



Developed at:



THE LAWRENCE  
HALL OF SCIENCE  
UNIVERSITY OF CALIFORNIA, BERKELEY

**A science education  
is built one discovery  
at a time.**

# FOSS puts students first.

Every student deserves the benefits of science education—not just exposure to scientific phenomena but the opportunity to understand and explain them. From its foundations, FOSS is built to afford that opportunity to all, regardless of background, culture, language, or ability.

The scholars at the Lawrence Hall of Science designed FOSS around the principle of collaborative, active investigation. FOSS effectively engages all students by inviting them to interact with observable phenomena, a teaching philosophy subsequently codified with the arrival of the Utah Science with Engineering Education (SEEd) Standards. Some recent programs place the phenomenon at the start of every lesson in a rigid “one size fits all” formula, but FOSS lessons carefully create a level playing field so that all learners have a logical context to recognize the phenomenon’s significance as it is introduced. This student-centered approach ultimately honors the spirit of the SEEd Standards better by ensuring that all learners can make sense of phenomena and solve problems. In this way, FOSS makes science accessible and equitable for every student in every classroom.



# Comprehensive packages for complete learning.

FOSS® is more than just a science curriculum or science kit. Your investment in any FOSS® Next Generation™ module buys you all the student and teacher components to deliver world-class science education. No teachers scrambling or budgets strained to provide what's been left out—all the key components are included, with each element thoughtfully designed to conserve your money, space, and precious time.



**“I’m often surprised by how easily students are able to access the learning. When using FOSS in the classroom, students are thoroughly engaged, learning, having academic conversations, and genuinely excited for science.”**

Rachael C., Science Specialist  
Utah

## Equipment Kit

Module and grade level kits contain permanent equipment, teacher materials, and consumables for three class uses. Durable, FOSS-exclusive equipment leads to successful investigations for all students, for class sizes up to 32 (8 groups) in repeated use.

## Investigations Guide

Core instructional tool supports the teacher with Overview, Frameworks, Materials, Investigations within the unit, and Assessments. Available in print and digital.

## FOSS Science Resources

In-depth articles connect students’ firsthand experiences to informational text, helping students integrate different methods of acquiring data. Available in print, eBook, and audiobook.

## FOSS Technology

Interactive FOSSweb on ThinkLink™ offers simulations and virtual investigations. Online activities provide differentiating instruction. Student ebooks and streaming video are also included. Comprehensive prep videos and slides support teachers.

## Teacher Resources

Includes detailed alignments to ELA and Math core standards, taking FOSS outdoors, science notebook chapters, notebook masters, teacher masters, and assessment masters. Available in print and online.

## Spanish Resources

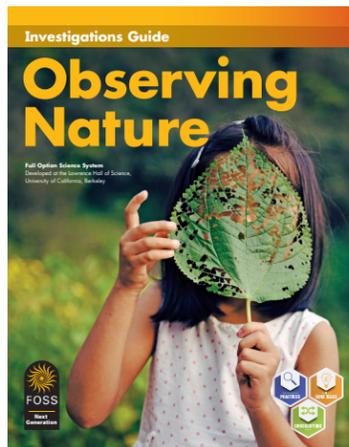
Spanish editions of *FOSS Science Resources* are offered both in print and eBook. FOSSweb provides audio files for *FOSS Science Resources*, as well as notebook, assessment, and teacher masters, module vocabulary and definitions, and Focus Questions.

# Module Descriptions for Pre-Kindergarten

## Observing Nature (Pre-K)

EARTH SCIENCE, LIFE SCIENCE, PHYSICAL SCIENCE

The Observing Nature Module builds understanding of the place of trees at school and in the community. Students investigate the phenomena of trees and leaves, the animals that make their home in leaf litter, the soil and rocks around the roots, and the wood that comes from trees.



### Module Driving Question:

What is a tree?

### Preview of Phenomena Investigated:

Students explore trees and leaves; earth materials, rocks, soil, and water; isopods (pill bugs and sow bugs); and wood.

