developing and using models** **Planning and carrying out investigations** **Analyzing and interpreting data** **Using mathematics and computational thinking** **Constructing explanations and designing solutions** **Obtaining, evaluating, and communicating information**	**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. **Defining and Delimiting Engineering Problems** 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. (UE.ETS1A.a)	**Patterns** Patterns can be used as evidence to support an explanation.

FOSS® NEXT GENERATION™ REFERENCES

The following **FOSS Next Generation** elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below.

Motion and Matter Investigations Guide:
Investigation 1, Parts 1-3

Motion and Matter *Science Resources* Book:
"*Magnetism and Gravity*"
"*What Scientists Do*"
"*Change of Motion*"

Louisiana Student Standards for Science

Grade 3-LS1

From Molecules to Organisms: Structures and Processes

Performance Expectation 3-LS1-1

Students who demonstrate understanding can:

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 that organisms go through during their lives form a pattern. For plant life cycles there is an emphasis on flowering plants.

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Asking questions and defining problems **Developing and using models** **Planning and carrying out investigations** **Analyzing and interpreting data** **Using mathematics and computational thinking** **Constructing explanations and designing solutions** **Engaging in argument from evidence** **Obtaining, evaluating, and communicating information**	**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. (UE.LS1B.a)	**Patterns** Patterns of change can be used to make predictions.

FOSS® NEXT GENERATION™ REFERENCES

The following **FOSS Next Generation** elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below.

Structures of Life Investigations Guide:
Investigation 1, Parts 1-3
Investigation 2, Parts 1-3

Structures of Life *Science Resources* Book:
"*The Reason for Fruit*"
"*The Most Important Seed*"
"*Barbara McClintock*"
"*Nature Journal--How Seeds Travel*"
"*Germination*"
"*Life Cycles*"

Louisiana Student Standards for Science

Grade 3-LS2

Ecosystems: Interactions, Energy, and Dynamics

Performance Expectation 3-LS2-1

Students who demonstrate understanding can:

Construct and support an argument that some animals form groups that help members survive.

Clarification Statement: Arguments could include examples of group behavior such as division of labor in a bee colony, flocks of birds staying together to confuse or intimidate predators, or wolves hunting in packs to more efficiently catch and kill prey.

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
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**	**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. (UE.LS2D.a)	**Systems and System Models** A system is a group of related parts that make up a whole and can carry out functions its individual parts cannot.

FOSS® NEXT GENERATION™ REFERENCES

The following **FOSS Next Generation** elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below.

Structures of Life Investigations Guide:
Investigation 3, Parts 3 and 5

Structures of Life *Science Resources* Book:
"*Life on Earth*"
"*Food Chains*"

Louisiana Student Standards for Science

Grade 3-LS3

Heredity: Inheritance and Variation Of Traits

Performance Expectation 3-LS3-1

Students who demonstrate understanding can:

Analyze and interpret data to provide evidence that plants and animals have traits inherited from their parents and that variation of these traits exists in a group of similar organisms.

Clarification Statement: Emphasis is on organisms other than humans and does not include genetic mechanisms of inheritance and prediction of traits. Data can include drawings, photographs, measurements, or written observations. Patterns are the similarities and differences in traits shared between offspring and their parents, or among siblings.

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Asking questions **Planning and carrying out investigations** **Analyzing and interpreting data** **Using mathematics and computational thinking** **Constructing explanations and designing solutions** **Developing and using models** **Engaging in argument from evidence** **Obtaining, evaluating, and communicating information**	**Inheritance of Traits** Many characteristics of organisms are inherited from their parents. (UE.LS3A.a) **Variation of Traits** Different organisms vary in how they look and function because they have different inherited information. (UE.LS3B.a)	**Patterns** Similarities and differences in patterns can be used to sort, classify, communicate and analyze simple rates of change for natural phenomena and designed products.

FOSS® NEXT GENERATION™ REFERENCES

The following **FOSS Next Generation** elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below.

Structures of Life Investigations Guide:
Investigation 1, Part 3
Investigation 2, Parts 2-3
Investigation 3, Part 2
Investigation 4, Parts 1-2

Structures of Life *Science Resources* Book:
"*Barbara McClintock*"
"*Life Cycles*"
"*Adaptations*"
"*The Human Skeleton*"
"*Barn Owls*"
"*Fossils*"
"*Skeletons on the Outside*"
"*Crayfish, Snails, and Humans*"

Louisiana Student Standards for Science

Grade 3-LS3

Heredity: Inheritance and Variation of Traits

Performance Expectation 3-LS3-2

Students who demonstrate understanding can:

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 normally tall plants grown with insufficient water are stunted or an animal that is given too much food and little exercise may become overweight.

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Asking questions **Planning and carrying out investigations** **Analyzing and interpreting data** **Using mathematics and computational thinking** **Constructing explanations and designing solutions** **Developing and using models** **Engaging in argument from evidence** **Obtaining, evaluating, and communicating information**	**Inheritance of Traits** Other characteristics result from individuals' interactions with the environment, which can range from diet to learning. Many characteristics involve both inheritance and environment. (UE.LS3A.b) **Variation of Traits** The environment also affects the traits that an organism expresses. (UE.LS3B.b)	**Cause and Effect** Cause and effect relationships are routinely identified, tested, and used to explain change.

FOSS® NEXT GENERATION™ REFERENCES

The following **FOSS Next Generation** elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below.

Structures of Life Investigations Guide:
- Investigation 1, Part 3
- Investigation 2, Parts 2-3
- Investigation 3, Part 2
- Investigation 4, Parts 1-2

Structures of Life *Science Resources* Book:
- "*Barbara McClintock*"
- "*Life Cycles*"
- "*Adaptations*"
- "*The Human Skeleton*"
- "*Barn Owls*"
- "*Fossils*"
- "*Skeletons on the Outside*"
- "*Crayfish, Snails, and Humans*"

Louisiana Student Standards for Science

Grade 3-LS4

Biological Evolution: Unity and Diversity

Performance Expectation 3-LS4-1

Students who demonstrate understanding can:

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 fossil organisms. Examples of fossils and environments could include major fossil types such as marine fossils found on dry land, tropical plant fossils found in arctic areas, or fossils of extinct organisms and relative ages.

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Planning and carrying out investigations **Analyzing and interpreting data** **Constructing explanations** **Engaging in argument from evidence** **Obtaining, evaluating, and communicating information**	**Evidence of Common Ancestry and Diversity** Some kinds of plants and animals that once lived on Earth are no longer found anywhere. (UE.LS4A.a) Fossils provide evidence about the types of organisms that lived long ago and also about the nature of their environment. (UE.LS4A.b)	**Scale, Proportion, and Quantity** Natural objects and/or observable phenomena exist from the very small to the immensely large or from very short to very long-time periods.

FOSS® NEXT GENERATION™ REFERENCES

The following **FOSS Next Generation** elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below.

Structures of Life Investigations Guide:
Investigation 4, Part 2

Structures of Life *Science Resources* Book:
"*Barn Owls*"
"*Fossils*"
"*Skeletons on the Outside*"
"*Crayfish, Snails, and Humans*"

Louisiana Student Standards for Science

Grade 3-LS4

Biological Evolution: Unity and Diversity

Performance Expectation 3-LS4-2

Students who demonstrate understanding can:

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.

Clarification Statement: Examples of cause and effect relationships could be plants that have larger thorns than other plants may be less likely to be eaten or animals that have better camouflage coloration than other animals may be more likely to survive and therefore more likely to leave offspring.

