



FOSS[®] Next Generation[™]

NGSS Alignment Overview

Grades K–5

Three-dimensional active science
for the Next Generation



FOSS Next Generation fulfills the vision of the Framework and the NGSS in three key ways:

- 1. FOSS is designed around learning as a developmental progression**—FOSS provides experiences that allow students to continually build and develop more complex science and engineering ideas.
- 2. FOSS focuses on core ideas**—FOSS chooses depth over superficial coverage and addresses core ideas at multiple grade levels in evermore complex ways.
- 3. FOSS integrates scientific knowledge with the practices of science and engineering**—FOSS investigations provide students with engaging firsthand experiences and sense-making activities.

Science and engineering practices have always been a critical part of FOSS investigations.

Rigorous ELA connections build literacy skills through science.

Every FOSS investigation integrates both disciplinary core ideas and crosscutting concepts.

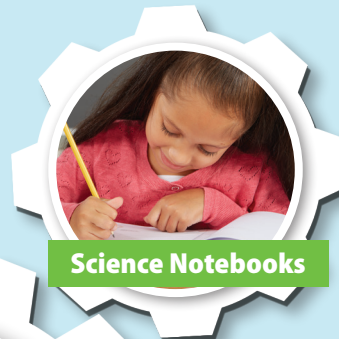
MOTION AND MATTER — Framework and NGSS		Connections to NGSS			
	Science and Engineering Practices	Connections to Common Core State Standards—ELA	Disciplinary Core Ideas	Crosscutting Concepts	
Inv. 3: Engineering	<ul style="list-style-type: none"> Asking questions and defining problems Planning and carrying out investigations Analyzing and interpreting data Constructing explanations and designing solutions Obtaining, evaluating, and communicating information 	<ul style="list-style-type: none"> RI 1: Ask and answer questions. RI 2: Determine the main idea of a text; recount the key details. RI 3: Describe the relationship between steps in technical procedures in a text. W 3: Write narratives. SL 1: Engage in collaborative discussions. SL 4: Report on a topic or text. L 6: Acquire and use domain-specific words. 	<p>PS2.A: Forces and motion</p> <ul style="list-style-type: none"> 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. <p>ETS1.A: Defining and delimiting engineering problems</p> <ul style="list-style-type: none"> Possible solutions 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. 	<p>ETS1.B: Developing possible solutions</p> <ul style="list-style-type: none"> 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. <p>ETS1.C: Optimizing the design solution</p> <ul style="list-style-type: none"> Different solutions need to be tested in order to determine which of them best solves the problem, given the criteria and the constraints. 	<ul style="list-style-type: none"> Patterns Cause and effect
Inv. 4: Mixtures	<ul style="list-style-type: none"> Planning and carrying out investigations Analyzing and interpreting data Constructing explanations and designing solutions Engaging in argument from evidence Obtaining, evaluating, and communicating information 	<ul style="list-style-type: none"> RI 2: Determine the main idea of a text; recount the key details. RI 3: Describe the relationship between scientific ideas using cause and effect. RI 4: Determine the meaning of domain-specific words and phrases in text. RI 5: Use text features to locate information. RI 10: Read and comprehend science text. RF 4c: Use context to confirm understandings of words. SL 1: Engage in collaborative discussions. SL 4: Report on a topic or text. 	<p>PS1.A: Structures and properties of matter</p> <ul style="list-style-type: none"> The amount (weight) of matter is conserved when it changes form, even in transitions in which it seems to vanish. Measurements of a variety of properties can be used to identify materials. 	<p>PS1.B: Chemical reactions</p> <ul style="list-style-type: none"> When two or more different substances are mixed, a new substance with different properties may be formed. No matter what reaction or change in properties occurs, the total weight of the substances does not change. 	<ul style="list-style-type: none"> Cause and effect Scale, proportion, and quantity Energy and matter

FOSS Instructional Design

FOSS is designed around active investigations that provide engagement with science concepts and science and engineering practices. Surrounding and supporting those firsthand investigations are experiences that help build student understanding of core science concepts and deepen scientific habits of mind.