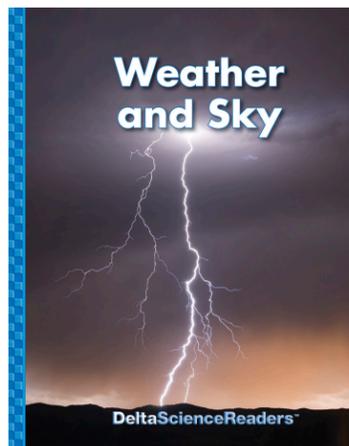
### SEEd Standards:

*Strand Pre-K.3: Living Things*

*Strand Pre-K.4: Matter and Motion*

## Delta Science Module: Weather and Sky (Pre-K)

EARTH SCIENCE



Weather and the sky are science topics that students can explore firsthand every day. Using their senses and several weather tools, students observe and measure weather factors such as temperature, wind, clouds, and precipitation. They record data on a weather calendar, which helps them recognize daily and seasonal weather changes and patterns. They also find out how weather affects everyday life. Next, students compare the daytime sky and the nighttime sky. They trace shadows to discover that the Sun changes position in the sky during the day. By keeping a Moon Phase journal, they conclude that the Moon, too, moves in a predictable pattern and appears to change shape as well.

### SEEd Standards:

*Strand Pre-K.1: Weather*

*Strand Pre-K.2: Light*



\*Delta Science Modules are provided by Delta Education®.

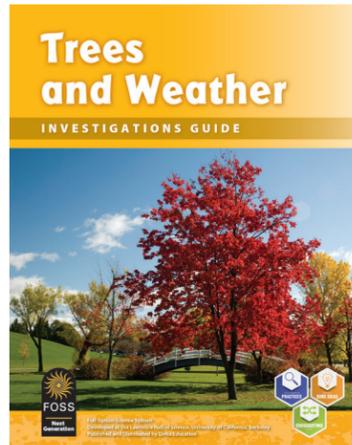


# Module Descriptions for Kindergarten

## Trees and Weather

EARTH SCIENCE

The Trees and Weather Module provides systematic investigations of trees and leaves over the seasons to bring students to a better understanding of trees' place at school and in the community. Students will observe day-to-day changes in weather over the year, as well as the impact weather has on living things.



### Module Driving Questions:

- What do trees need to live and grow?
- How does weather affect trees?
- What changes do trees cause in their surroundings?

### Preview of Phenomena Investigated:

Students get to know the structures of neighborhood trees, their similarities and differences, and make sense of how trees live and grow through the seasons.

#### SEEd Standards:

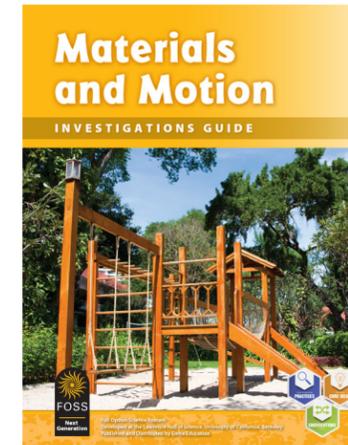
*Strand K.1: Weather Patterns K.1.1-K.1.3*

*Strand K.2: Living Things and Their Surroundings K.2.1-K.2.3*

## Materials and Motion

PHYSICAL SCIENCE

The Materials and Motion Module provides experiences that heighten students' understanding of the physical world as they perform tests to observe properties of materials such as wood, paper, and fabric. They learn about different materials to engineer a better shade structure. Students observe and compare pushes and pulls, the speed and motion of moving objects, and collisions.



### Module Driving Questions:

- What is made of wood, paper, and fabric?
- How are the properties of those useful to us?
- How can we change the motion of an object?

### Preview of Phenomena Investigated:

Students make sense of how common materials—wood, paper, and fabric—are defined by their properties. Students explore the motion of rolling objects and what changes their motion.

#### SEEd Standards:

*Strand K.1: Weather Patterns K.1.3, K.1.4*

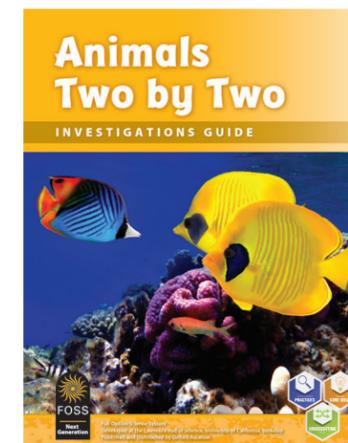
*Strand K.2: Living Things and Their Surroundings K.2.4*

*Strand K.3: Forces and Interactions*

## Animals Two by Two

LIFE SCIENCE

The Animals Two by Two Module provides young students with close and personal interaction with some common land and water animals. Students observe differences in structure and behavior and learn about basic needs of animals. Living materials are not included in the kits.



### Module Driving Questions:

- How are animal structures similar and different?
- What do animals need to live and grow?