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Developing and using models **Analyzing and interpreting data** **Using mathematics and computational thinking** **Constructing explanations and designing solutions** **Obtaining, evaluating, and communicating information**	**Natural Selection** Sometimes the differences in characteristics between individuals of the same species provide advantages in surviving, finding mates, and reproducing. (UE.LS4B.a)	**Cause and Effect** Cause and effect relationships are routinely identified, tested, and used to explain change.

FOSS® NEXT GENERATION™ REFERENCES

The following **FOSS Next Generation** elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below.

Structures of Life Investigations Guide:
Investigation 3, Parts 2 and 5

Structures of Life *Science Resources* Book:
"*Adaptations*"
"*Food Chains*"

Louisiana Student Standards for Science

Grade 3-LS4

Biological Evolution: Unity and Diversity

Performance Expectation 3-LS4-3

Students who demonstrate understanding can:

Construct and support an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all.

Clarification Statement: Examples of evidence could include needs and characteristics of the organisms and habitats involved. The organisms and their habitats make up a system in which the parts depend on each other.

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Developing and using models **Analyzing and interpreting data** **Using mathematics and computational thinking** **Constructing explanations and designing solutions** **Engaging in argument from evidence** **Obtaining, evaluating, and communicating information**	**Adaptation** For any particular environment, some kinds of organisms survive well, some survive less well, and some cannot survive at all. (UE.LS4C.a)	**Cause and Effect** Cause and effect relationships are routinely identified, tested, and used to explain change.

FOSS® NEXT GENERATION™ REFERENCES

The following **FOSS Next Generation** elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below.

Structures of Life Investigations Guide:
Investigation 3, Parts 2, 4-5

Structures of Life *Science Resources* Book:
"*Adaptations*"
"*Inside a Snail's Shell*"
"*A Change in the Environment*"
"*Food Chains*"

Louisiana Student Standards for Science

Grade 3-LS4

Biological Evolution: Unity and Diversity

Performance Expectation 3-LS4-4

Students who demonstrate understanding can:

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 change(s) could include changes in land characteristics, water distribution, temperature, food, and other biological communities. Louisiana specific examples could include impacts related to levees, dams, crop rotations, irrigation systems, hunting limits, diversion canals, or sea level rise.

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Developing and using models **Analyzing and interpreting data** **Using mathematics and computational thinking** **Constructing explanations and designing solutions** **Engaging in argument from evidence** **Obtaining, evaluating, and communicating information**	**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. (UE.LS2C.a) **Biodiversity and Humans** Populations live in a variety of habitats, and change in those habitats affects the organisms living there. (UE.LS4D.a) **Developing Possible Solutions** 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. (ETS.UE.1B.b)	**Systems and Systems Models** A system can be described in terms of its components and their interactions.

FOSS® NEXT GENERATION™ REFERENCES

The following **FOSS Next Generation** elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below.

Structures of Life Investigations Guide:
Investigation 3, Parts 2, 4-5

Structures of Life *Science Resources* Book:
"*Adaptations*"
"*Inside a Snail's Shell*"
"*A Change in the Environment*"
"*Food Chains*"

Louisiana Student Standards for Science

Grade 3-ESS2

Earth's Systems

Performance Expectation 3-ESS2-1

Students who demonstrate understanding can:

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. Examples of data representations could include pictographs and bar graphs.

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Analyzing and interpreting data **Constructing explanations and designing solutions** **Obtaining, evaluating, and communicating information**	**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. (UE.ESS2D.a)	**Patterns** Patterns of change can be used to make predictions

FOSS® NEXT GENERATION™ REFERENCES

The following **FOSS Next Generation** elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below.

Water and Climate Investigations Guide:
Investigation 4, Parts 1-3

Water and Climate *Science Resources* Book:
"*Climate Regions*"
"*Wetlands for Flood Control*"
"*Conserving Water during Droughts*"

Louisiana Student Standards for Science

Grade 3-ESS2

Earth's Systems

Performance Expectation 3-ESS2-2

Students who demonstrate understanding can:

Obtain and combine information to describe climates in different regions around the world.

Clarification Statement: Information could include rainfall and temperature data.

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Asking questions and defining problems **Developing and using models** **Planning and carrying out investigations** **Analyzing and interpreting data** **Using mathematics and computational thinking** **Constructing explanations and designing solutions** **Engaging in argument from evidence** **Obtaining, evaluating, and communicating information**	**Weather and Climate** Climate describes a range of an area's typical weather conditions and the extent to which those conditions vary over years. (UE.ESS2D.b)	**Patterns** Patterns of change can be used to make predictions.

FOSS® NEXT GENERATION™ REFERENCES

The following **FOSS Next Generation** elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below.

Water and Climate Investigations Guide:
Investigation 2, Parts 1-5
Investigation 3, Parts 1-5
Investigation 4, Parts 1-3

Water and Climate *Science Resources* Book:
"*Vacation Aggravation*"
"*Celsius and Fahrenheit*"
"*Water: Hot and Cold*"
"*Studying Weather*"
"*Drying Up*"
"*Surface-Area Experiment*"
"*Climate Regions*"
"*Wetlands for Flood Control*"
"*Conserving Water during Droughts*"

Louisiana Student Standards for Science

Grade 3-ESS3

Earth and Human Activity

Performance Expectation 3-ESS3-1

Students who demonstrate understanding can:

Make a claim about the merit of a design solution that reduces the impact of a weather-related hazard.

Clarification Statement: Examples of design solutions to weather-related hazards could include barriers to prevent flooding (including levees), wind-resistant roofs, tornado shelters and lightning rods.

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Asking questions and defining problems **Planning and carrying out investigations** **Analyzing and interpreting data** **Constructing explanations and designing solutions** **Engaging in argument from evidence** **Obtaining, evaluating, and communicating information**	**Natural Hazards** A variety of natural hazards result from natural processes. Humans cannot eliminate natural hazards but can take steps to reduce their impacts. (UE.ESS3B.a) **Developing Possible Solutions** 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. (ETS.UE.1B.a)	**Cause and Effect** Cause and effect relationships are routinely identified, tested, and used to explain change.

FOSS® NEXT GENERATION™ REFERENCES

The following **FOSS Next Generation** elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below.

Water and Climate Investigations Guide:
Investigation 4, Parts 1-3
Investigation 5, Parts 1-3

Water and Climate *Science Resources* Book:
"*Climate Regions*"
"*Wetlands for Flood Control*"
"*Conserving Water during Droughts*"
"*Water: A Vital Resource*"
"*Natural Resources*"
"*Ellen Swallow Richards: An Early Ecologist*"
"*Making Drinking Water Safe*"
"*Using the Energy of Water*"

Louisiana Student Standards for Science

Grade 4-PS3

Energy

Performance Expectation 4-PS3-1

Students who demonstrate understanding can:

Use evidence to construct an explanation relating the speed of an object to the energy of that object.

Clarification Statement: Relating the speed of an object to the energy of the object does not require calculation of the object's speed

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Asking questions **Planning and carrying out investigations** **Analyzing and interpreting data** **Using mathematics and computational thinking** **Constructing explanations** **Engaging in argument from evidence** **Obtaining, evaluating, and communicating information**	**Definitions of Energy** The faster a given object is moving, the more energy it possesses. (UE.PS3A.a)	**Energy and Matter** Energy can be transferred in various ways and between objects.

FOSS® NEXT GENERATION™ REFERENCES

The following **FOSS Next Generation** elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below.

Energy Investigations Guide:
Investigation 4, Parts 1-3

Energy *Science Resources* Book:
"*Energy*"
"*What Causes Change of Motion?*"
"*Bowling*"
"*Force and Energy*"
"*Potential and Kinetic Energy at Work*"

Louisiana Student Standards for Science

Grade 4-PS3

Energy

Performance Expectation 4-PS3-2

Students who demonstrate understanding can:

Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.