Find out more about FOSS active investigations at deltaeducation.com/foss/activeinvestigation.

Ongoing assessment that monitors progress and drives future instruction



Organize data and thinking to create a personalized record of learning



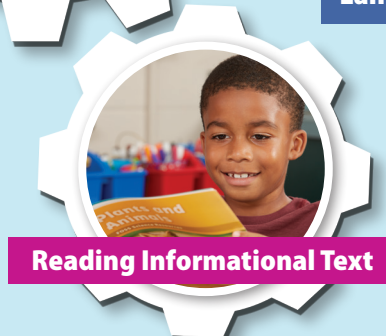
Outdoor learning experiences help students collect additional data and apply knowledge



Using the connections between science and language arts, students read, write, and discuss their experiences



Online activities that review and provide application opportunities for each investigation



Students read and comprehend engaging informational text to extend and enrich their experiences



FOSS Next Generation

Physical Science Performance Expectations

			Materials and Motion	Sound and Light	Solids and Liquids	Motion and Matter
K	K-PS2-1	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.	✓			
	K-PS2-2	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.	✓			
	K-PS3-1	Make observations to determine the effect of sunlight on Earth's surface.	✓			
	K-PS3-2	Use tools and materials to design and build a structure that will reduce the warming effect of sunlight on an area.	✓			
1	1-PS4-1	Plan and conduct investigations to provide evidence that vibrating materials can make sound and that sound can make materials vibrate.		✓		
	1-PS4-2	Make observations to construct an evidence-based account that objects can be seen only when illuminated.		✓		
	1-PS4-3	Plan and conduct an investigation to determine the effect of placing objects made with different materials in the path of a beam of light.		✓		
	1-PS4-4	Use tools and materials to design and build a device that uses light or sound to solve the problem of communicating over a distance.		✓		
2	2-PS1-1	Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties.			✓	
	2-PS1-2	Analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose.			✓	
	2-PS1-3	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.			✓	
	2-PS1-4	Construct an argument with evidence that some changes caused by heating or cooling can be reversed and some cannot.			✓	
3	3-PS2-1	Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object.				✓
	3-PS2-2	Make observations and/or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion.				✓
	3-PS2-3	Ask questions to determine cause and effect relationships of electric or magnetic interactions between two objects not in contact with each other.				✓
	3-PS2-4	Define a simple design problem that can be solved by applying scientific ideas about magnets.				✓
4	4-PS3-1	Use evidence to construct an explanation relating the speed of an object to the energy of that object.				
	4-PS3-2	Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.				
	4-PS3-3	Ask questions and predict outcomes about the changes in energy that occur when objects collide.				
	4-PS3-4	Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.				
	4-PS4-1	Develop a model of waves to describe patterns in terms of amplitude and wavelength and that waves can cause objects to move.				
	4-PS4-2	Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen.				
5	4-PS4-3	Generate and compare multiple solutions that use patterns to transfer information.				
	5-PS1-1	Develop a model to describe that matter is made of particles too small to be seen.				✓
	5-PS1-2	Measure and graph quantities to provide evidence that regardless of the type of change that occurs when heating, cooling, or mixing substances, the total weight of matter is conserved.				
	5-PS1-3	Make observations and measurements to identify materials based on their properties.				
	5-PS1-4	Conduct an investigation to determine whether the mixing of two or more substances results in new substances.				
	5-PS2-1	Support an argument that the gravitational force exerted by Earth on objects is directed down.				
	5-PS3-1	Use models to describe that energy in animals' food (<i>used for body repair, growth, motion, and to maintain body warmth</i>) was once energy from the sun.				