### Preview of Phenomena Investigated:

Students investigate a few common animals to make sense of the animals' survival needs.

#### SEEd Standards:

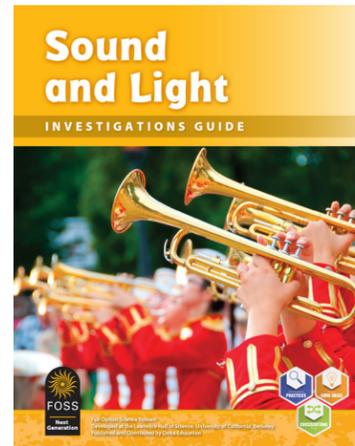
*Strand K.2: Living Things and Their Surroundings K.2.1-K.2.3*

# Module Descriptions for Grade 1

## Sound and Light

PHYSICAL SCIENCE

The Sound and Light Module provides students with experiences to develop an understanding of how to observe and manipulate sound and light. Students learn that sound comes from vibrating objects and develop simple models for how sound travels. With light, students find out what happens when materials with different properties are placed in a beam of light.



### Module Driving Question:

How do sound and light interact with objects?

### Preview of Phenomena Investigated:

Students manipulate vibrating objects and sources of illumination to make sense of what they produce, and how humans and other animals use sound and light.

#### SEEd Standards:

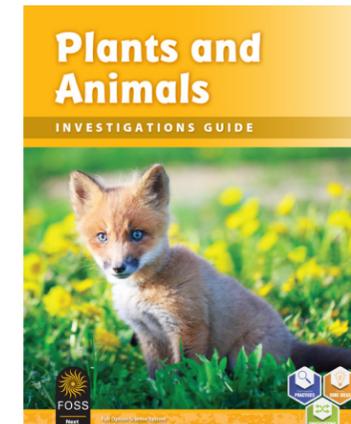
*Strand 1.1: Seasons and Space Patterns 1.1.3*

*Strand 1.3: Light and Sound*

## Plants and Animals

LIFE SCIENCE

The Plants and Animals Module provides experiences with structures of plants, so that students discover ways to propagate new plants from mature plants. Students build a terrarium and provide for the needs of both plants and animals living together in a classroom habitat. They explore variation in the same kind of organism, including variation between young and adults, and find out about the behaviors of parents to help their offspring survive.



### Module Driving Question:

How do young plants and animals survive in their habitat?

### Preview of Phenomena Investigated:

Students find out about the structures and behaviors of young plants and animals (offspring) to make sense of how the young organisms grow and survive.

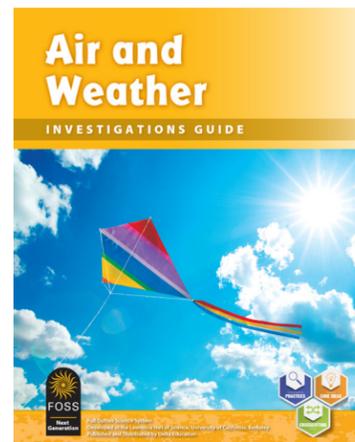
#### SEEd Standards:

*Strand 1.2: The Needs of Living Things and Their Offspring*

## Air and Weather

EARTH SCIENCE

In the Air and Weather Module, students turn their focus upward to explore that objects in the sky change position in predictable ways. They explore the natural using tools and methods to build on their understanding of the weather and to identify patterns. They monitor changes in hours of daylight over seasons and changing weather conditions. And they find the Moon in the day and night skies, and monitor its movement over the month.



### Module Driving Questions:

- What is all around us?
- What do we observe in the sky above us?

### Preview of Phenomena Investigated:

Students observe and describe patterns in weather and those made by natural objects in the sky to make sense of change in their surroundings.

#### SEEd Standards:

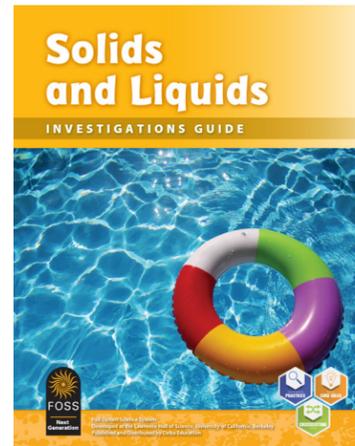
*Strand 1.1: Seasons and Space Patterns 1.1.1, 1.1.2*

# Module Descriptions for Grade 2

## Solids and Liquids

PHYSICAL SCIENCE

In the Solids and Liquids Module, students build on the science concepts of matter and its interactions developed in kindergarten, using new tools to enrich observations. Students observe, describe, and compare properties of solids and liquids. They conduct investigations to find out what happens when solids and water are mixed, and when liquids and water are mixed.