Clarification Statement: When energy is transferred it may change forms such as when light from the sun warms a window pane.

Science and	Disciplinary Core Ideas	Crosscutting Concepts
Asking questions and defining problems **Developing and using models** **Planning and carrying out investigations** **Analyzing and interpreting data** **Using mathematics and computational thinking** **Constructing explanations and designing solutions** **Engaging in argument from evidence** **Obtaining, evaluating, and communicating information**	**Definitions of Energy** Energy can be moved from place to place by moving objects or through sound, light, or electric currents. (UE.PS3A.b) **Conservation of Energy And Energy Transfer** Energy is present whenever there are moving objects, sound, light, or heat. When objects collide, energy can be transferred from one object to another, thereby changing their motion. In such collisions, some energy is typically also transferred to the surrounding air; as a result, the air gets heated and sound is produced. (UE.PS3B.a) Light also transfers energy from place to place. (UE.PS3B.b) Energy can also be transferred from place to place by electric currents, which can then be used locally to produce motion, sound, heat, or light. The currents may have been produced to begin with by transforming the energy of motion into electrical energy. (UE.PS3B.c)	**Energy and Matter** Energy can be transferred in various ways and between objects.

FOSS® NEXT GENERATION™ REFERENCES

The following **FOSS Next Generation** elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below.

Energy Investigations Guide:
- Investigation 1, Parts 1-4
- Investigation 3, Parts 1-3
- Investigation 4, Parts 1-3
- Investigation 5, Parts 1-3

Energy *Science Resources* Book:
- "*Edison Sees the Light*"
- "*Energy Sources*"
- "*Science Practices*"
- "*Engineering Practices*"
- "*Thinking Like an Engineer*"
- "*Engineering a Solar Lighting Solution*"
- "*Electricity Creates Magnetism*"
- "*Using Magnetic Fields*"
- "*Electromagnets Everywhere*"
- "*Morse Gets Clicking*"
- "*Energy*"
- "*What Causes Change of Motion?*"
- "*Bowling*"
- "*Force and Energy*"
- "*Potential and Kinetic Energy at Work*"

Louisiana Student Standards for Science

Grade 4-PS3

Energy

Performance Expectation 4-PS3-3

Students who demonstrate understanding can:

Ask questions and predict outcomes about the changes in energy that occur when objects collide.

Clarification Statement: Emphasis is on the change in the energy due to the change in speed, not on the forces, as objects interact. Quantitative measurements of energy are not included.

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Asking questions **Planning and carrying out investigations** **Analyzing and interpreting data** **Using mathematics and computational thinking** **Constructing explanations** **Engaging in argument from evidence** **Obtaining, evaluating, and communicating information**	**Definitions of Energy** Energy can be moved from place to place by moving objects or through sound, light, or electric currents. (UE.PS3A.b) **Conservation of Energy And Energy Transfer** Energy is present whenever there are moving objects, sound, light, or heat. When objects collide, energy can be transferred from one object to another, thereby changing their motion. In such collisions, some energy is typically also transferred to the surrounding air; as a result, the air gets heated and sound is produced. (UE.PS3B.a) **Relationship Between Energy and Forces** When objects collide, the contact forces transfer energy so as to change the objects' motions. (UE.PS3C.a)	**Energy and Matter** Energy can be transferred in various ways and between objects.

FOSS® NEXT GENERATION™ REFERENCES

The following **FOSS Next Generation** elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below.

Energy Investigations Guide:
Investigation 4, Parts 1-3

Energy *Science Resources* Book:
"*Energy*"
"*What Causes Change of Motion?*"
"*Bowling*"
"*Force and Energy*"
"*Potential and Kinetic Energy at Work*"

Louisiana Student Standards for Science

Grade 4-PS3

Energy

Performance Expectation 4-PS3-4

Students who demonstrate understanding can:

Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.

Clarification Statement: Examples of devices could include electric circuits that convert electrical energy into motion energy of a vehicle, light, or sound and a passive solar heater that converts light into heat. Example of constraints could include the materials, cost, or time to design the device.

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Planning and carrying out investigations **Analyzing and interpreting data** **Using mathematics and computational thinking** **Constructing explanations and designing solutions** **Obtaining, evaluating, and communicating information** **Asking questions and defining problems** **Developing and using models** **Obtaining, evaluating, and communicating information** **Engaging in argument from evidence**	**Conservation of Energy and Energy Transfer** Energy can also be transferred from place to place by electric currents, which can then be used locally to produce motion, sound, heat, or light. The currents may have been produced to begin with by transforming the energy of motion into electrical energy. (UE.PS3B.c) **Energy in Chemical Processes and Everyday Life** The expression "produce energy" typically refers to the conversion of stored energy into a desired form for practical use. (UE.PS3D.a) **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. (UE.ETS1C.a)	**Energy And Matter** Energy can be transferred in various ways and between objects

FOSS® NEXT GENERATION™ REFERENCES

The following **FOSS Next Generation** elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below.

Energy Investigations Guide:
- Investigation 1, Parts 1-4
- Investigation 2, Parts 1-3
- Investigation 3, Parts 1-3
- Investigation 5, Parts 1-3

Energy *Science Resources* Book:
- *"Edison Sees the Light"*
- *"Energy Sources"*
- *"Series and Parallel Circuits"*
- *"Science Practices"*
- *"Engineering Practices"*
- *"Thinking Like an Engineer"*
- *"Engineering a Solar Lighting Solution"*
- *"When Magnet Meets Magnet"*
- *"Magnificent Magnetic Models"*
- *"Make a Magnetic Compass"*
- *"Electricity Creates Magnetism"*
- *"Using Magnetic Fields"*
- *"Electromagnets Everywhere"*
- *"Morse Gets Clicking"*
- *"Waves"*
- *"More about Sound"*
- *"Light Interactions"*
- *"Throw a Little Light on Sight"*
- *"More Light on the Subject"*
- *"Alternative Sources of Energy"*
- *"Ms. Osgood's Class Report"*

Louisiana Student Standards for Science

Grade 4-PS4

Waves and Their Applications in Technologies for Information Transfer

Performance Expectation4-PS4-1

Students who demonstrate understanding can:

Develop a model of waves to describe patterns in terms of amplitude and wavelength and to show that waves can cause objects to move.

Clarification Statement: Examples of models could include diagrams, analogies, or physical models using wire to illustrate wavelength and amplitude of waves. Examples of wave patterns could include the vibrating patterns associated with sound or the vibrating patterns of seismic waves produced by earthquakes. Does not include interference effects, electromagnetic waves, non-periodic waves, or quantitative models of amplitude and wavelength.

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Asking questions and defining problems **Developing and using models** **Planning and carrying out investigations** **Analyzing and interpreting data** **Using mathematics and computational thinking** **Constructing explanations and designing problems** **Obtaining, evaluating, and communicating information**	**Wave Properties** Waves, which are regular patterns of motion, can be made in water by disturbing the surface. When waves move across the surface of deep water, the water goes up and down in place; it does not move in the direction of the wave except when the water meets the beach. (UE.PS4A.a) Waves of the same type can differ in amplitude (height of the wave) and wavelength (spacing between wave peaks). (UE.PS4A.b)	**Patterns** Similarities and differences in patterns can be used to sort, classify, communicate and analyze simple rates of change for natural phenomena and designed products.

FOSS® NEXT GENERATION™ REFERENCES

The following **FOSS Next Generation** elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below.