Physical Science Core Ideas

PS1-A	Structures and Properties of Matter	✓		✓	✓
PS1-B	Chemical Reactions			✓	
PS2-A	Forces and Motion	✓			✓
PS2-B	Types of Interactions	✓			✓
PS3-A	Definitions of Energy	✓			
PS3-B	Conservation of Energy and Energy Transfer	✓			
PS3-C	Relationship Between Energy and Forces	✓			
PS3-D	Energy in Chemical Processes and Everyday Life				
PS4-A	Wave Properties		✓		
PS4-B	Electromagnetic Radiation		✓		



Life Science Performance Expectations

			Materials and Motion	Sound and Light	Solids and Liquids
K	K-LS1-1	Use observations to describe patterns of what plants and animals (including humans) need to survive.			
	1-LS1-1	Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs.		✓	
1	1-LS1-2	Read texts and use media to determine patterns in behavior of parents and offspring that help offspring survive.			
	1-LS3-1	Make observations to construct an evidence-based account that young plants and animals are like, but not exactly like, their parents.			
2	2-LS2-1	Plan and conduct an investigation to determine if plants need sunlight and water to grow.			
	2-LS2-2	Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants.			
	2-LS4-1	Make observations of plants and animals to compare the diversity of life in different habitats.			
3	3-LS1-1	Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death.			
	3-LS2-1	Construct an argument that some animals form groups that help members survive.			
	3-LS3-1	Analyze and interpret data to provide evidence that plants and animals have traits inherited from parents and the variation of these traits exists in a group of similar organisms.			
	3-LS3-2	Use evidence to support the explanation that traits can be influenced by the environment.			
	3-LS4-1	Analyze and interpret data from fossils to provide evidence of organisms and the environments in which they lived long ago.			
	3-LS4-2	Use evidence to construct an explanation for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing.			
	3-LS4-3	Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all.			
4	3-LS4-4	Make a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change.			
	4-LS1-1	Construct an argument that plants have internal and external structures that function to support survival, growth, behavior, and reproduction.			
5	4-LS1-2	Use a model to describe that animals' receive different types of information through their senses, process the information in their brain, and respond to the information in different ways.			
	5-LS1-1	Support an argument that plants get the materials they need for growth chiefly from air and water.			
	5-LS2-1	Develop a model to describe the movement of matter among plants, animals, omposers, and the environment.			

Life Science Core Ideas

LS1-A	Structure and Function		✓	
LS1-B	Growth and Development of Organisms			
LS1-C	Organization for Matter and Energy Flow in Organisms			
LS1-D	Information Processing			
LS2-A	Interdependent Relationships in Ecosystems			
LS2-B	Cycles of Matter and Energy Transfer in Ecosystems			
LS2-C	Ecosystem Dynamics, Functioning, and Resilience			
LS2-D	Social Interactions and Group Behavior			
LS3-A	Inheritance of Traits			
LS3-B	Variation of Traits			
LS4-A	Evidence of Common Ancestry and Diversity			
LS4-B	Natural Selection			
LS4-C	Adaptation			
LS4-D	Biodiversity and Humans			



Earth Science Performance Expectations

			Materials and Motion	Sound and Light	Solids and Liquids
K	K-ESS2-1	Use and share observations of local weather conditions to describe patterns over time.			
	K-ESS2-2	Construct an argument supported by evidence for how plants and animals (including humans) can change the environment to meet their needs.			
	K-ESS3-1	Use a model to represent the relationship between the needs of different plants or animals (including humans) and the places they live.			
	K-ESS3-2	Ask questions to obtain information about the purpose of weather forecasting to prepare for, and respond to, severe weather.			
	K-ESS3-3	Communicate solutions that will reduce the impact of humans on the land, water, air, and/or other living things in the environment.	✓		
1	1-ESS1-1	Use observations of the sun, moon, and stars to describe patterns that can be predicted.			
	1-ESS1-2	Make observations at different times of year to relate the amount of daylight to the time of year.			
2	2-ESS1-1	Make observations from media to construct an evidence-based account that Earth events can occur quickly or slowly.			
	2-ESS2-1	Compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land.			
	2-ESS2-2	Develop a model to represent the shapes and kinds of land and bodies of water in an area.			
	2-ESS2-3	Obtain information to identify where water is found on Earth and that it can be solid or liquid.			
3	3-ESS2-1	Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season.			
	3-ESS2-2	Obtain and combine information to describe climates in different regions of the world.			
	3-ESS3-1	Make a claim about the merit of a design solution that reduces the impacts of a weather-related hazard.			
4	4-ESS1-1	Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in a landscape over time.			
	4-ESS2-1	Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation.			
	4-ESS2-2	Analyze and interpret data from maps to describe patterns of Earth's features.			
	4-ESS3-1	Obtain and combine information to describe that energy and fuels are derived from natural resources and their use affect the environment.			
	4-ESS3-2	Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans.			
5	5-ESS1-1	Support an argument that the apparent brightness of the sun and stars is due to their relative distances from Earth.			
	5-ESS1-2	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.			
	5-ESS2-1	Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact.			
	5-ESS2-2	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.			
	5-ESS3-1	Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.			