### Module Driving Questions:

- How are solid and liquid materials similar and different?
- How do the properties of solid and liquid materials relate to how they can be used and how they can change?

### Preview of Phenomena Investigated:

Students experience the properties of matter in two of its phases—solid and liquid—to make sense of how materials can change.

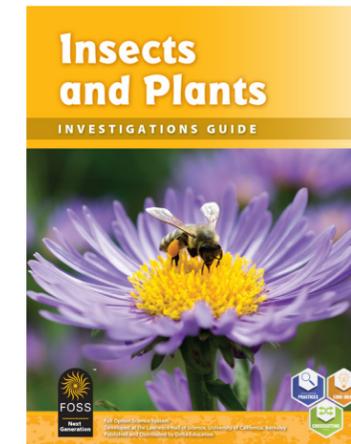
### SEEd Standards:

*Strand 2.3: Properties of Matter*

## Insects and Plants

LIFE SCIENCE

The Insects and Plants Module builds understanding of growth and development of plants by observing new organisms over time. Students see the life cycles of insects unfold in real time and compare the structures and functions exhibited by each species to reveal patterns. At the same time, they grow a flowering plant in the classroom, and gain experience with the ways that plants and insects interact in feeding relationships, pollination, and seed dispersal.



### Module Driving Question:

What is the natural history of some plants and animals in different habitats?

### Preview of Phenomena Investigated:

Students observe patterns in the lives of insects and flowering plants as a way to make sense of the diversity of life in different habitats.

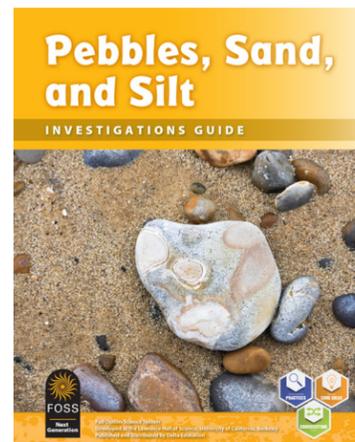
### SEEd Standards:

*Strand 2.2: Living Things and Their Habitats*

## Pebbles, Sand, and Silt

EARTH SCIENCE

The Pebbles, Sand, and Silt Module provides experiences of Earth's natural resources—rocks, soil, and water—and provides opportunities for students to engage in science and engineering practices. Students explore the natural world by using simple tools to observe and describe properties of earth materials.



### Module Driving Questions:

- What are the properties of earth materials?
- How do earth materials interact and change?

### Preview of Phenomena Investigated:

Students experience common earth materials that cover the Earth's surface to make sense of how they are used and how they can change.

### SEEd Standards:

*Strand 2.1: Changes in the Earth's Surface*  
*Strand 2.3: Properties of Matter 2.3.1, 2.3.2*



**“I love FOSS science because is it a hands-on, cross-curricular approach to teaching science. I know that the FOSS science lessons will be quality and research-based. There is no last-minute scramble for materials; everything is provided and in good condition. My students love FOSS and so do I!”**

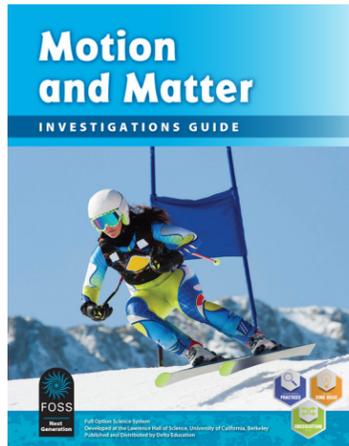
Lydia L., 3rd Grade Teacher  
*Freedom Preparatory Academy, Provo, UT*

# Module Descriptions for Grade 3

## Motion and Matter

PHYSICAL SCIENCE

In the Motion and Matter Module, students explore forces and interactions, matter, and with engineering design. They work with magnets and paper clips, wheel-and-axle systems, paper air twirlers, and rotating tops. Students use their knowledge of science to experience the engineering design process. Finally, they build on the science concepts of matter and its interactions.



### Module Driving Question:

What causes objects to move?

### Preview of Phenomena Investigated:

Students manipulate common objects to make sense of the patterns and causes of motion.