Energy Investigations Guide:
Investigation 5, Parts 1-3

Energy *Science Resources* Book:
"*Waves*"
"*More about Sound*"
"*Light Interactions*"
"*Throw a Little Light on Sight*"
"*More about Light on the Subject*"
"*Alternative Sources of Electricity*"
"*Ms. Osgood's Class Report*"

Louisiana Student Standards for Science

Grade 4-PS4

Waves and Their Applications in Technologies for Information Transfer

Performance Expectation 4-PS4-2

Students who demonstrate understanding can:

Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen.

Clarification Statement: Develop a model to make sense of a phenomenon involving the relationship between light reflection and visibility of objects. In the model, identify the relevant components including light and its source, objects, the path that light follows, and the eye.

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Asking questions and defining problems **Developing and using models** **Planning and carrying out investigations** **Analyzing and interpreting data** **Using mathematics and computational thinking** **Constructing explanations and designing problems** **Obtaining, evaluating, and communicating information**	**Electromagnetic Radiation** An object can be seen when light reflected from its surface enters the eyes. (UE.PS4B.a)	**Cause and Effect** Cause and effect relationships are routinely identified, tested, and used to explain change.

FOSS® NEXT GENERATION™ REFERENCES

The following **FOSS Next Generation** elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below.

Energy Investigations Guide:
Investigation 5, Parts 1-3

Energy *Science Resources* Book:
"*Waves*"
"*More about Sound*"
"*Light Interactions*"
"*Throw a Little Light on Sight*"
"*More about Light on the Subject*"
"*Alternative Sources of Electricity*"
"*Ms. Osgood's Class Report*"

Louisiana Student Standards for Science

Grade 4-LS1

From Molecules to Organisms: Structure and Processes

Performance Expectation 4-LS1-1

Students who demonstrate understanding can:

Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.

Clarification Statement: Examples of structures could include thorns, stems, roots, colored petals, heart, stomach, lung, brain, shells, fur or skin.

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Asking questions and defining problems **Developing and using models** **Planning and conducting investigations** **Analyzing and interpreting data** **Constructing explanations and designing solutions** **Engaging in argument from evidence** **Obtaining, evaluating, and communicating information**	**Structure and Function** Plants and animals have both internal and external structures that serve various functions in growth, survival, behavior, and reproduction. (UE.LS1A.a)	**Systems and System Models** A system can be described in terms of its components and their interactions.

FOSS® NEXT GENERATION™ REFERENCES

The following **FOSS Next Generation** elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below.

Environments Investigations Guide:
Investigation 1, Parts 1-3
Investigation 2, Parts 1-4

Environments *Science Resources* Book:
"*Two Terrestrial Environments*"
"*Darkling Beetles*"
"*Setting Up a Terrarium*"
"*Isopods*"
"*Amazon Rainforest Journal*"
"*Freshwater Environments*"
"*What Is an Ecosystem?*"
"*Food Chains and Food Webs*"
"*Human Activities and Aquatic Environments*"
"*Comparing Aquatic and Terrestrial Environments*"
"*Animal Sensory Systems*"
"*Saving Murrelets through Mimicry*"

Louisiana Student Standards for Science

Grade 4-LS1

From Molecules to Organisms: Structure and Processes

Performance Expectation 4-LS1-2

Students who demonstrate understanding can:

Construct an explanation to describe how animals receive different types of information through their senses, process the information in their brains, and respond to the information in different ways.

Clarification Statement: Emphasis is on systems of information transfer. Responses could include animals running from predators, animals returning to breeding grounds, animals scavenging for food, or humans responding to stimuli.

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Asking questions and defining problems **Developing and using models** **Planning and conducting investigations** **Analyzing and interpreting data** **Constructing explanations and designing solutions** **Engaging in argument from evidence** **Obtaining, evaluating, and communicating information**	**Information Processing** Different sense receptors are specialized for particular kinds of information, which then may be processed by the animal's brain. Animals are able to use their perceptions and memories to guide their actions. (UE.LS1D.a)	**Cause and Effect** Events that occur together with regularity might or might not be a cause and effect relationship.

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Environments Investigations Guide:
Investigation 1, Parts 1-3
Investigation 2, Parts 1-4

Environments *Science Resources* Book:
"*Two Terrestrial Environments*"
"*Darkling Beetles*"
"*Setting Up a Terrarium*"
"*Isopods*"
"*Amazon Rainforest Journal*"
"*Freshwater Environments*"
"*What Is an Ecosystem?*"
"*Food Chains and Food Webs*"
"*Human Activities and Aquatic Environments*"
"*Comparing Aquatic and Terrestrial Environments*"
"*Animal Sensory Systems*"
"*Saving Murrelets through Mimicry*"

Louisiana Student Standards for Science

Grade 4-ESS

Earth's Place in The Universe

Performance Expectation 4-ESS1-1

Students who demonstrate understanding can:

Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in landforms over time.

Clarification Statement: Examples of evidence from patterns could include rock layers with marine shell fossils above rock layers with plant fossils and no shells, indicating a change from land to water over time, and a canyon with different rock layers in the walls and a river in the bottom, indicating that over time a river cut through the rock. Does not include specific knowledge of the mechanism of rock formation or memorization of specific rock formation and layers.

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Asking questions **Developing and using models** **Planning and carrying out investigations** **Analyzing and interpreting data** **Constructing explanations** **Obtaining, evaluating, and communicating information**	**The History of Planet Earth** Local, regional, and global patterns of rock formations reveal changes over time due to Earth's forces such as earthquakes and volcanoes. The presence and location of certain fossil types indicate the order in which rock layers were formed. (UE.ESS1C.a)	**Patterns** Patterns can be used as evidence to support an explanation.

FOSS® NEXT GENERATION™ REFERENCES

The following **FOSS Next Generation** elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below.

Soils, Rocks, and Landforms Investigations Guide:
Investigation 2, Parts 1-4

Soils, Rocks, and Landforms *Science Resources* Book:
"*Erosion and Deposition*"
"*Landforms Photo Album*"
"*Fossils Tell a Story*"
"*Pieces of a Dinosaur Puzzle*"

Louisiana Student Standards for Science

Grade 4-ESS2

Earth's Systems

Performance Expectation 4-ESS2-1

Students who demonstrate understanding can:

Plan and conduct investigations on the effects of water, ice, wind, and vegetation on the relative rate of weathering and erosion.

Clarification Statement: Examples of variables to test could include angle of slope in the downhill movement of water, amount of vegetation, speed of wind, relative rate of deposition, cycles of freezing and thawing of water, cycles of heating and cooling, and volume of water flow.

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Asking questions **Developing and using models** **Planning and carrying out investigations** **Analyzing and interpreting data** **Constructing explanations** **Engaging in argument from evidence** **Obtaining, evaluating, and communicating information**	**Earth Materials and Systems** Rainfall helps to shape the land and affects the types of living things found in a region. Water, ice, wind, living organisms, and gravity break rocks, soils, and sediments into smaller particles and move them around. (UE.ESS2A.a) **Biogeology** Living things affect the physical characteristics of their environment. (UE.ESS2E.a)	**Cause and Effect** Cause and effect relationships are routinely identified, tested, and used to explain change.

FOSS® NEXT GENERATION™ REFERENCES

The following **FOSS Next Generation** elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below.

Soils, Rocks, and Landforms Investigations Guide:
Investigation 1, Parts 1-4
Investigation 2, Parts 1-4

Soils, Rocks, and Landforms *Science Resources* Book:
"*What Is Soil?*"
"*Weathering*"
"*Erosion and Deposition*"
"*Landforms Photo Album*"
"*Fossils Tell a Story*"
"*Pieces of a Dinosaur Puzzle*"

Louisiana Student Standards for Science

Grade 4-ESS2

Earth's Systems

Performance Expectation 4-ESS2-2

Students who demonstrate understanding can:

Analyze and interpret data from maps to describe patterns of Earth's features

Clarification Statement: Maps can include topographic maps of Earth's land and ocean floor, as well as maps of the locations of mountains, continental boundaries, volcanoes, and earthquakes.