Earth Science Core Ideas

ESS1-A	The Universe and its Stars			
ESS1-B	Earth and the Solar System			
ESS1-C	The History of Planet Earth			
ESS2-A	Earth Materials and Systems			
ESS2-B	Plate Tectonics and Large-Scale Systems			
ESS2-C	The Roles of Water in Earth's Surface Processes			
ESS2-D	Weather and Climate			
ESS2-E	Biogeology			
ESS3-A	Natural Resources			
ESS3-B	Natural Hazards			
ESS3-C	Human Impacts on Earth Systems	✓		

Engineering Design Performance Expectations

		Materials and Motion	Sound and Light	Solids and Liquids	Motion and Matter
K-2-ETS1	K-2-ETS1-1	✓	✓	✓	
	K-2-ETS1-2	✓	✓	✓	
	K-2-ETS1-3	✓	✓	✓	
3-5-ETS1	3-5-ETS1-1				✓
	3-5-ETS1-2				✓
	3-5-ETS1-3				✓

Engineering Design Core Ideas

		Materials and Motion	Sound and Light	Solids and Liquids	Motion and Matter
ETS1-A	Defining and Delimiting Engineering Problems	✓	✓	✓	✓
ETS1-B	Developing Possible Solutions	✓	✓	✓	✓
ETS1-C	Optimizing Design Solution	✓	✓	✓	✓

Science and Engineering Practices

		Materials and Motion	Sound and Light	Solids and Liquids	Motion and Matter
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		✓	✓	✓	✓

Crosscutting Concepts

		Materials and Motion	Sound and Light	Solids and Liquids	Motion and Matter
Patterns		✓	✓	✓	✓
Cause and Effect		✓	✓	✓	✓
Scale, Proportion, and Quantity				✓	✓
System and System Models			✓	✓	
Energy and Matter in Systems		✓		✓	✓
Structure and Function		✓		✓	
Stability and Change of Systems			✓	✓	

Energy	Mixtures and Solutions	Life Science	Animals Two by Two	Plants and Animals	Insects and Plants	Structures of Life	Environments	Living Systems	Earth Science	Trees and Weather	Air and Weather	Pebbles, Sand, and Silt	Water and Climate	Soils, Rocks, and Landforms	Earth and Sun
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Energy	Mixtures and Solutions	Life Science	Animals Two by Two	Plants and Animals	Insects and Plants	Structures of Life	Environments	Living Systems	Earth Science	Trees and Weather	Air and Weather	Pebbles, Sand, and Silt	Water and Climate	Soils, Rocks, and Landforms	Earth and Sun
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Join the **Next Generation!**

FOSS Next Generation

Recommended K–8 Scope and Sequence

Grade	 Physical Science	 Earth Science	 Life Science
6–8	Waves* Gravity and Kinetic Energy*	Planetary Science	Human Systems Interactions* Heredity and Adaptation*
	Chemical Interactions	Earth History	Populations and Ecosystems
	Electromagnetic Force* Variables and Design*	Weather and Water	Diversity of Life
5	Mixtures and Solutions	Earth and Sun	Living Systems
4	Energy	Soils, Rocks, and Landforms	Environments
3	Motion and Matter	Water and Climate	Structures of Life
2	Solids and Liquids	Pebbles, Sand, and Silt	Insects and Plants
1	Sound and Light	Air and Weather	Plants and Animals
K	Materials and Motion	Trees and Weather	Animals Two by Two

*Half-length course