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Asking questions **Developing and using models** **Planning and carrying out investigations** **Analyzing and interpreting data** **Constructing explanations** **Engaging in argument from evidence** **Obtaining, evaluating, and communicating information**	**Plate Tectonics and Large-Scale System Interactions** The locations of mountain ranges, deep ocean trenches, ocean floor structures, earthquakes, and volcanoes occur in patterns. Most earthquakes and volcanoes occur in bands that are often along the boundaries between continents and oceans. Major mountain chains form inside continents or near their edges. Maps can help locate the different land and water features of Earth. (UE.ESS2B.a)	**Patterns** Patterns can be used as evidence to support an explanation.

FOSS® NEXT GENERATION™ REFERENCES

The following **FOSS Next Generation** elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below.

Soils, Rocks, and Landforms Investigations Guide:
Investigation 2, Parts 1-4
Investigation 3, Parts 1-4

Soils, Rocks, and Landforms *Science Resources* Book:
"*Erosion and Deposition*"
"*Landforms Photo Album*"
"*Fossils Tell a Story*"
"*Pieces of a Dinosaur Puzzle*"
"*Topographic Maps*"
"*The Story of Mount Shasta*"
"*It Happened So Fast!*"

Louisiana Student Standards for Science

Grade 4-ESS2

Earth's System

Performance Expectation 4-ESS2-3

Students who demonstrate understanding can:

Ask questions that can be investigated and predict reasonable outcomes about how living things affect the physical characteristics of their environment.

Clarification Statement: Investigations include making observations in various habitats in real life or virtual circumstances. Living things could include animals such as beavers, crawfish, armadillos, nutria, gophers, and plants such as kudzu, water hyacinth, and Chinese tallow.

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Developing and using models **Planning and conducting investigations** **Analyzing and interpreting data** **Using mathematics and computational thinking** **Constructing explanations and designing solutions** **Engaging in argument from evidence** **Obtaining, evaluating, and communicating information**	**Biogeology** Living things affect the physical characteristics of their environment. (UE.ESS2E.a)	**Cause and Effect** Cause and effect relationships are routinely identified, tested, and used to explain change.

FOSS® NEXT GENERATION™ REFERENCES

The following **FOSS Next Generation** elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below.

Environments Investigations Guide:
Investigation 1, Parts 1-4
Investigation 2, Parts 1-3

Environments *Science Resources* Book:
"*Brine Shrimp*"
"*The Mono Lake Story*"
"*What Happens When Ecosystems Change?*"
"*The Shrimp Club*"
"*Variation and Selection*"

Louisiana Student Standards for Science

Grade 4-ESS3

Earth and Human Activity

Performance Expectation 4-ESS3-1

Students who demonstrate understanding can:

Obtain and combine information to describe that energy and fuels are derived from renewable and non-renewable resources and how their uses affect the environment.

Clarification Statement: Examples of renewable energy resources could include wind energy, hydroelectric energy, and solar energy; nonrenewable energy resources are fossil fuels. Examples of environmental effects could include loss of habitat due to dams, loss of habitat due to surface mining, and air pollution from burning fossil fuels.

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Developing and using models **Planning and conducting investigations** **Analyzing and interpreting data** **Using mathematics and computational thinking** **Constructing explanations and designing solutions** **Engaging in argument from evidence** **Obtaining, evaluating, and communicating information**	**Natural Resources** Energy and fuels (fossil fuels, wind energy, solar energy, hydroelectric energy) that humans use are derived from natural sources, and their use affects the environment in multiple ways. Some resources are renewable over time, and others are not. (UE.ESS3A.a)	**Cause and Effect** Cause and effect relationships are routinely identified, tested, and used to explain change

FOSS® NEXT GENERATION™ REFERENCES

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Environments Investigations Guide:
Investigation 3, Parts 1-4

Environments *Science Resources* Book:
"*Brine Shrimp*"
"*The Mono Lake Story*"
"*What Happens When Ecosystems Change?*"
"*The Shrimp Club*"
"*Variation and Selection*"

Louisiana Student Standards for Science

Grade 4-ESS3

Earth and Human Activity

Performance Expectation 4-ESS3-2

Students who demonstrate understanding can:

Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans.

Clarification Statement: Examples of solutions could include designing flood, wind, or earthquake resistant structures and models to prevent soil erosion.

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Developing and using models **Planning and conducting investigations** **Analyzing and interpreting data** **Using mathematics and computational thinking** **Constructing explanations and designing solutions** **Engaging in argument from evidence** **Obtaining, evaluating, and communicating information**	**Natural Hazards** A variety of natural hazards result from natural processes. Humans cannot eliminate natural hazards but can take steps to reduce their impacts. (UE.ESS3B.a) **Developing Possible Solutions to Engineering Problems** Testing a solution involves investigating how well it performs under a range of likely conditions. (UE.ETS1B.d)	**Cause and Effect** Cause and effect relationships are routinely identified, tested, and used to explain change.

FOSS® NEXT GENERATION™ REFERENCES

The following **FOSS Next Generation** elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below.

Soils, Rocks, and Landforms Investigations Guide:
Investigation 3, Parts 1-4
Investigation 4, Parts 1-3

Soils, Rocks, and Landforms *Science Resources* Book:
"*Topographic Maps*"
"*The Story of Mount Shasta*"
"*It Happened So Fast!*"
"*Monumental Rocks*"
"*Geoscientists at Work*"
"*Making Concrete*"
"*Earth Materials in Art*"
"*Where Do Rocks Come From?*"

Louisiana Student Standards for Science

Grade 5-PS1

Matter and Its Interactions

Performance Expectation 5-PS1-1

Students who demonstrate understanding can:

Develop a model to describe that matter is made of particles too small to be seen.

Clarification Statement: Examples of evidence could include adding air to expand a basketball, compressing air in a syringe, dissolving sugar in water, or evaporating salt water. Does not include atomic scale mechanism of evaporation and condensation or defining the unseen particles.

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Asking questions and defining problems **Developing and using models** **Planning and carrying out investigations** **Analyzing and interpreting data** **Using mathematics and computational thinking** **Constructing explanations and designing solutions** **Engaging in argument from evidence** **Obtaining, evaluating, and communicating information**	**Structures and Properties Of Matter** Matter of any type can be subdivided into particles that are too small to see, but even then the matter still exists and can be detected by other means. A model showing that gases are made from matter particles that are too small to see and are moving freely around in space can explain many observations, including boiling water, the inflation and shape of a balloon, and the effects of air on larger particles or objects. (UE.PS1A.a)	**Scale, Proportion, and Quantity** Natural objects and/or observable phenomena exist from the very small to the immensely large or from very short to very long time periods.

FOSS® NEXT GENERATION™ REFERENCES

The following **FOSS Next Generation** elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below.

Mixtures and Solutions Investigations Guide:
- Investigation 1, Parts 1-4
- Investigation 2, Parts 1-3
- Investigation 3, Parts 1-4
- Investigation 4, Parts 1-4
- Investigation 5, Parts 1-3

Mixtures and Solutions *Science Resources* Book:
- "*Mixtures*"
- "*Taking Mixtures Apart*"
- "*Science Practices*"
- "*Engineering Practices*"
- "*Extracts*"
- "*The Story of Salt*"
- "*Beachcombing Science*"
- "*Solid to Liquid*"
- "*Liquid and Gas Changes*"
- "*Celsius and Fahrenheit*"
- "*Solutions Up Close*"
- "*Concentrated Solutions*""*The Air*"
- "*Famous Scientists*"
- "*Carbon Dioxide Concentration in the Air*"
- "*The Frog Story*"
- "*The Bends*"
- "*A Sweet Solution*"
- "*Sour Power*"
- "*East Bay Academy for Young Scientists*"
- "*Drinking Ocean Water*"
- "*Creative Solutions*"
- "*Ask a Chemist*"
- "*When Substances Change*"
- "*Air Bags*"

Louisiana Student Standards for Science

Grade 5-PS1

Matter and Its Interactions

Performance Expectation 5-PS1-2

Students who demonstrate understanding can:

Measure and graph quantities to provide evidence that regardless of the type of change that occurs when heating, cooling, or mixing substances, the total amount of matter is conserved.

Clarification Statement: Examples of chemical changes includes reactions that produce new substances with new properties. Examples of physical changes could include phase changes, dissolving, or mixing.

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Asking questions and defining problems **Developing and using models** **Planning and carrying out investigations** **Analyzing and interpreting data** **Using mathematics and computational thinking** **Constructing explanations and designing solutions** **Engaging in argument from evidence** **Obtaining, evaluating, and communicating information**	**Structure and Properties Of Matter** The amount of mass in matter is conserved when it changes form, even in transitions in which it seems to vanish. (UE.PS1A.b) **Chemical Reactions** When two or more different substances are mixed, a new substance with different properties may be formed. (UE.PS1B.a) No matter what reaction or change in properties occurs, the total mass of the substances does not change. (UE.PS1B.b)	**Energy and Matter** Matter flows and cycles can be tracked in terms of mass of the substances before and after a process occurs. The total mass of the substances does not change. This is what is meant by conservation of matter. Matter is transported into, out of, and within systems.

FOSS® NEXT GENERATION™ REFERENCES

The following **FOSS Next Generation** elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below.

Mixtures and Solutions Investigations Guide:
Investigation 1, Parts 1-4
Investigation 2, Parts 1-3
Investigation 3, Parts 1-4
Investigation 4, Parts 1-4
Investigation 5, Parts 1-3

Mixtures and Solutions *Science Resources* Book:
"*Mixtures*"
"*Taking Mixtures Apart*"
"*Science Practices*"
"*Engineering Practices*"
"*Extracts*"
"*The Story of Salt*"
"*Beachcombing Science*"
"*Solid to Liquid*"
"*Liquid and Gas Changes*"
"*Celsius and Fahrenheit*"
"*Solutions Up Close*"
"*Concentrated Solutions*"
"*The Air*"
"*Famous Scientists*"
"*Carbon Dioxide Concentration in the Air*"
"*The Frog Story*"
"*The Bends*"
"*A Sweet Solution*"
"*Sour Power*"
"*East Bay Academy for Young Scientists*"
"*Drinking Ocean Water*"
"*Creative Solutions*"
"*Ask a Chemist*"
"*When Substances Change*"
"*Air Bags*"

Louisiana Student Standards for Science

Grade 5-PS1

Matter and Its Interactions

Performance Expectation 5-PS1-3

Students who demonstrate understanding can:

Make observations and measurements to identify materials based on their properties.

Clarification Statement: Examples of materials to be identified could include baking soda and other powders, metals, minerals, or liquids. Examples of properties could include color, hardness, reflectivity, electrical conductivity, thermal conductivity, response to magnetic forces, or solubility; density is not intended to be used as an identifiable property. No attempt is made to define the unseen particles or explain the atomic-scale mechanism of evaporation and condensation.

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Asking questions and defining problems **Developing and using models** **Planning and carrying out investigations** **Analyzing and interpreting data** **Using mathematical and computational thinking** **Constructing explanations and designing solutions** **Engaging in argument from evidence** **Obtaining, evaluating, and communicating information**	**Structures and Properties of Matter** Measurements of a variety of properties can be used to identify materials. (UE.PS1A.c)	**Scale, Proportion, and Quantity** Standard units are used to measure and describe physical quantities such as mass, time, temperature, and volume.

FOSS® NEXT GENERATION™ REFERENCES

The following **FOSS Next Generation** elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below.

Mixtures and Solutions Investigations Guide:
Investigation 4, Parts 1-4
Investigation 5, Parts 1-3

Mixtures and Solutions *Science Resources* Book:
"*The Bends*"
"*A Sweet Solution*"
"*Sour Power*"
"*East Bay Academy for Young Scientists*"
"*Drinking Ocean Water*"
"*Creative Solutions*"
"*Ask a Chemist*"
"*When Substances Change*"
"*Air Bags*"

Louisiana Student Standards for Science

Grade 5-PS1

Matter and Its Interactions

Performance Expectation 5-PS1-4

Students who demonstrate understanding can:

Conduct an investigation to determine whether the mixing of two or more substances results in new substances.

Clarification Statement: Examples of interactions forming new substances can include mixing baking soda and vinegar. Examples of interactions not forming new substances can include mixing baking soda and water.

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Asking questions **Developing and using models** **Planning and carrying out investigations** **Analyzing and interpreting data** **Constructing explanations** **Obtaining, evaluating, and communicating information**	**Chemical Reactions** When two or more different substances are mixed, a new substance with different properties may be formed. (UE.PS1B.a)	**Cause and Effect** Cause and effect relationships are routinely identified, tested, and used to explain change.

FOSS® NEXT GENERATION™ REFERENCES

The following **FOSS Next Generation** elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below.

Mixtures and Solutions Investigations Guide:
Investigation 5, Parts 1-3

Mixtures and Solutions *Science Resources* Book:
"*Ask a Chemist*"
"*When Substances Change*"
"*Air Bags*"

Louisiana Student Standards for Science

Grade 5-PS2

Motion and Stability: Forces and Interactions

Performance Expectation 5-PS2-1

Students who demonstrate understanding can:

Support an argument that the gravitational force exerted by the Earth is directed down.

Clarification Statement: "Down" is a local description of the direction that points toward the center of the spherical Earth. Earth's mass causes objects to have a force on them that points toward the center of the Earth, "down". Support for arguments can be drawn from diagrams, evidence, and data that are provided. This does not include mathematical representation of gravitational force.

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Developing and using models **Planning and carrying out investigations** **Analyzing and interpreting data** **Using mathematics and computational thinking** **Constructing explanations** **Engaging in argument from evidence** **Obtaining, evaluating, and communicating information**	**Types of Interactions** The gravitational force of Earth acting on an object near Earth's surface pulls that object toward the planet's center. (UE.PS2B.c)	**Cause and Effect** Cause and effect relationships are routinely identified, tested, and used to explain change.

FOSS® NEXT GENERATION™ REFERENCES

The following **FOSS Next Generation** elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below.

Earth and Sun Investigations Guide:
Investigation 2, Parts 1-5

Earth and Sun *Science Resources* Book:
"*The Night Sky*"
"*Looking through Telescopes*"
"*Comparing the Size of Earth and the Moon*"
"*Apollo 11 Space Mission*"
"*How Did Earth's Moon Form?*"
"*Changing Moon*"
"*Lunar Cycle*"
"*Eclipse*"
"*Exploring the Solar System*"
"*Planets of the Solar System*"
"*Why Doesn't Earth Fly Off into Space?*"
"*Stargazing*"
"*Star Scientists*"
"*Our Galaxy*"

Louisiana Student Standards for Science

Grade 5-PS3

Matter and Energy in Organisms and Ecosystems

Performance Expectation 5-PS3-1

Students who demonstrate understanding can:

Use models to describe that energy in animals' food (used for body repair, growth, motion, and to maintain body warmth) was once energy from the sun.

Clarification Statement: Examples of models could include diagrams or flowcharts.

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Asking questions **Developing and using models** **Planning and carrying out investigations** **Using mathematics and computational thinking** **Analyzing and interpreting data** **Constructing explanations** **Engaging in argument from evidence** **Obtaining, evaluating, and communicating information**	**Energy in Chemical Processes and Everyday Life** The energy released from food was once energy from the sun that was captured by plants in the chemical process that forms plant matter (from air and water). (UE.PS3D.b) **Organization for Matter and Energy Flow in Organisms** Food provides animals with the materials they need for body repair and growth and energy they need to maintain body warmth and for motion. (UE.LS1C.a)	**Energy and Matter** Energy can be transferred in various ways and between objects

FOSS® NEXT GENERATION™ REFERENCES

The following **FOSS Next Generation** elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below.

Living Systems Investigations Guide:
- Investigation 1, Parts 1-4
- Investigation 2, Parts 1-3
- Investigation 3, Parts 1-3
- Investigation 4, Parts 1-4

Living Systems *Science Resources* Book:
- "*Introduction to Systems*"
- "*Is Earth a System?*"
- "*The Biosphere*"
- "*Monterey Bay National Marine Sanctuary*"
- "*Comparing Aquatic and Terrestrial Ecosystems*"
- "*There's Yeast in My Bread!*"
- "*Producers*"
- "*Getting Nutrients*"
- "*The Human Digestive System*"
- "*Leaf Classification*"
- "*Plant Vascular Systems*"
- "*The Story of Maple Syrup*"
- "*The Human Circulatory System*"
- "*The Human Respiratory System*"
- "*Other Circulatory and Respiratory Systems*"
- "*Structures of the Brain*"
- "*Sensory Systems*"
- "*Animal Communication*"
- "*Monarch Migration*"
- "*North Atlantic Ocean Ecosystem*"

Louisiana Student Standards for Science

Grade 5-LS1

From Molecules to Organisms: Structures and Processes

Performance Expectation 5-LS1-1

Students who demonstrate understanding can:

Ask questions about how air and water affect the growth of plants.

Clarification Statement: Emphasis is on the idea that plant matter comes mostly from air and water, not from the soil. The chemical processes of photosynthesis and cellular respiration are not addressed at this grade level.

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Asking questions **Developing and using models** **Planning and carrying out investigations** **Using mathematics and computational thinking** **Analyzing and interpreting data** **Constructing explanations** **Engaging in argument from evidence** **Obtaining, evaluating, and communicating information**	**Organization for Matter and Energy Flow in Organisms** Plants acquire their material for growth chiefly from air and water. (UE.LS1C.b)	**Energy and Matter** Matter is transported into, out of, and within systems.

FOSS® NEXT GENERATION™ REFERENCES

The following **FOSS Next Generation** elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below.

Living Systems Investigations Guide:
Investigation 2, Parts 1-3
Investigation 3, Parts 1-3

Living Systems *Science Resources* Book:
"*There's Yeast in My Bread!*"
"*Producers*"
"*Getting Nutrients*"
"*The Human Digestive System*"
"*Leaf Classification*"
"*Plant Vascular Systems*"
"*The Story of Maple Syrup*"
"*The Human Circulatory System*"
"*The Human Respiratory System*"
"*Other Circulatory and Respiratory Systems*"

Louisiana Student Standards for Science

Grade 5-LS2

Ecosystems

Performance Expectation 5-LS2-1

Students who demonstrate understanding can:

Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.

Clarification Statement: Emphasis is on the idea that matter that is not food (air, water, decomposed materials in soil) is changed by plants into matter that is food. Examples of systems could include organisms, ecosystems of the Earth not including molecular explanations.

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Asking questions **Developing and using models** **Planning and carrying out investigations** **Analyzing and interpreting data** **Using mathematics and computational thinking** **Constructing explanations** **Engaging in argument from evidence** **Obtaining, evaluating, and communicating information**	**Interdependent Relationships in Ecosystems** The food of almost any kind of animal can be traced back to plants. Organisms are related in food webs in which some animals eat plants for food and other animals eat the animals that eat plants. (UE.LS2A.a) Some organisms, such as fungi and bacteria, break down dead organisms and therefore operate as "decomposers." Decomposition eventually restores (recycles) some materials back to the soil. (UE.LS2A.b) Organisms can survive only in environments in which their particular needs are met. A healthy ecosystem is one in which multiple species of different types are each able to meet their needs in a relatively stable web of life. (UE.LS2A.c) Newly introduced species can damage the balance of an ecosystem. (UE.LS2A.d) **Cycles of Matter and Energy Transfer in Ecosystems** Matter cycles between the air and soil and among plants, animals, decomposers, and microbes as these organisms live and die. Organisms obtain gases, and water, from the environment, and release waste matter (gas, liquid, or solid) back into the environment. (UE.LS2B.a)	**Systems and System Models** A system can be described in terms of its components and their interactions.

FOSS® NEXT GENERATION™ REFERENCES

The following FOSS Next Generation elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below.

Living Systems Investigations Guide:
- Investigation 1, Parts 1-4
- Investigation 2, Parts 1-3
- Investigation 3, Parts 1-3
- Investigation 4, Parts 1-4

Living Systems *Science Resources* Book:
- *"Introduction to Systems"*
- *"Is Earth a System?"*
- *"The Biosphere"*
- *"Monterey Bay National Marine Sanctuary"*
- *"Comparing Aquatic and Terrestrial Ecosystems"*
- *"There's Yeast in My Bread!"*
- *"Producers"*
- *"Getting Nutrients"*
- *"The Human Digestive System"*
- *"Leaf Classification"*
- *"Plant Vascular Systems"*
- *"The Story of Maple Syrup"*
- *"The Human Circulatory System"*
- *"The Human Respiratory System"*
- *"Other Circulatory and Respiratory Systems"*
- *"Structures of the Brain"*
- *"Sensory Systems"*
- *"Animal Communication"*
- *"Monarch Migration"*
- *"North Atlantic Ocean Ecosystem"*

Louisiana Student Standards for Science

Grade 5-ESS1

Earth's Place in The Universe

Performance Expectation 5-ESS1-1

Students who demonstrate understanding can:

Support an argument that differences in the apparent brightness of the sun compared to other stars is due to their relative distances from the Earth.

Clarification Statement: Examples include the relative distances of the stars, but not the sizes. It does not include other factors that affect apparent brightness (such as stellar masses, age, stage).

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Asking questions **Developing and using models** **Planning and carrying out investigations** **Analyzing and interpreting data** **Using mathematics and computational thinking** **Constructing explanations** **Engaging in argument from evidence** **Obtaining, evaluating, and communicating information**	**The Universe and its Stars** The sun is a star that appears larger and brighter then other stars because it is closer. Stars range greatly in their distance from Earth. (UE.ESS1A.a)	**Scale, Proportion and Quantity** Natural objects and/or observable phenomena exist from the very small to the immensely large or from very short to very long time periods.

FOSS® NEXT GENERATION™ REFERENCES

The following **FOSS Next Generation** elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below.

Earth and Sun Investigations Guide:
Investigation 1, Parts 1-3
Investigation 2, Parts 1-5

Earth and Sun *Science Resources* Book:
"*Changing Shadows*"
"*Sunrise and Sunset*"
"*The Night Sky*"
"*Looking through Telescopes*"
"*Comparing the Size of Earth and the Moon*"
"*Apollo 11 Space Mission*"
"*How Did Earth's Moon Form?*"
"*Changing Moon*"
"*Lunar Cycle*"
"*Eclipse*"
"*Exploring the Solar System*"
"*Planets of the Solar System*"
"*Why Doesn't Earth Fly Off into Space?*"
"*Stargazing*"
"*Star Scientists*"
"*Our Galaxy*"

Louisiana Student Standards for Science

Grade 5-ESS1

Earth's Place in The Universe

Performance Expectation 5-ESS1-2

Students who demonstrate understanding can:

Represent data in graphical displays to reveal patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky.

Clarification Statement: Patterns could include the position and motion of Earth with respect to the sun and selected stars that are visible only in particular months; not including the causes of the seasons.

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Asking questions **Developing and using models** **Planning and carrying out investigations** **Analyzing and interpreting data** **Using mathematics and computational thinking** **Constructing explanations** **Engaging in argument from evidence** **Obtaining, evaluating, and communicating information**	**History of Planet Earth** The orbits of Earth around the sun and of the moon around Earth, together with the rotation of Earth about an axis between its North and South poles, cause observable patterns. These include: day and night, daily changes in the length and direction of shadows, and different positions of the sun, moon, and stars at different times of the day, month, and year. (UE.ESS1B.a)	**Patterns** Similarities and differences in patterns can be used to sort, classify, communicate and analyze simple rates of change for natural phenomena and designed products.

FOSS® NEXT GENERATION™ REFERENCES

The following **FOSS Next Generation** elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below.

Earth and Sun Investigations Guide:
Investigation 1, Parts 1-3
Investigation 2, Parts 1-5

Earth and Sun *Science Resources* Book:
"*Changing Shadows*"
"*Sunrise and Sunset*"
"*The Night Sky*"
"*Looking through Telescopes*"
"*Comparing the Size of Earth and the Moon*"
"*Apollo 11 Space Mission*"
"*How Did Earth's Moon Form?*"
"*Changing Moon*"
"*Lunar Cycle*"
"*Eclipse*"
"*Exploring the Solar System*"
"*Planets of the Solar System*"
"*Why Doesn't Earth Fly Off into Space?*"
"*Stargazing*"
"*Star Scientists*"
"*Our Galaxy*"

Louisiana Student Standards for Science

Grade 5-ESS2

Earth's Systems

Performance Expectation 5-ESS2-1

Students who demonstrate understanding can:

Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact.

Clarification Statement: Examples could include the influence of the ocean on ecosystems, landform shape, and climate; the influence of the atmosphere on landforms and ecosystems through weather and climate; and the influence of mountain ranges on winds and clouds in the atmosphere. The geosphere, hydrosphere, atmosphere, and biosphere are each a system.

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Asking questions **Developing and using models** **Planning and carrying out investigations** **Analyzing and interpreting data** **Using mathematics and computational thinking** **Constructing explanations** **Engaging in argument from evidence** **Obtaining, evaluating, and communicating information**	**Earth Materials and Systems** Earth's major systems are the geosphere (solid and molten rock, soil, and sediments), the hydrosphere (water and ice), the atmosphere (air), and the biosphere (living things, including humans). These systems interact in multiple ways to affect Earth's surface materials and processes. The ocean supports a variety of ecosystems and organisms, shapes landforms, and influences climate. Winds and clouds in the atmosphere interact with the landforms to determine patterns of weather. (UE.ESS2A.b)	**Systems and Systems Models** A system can be described in terms of its components and their interactions

FOSS® NEXT GENERATION™ REFERENCES

The following **FOSS Next Generation** elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below.

Earth and Sun Investigations Guide:
Investigation 3, Parts 1-3
Investigation 4, Parts 1-4
Investigation 5, Parts 1-4

Earth and Sun *Science Resources* Book:
"*What Is Air?*"
"*Earth's Atmosphere*"
"*Weather Instruments*"
"*Uneven Heating*"
"*Heating the Air: Radiation and Conduction*"
"*Wind and Convection*"
"*Wind Power*"
"*Solar Technology*"
"*Condensation*"
"*Where Is Earth's Water?*"
"*The Water Cycle*"
"*Severe Weather*"
"*Earth's Climates*"
"*Global Climate Change*"

Louisiana Student Standards for Science

Grade 5-ESS2

Earth's Systems

Performance Expectation 5-ESS2-2

Students who demonstrate understanding can:

Describe and graph the amounts and percentages of water and fresh water in various reservoirs to provide evidence about the distribution of water on Earth.

Clarification Statement: Examples include oceans, lakes, rivers, glaciers, ground water, and polar ice caps.

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Asking questions **Developing and using models** **Planning and carrying out investigations** **Analyzing and interpreting data** **Using mathematics and computational thinking** **Constructing explanations** **Engaging in argument from evidence** **Obtaining, evaluating, and communicating information**	**The Role of Water in Earth's Surface Processes** Nearly all of Earth's available water is in the ocean. Most fresh water is in glaciers or underground; only a tiny fraction is in streams, lakes, wetlands, and the atmosphere. (UE.ESS2C.a) Liquid water can become the gas form of water (water vapor) and liquid water can become a solid as ice. (UE.ESS2C.b)	**Scale, Proportion and Quantity** Standard units are used to measure and describe physical quantities such as mass, time, temperature, and volume.

FOSS® NEXT GENERATION™ REFERENCES

The following **FOSS Next Generation** elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below.

Earth and Sun Investigations Guide:
Investigation 4, Parts 1-4
Investigation 5, Parts 1-4

Earth and Sun *Science Resources* Book:
"*Uneven Heating*"
"*Heating the Air: Radiation and Conduction*"
"*Wind and Convection*"
"*Wind Power*"
"*Solar Technology*"
"*Condensation*"
"*Where Is Earth's Water?*"
"*The Water Cycle*"
"*Severe Weather*"
"*Earth's Climates*"
"*Global Climate Change*"

Louisiana Student Standards for Science

Grade 5-ESS3

Earth and Human Activity

Performance Expectation 5-ESS3-1

Students who demonstrate understanding can:

Generate and compare multiple solutions about ways individual communities can use science to protect the Earth's resources and environment.

Clarification Statement: Examples of solutions can include cleanup of oil spills, protecting against coastal erosion, or prevention of polluted runoff into waterways

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Asking questions **Developing and using models** **Planning and carrying out investigations** **Analyzing and interpreting data** **Using mathematics and computational thinking** **Constructing explanations and designing solutions** **Engaging in argument from evidence** **Obtaining, evaluating, and communicating information**	**Human Impact on Earth Systems** Human activities in agriculture, industry, and everyday life have had major effects on the land, vegetation, streams, ocean and the atmosphere. But individuals and communities are doing things to help protect Earth's resources and environments. (UE.ESS3C.a) **Developing Possible Solutions** Tests are often designed to identify failure points or difficulties, which suggest the elements of the design that need to be improved. (ETS.UE.1B.c)	**System and System Models** A system can be described in terms of its components and their interactions.

FOSS® NEXT GENERATION™ REFERENCES

The following **FOSS Next Generation** elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below.

Earth and Sun Investigations Guide:
Investigation 4, Parts 1-4
Investigation 5, Parts 1-4

Earth and Sun *Science Resources* Book:
"*Uneven Heating*"
"*Heating the Air: Radiation and Conduction*"
"*Wind and Convection*"
"*Wind Power*"
"*Solar Technology*"
"*Condensation*"
"*Where Is Earth's Water?*"
"*The Water Cycle*"
"*Severe Weather*"
"*Earth's Climates*"
"*Global Climate Change*"