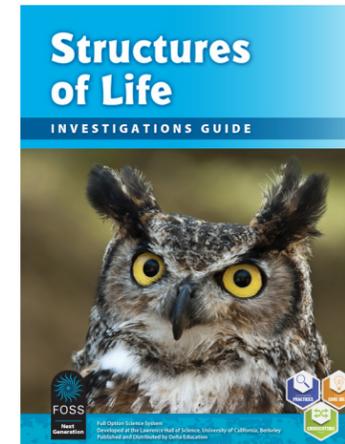
#### SEEd Standards:

*Strand 3.3: Force Affects Motion*

## Structures of Life

LIFE SCIENCE

The Structures of Life Module consists of investigations dealing with the big ideas in life science: Plants and animals are organisms and exhibit a variety of strategies for life, organisms are complex and have a variety of observable structures and behaviors, organisms have varied but predictable life cycles and reproduce their own kind, and individual organisms have variations in their traits that may provide an advantage in surviving in the environment.



### Module Driving Questions:

- Where do organisms come from and how do they survive?
- How are all the different kinds of plants and animals able to continue to exist on Earth?

### Preview of Phenomena Investigated:

Students engage with the diversity of plants and animals they observe in our world to make sense of how organisms survive over time.

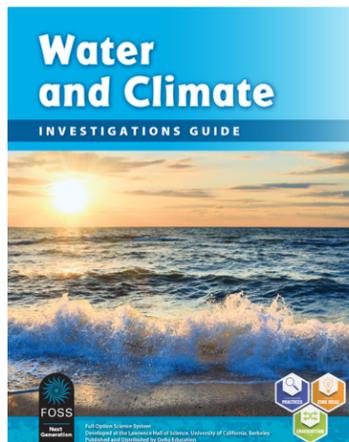
#### SEEd Standards:

*Strand 3.2: Effects of Traits on Survival*

## Water and Climate

EARTH SCIENCE

In the Water and Climate Module, students explore the properties of water, the water cycle and weather, interactions between water and other materials, and how we use water as a natural resource. They engage in science and engineering practices in the context of water, weather, and climate, and explore the crosscutting concepts of patterns; cause and effect; scale, proportion, and quantity; and systems and system models.



### Module Driving Questions:

- How is water involved in weather?
- Are weather conditions the same around the world and through the year?

### Preview of Phenomena Investigated:

Students make sense of the properties of water and variations in weather to explain climate.

#### SEEd Standards:

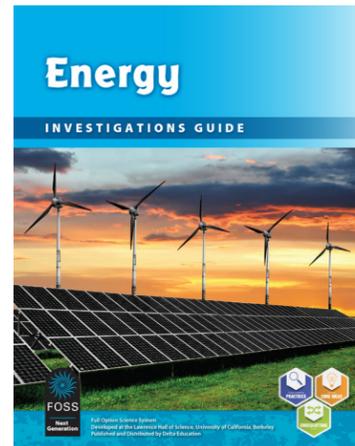
*Strand 3.1: Weather and Climate Patterns*

# Module Descriptions for Grade 4

## Energy

PHYSICAL SCIENCE

Students explore the concepts of energy and change, waves, and energy transfer in the Energy Module. Students experience electricity and magnetism as related effects and learn useful applications of electromagnetism in everyday life. They also consider energy transfer, force, and motion in different systems.



### Module Driving Question:

How does energy transfer between systems?

### Preview of Phenomena Investigated:

Students make sense of energy transferring from place to place by observing motion, electric current, sound, light, and heat.

#### SEEd Standards:

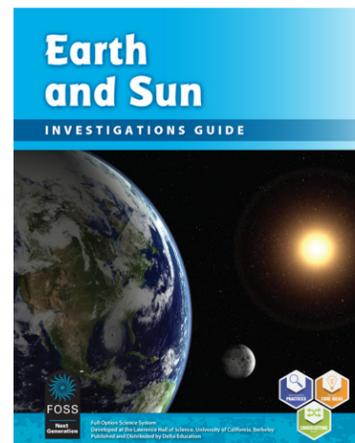
*Strand 4.2: Energy Transfer*

*Strand 4.3: Wave Patterns*

## Earth and Sun

EARTH SCIENCE

The Earth and Sun Module focuses on Earth and the Sun as a system. Students collect and analyze shadow data. They observe the changes in the Moon's appearance over time. Then students explore the properties of the atmosphere, energy transfer from the Sun to Earth, and the dynamics of weather and water cycling in Earth's atmosphere.



### Module Driving Question:

How do Earth's geosphere, hydrosphere, atmosphere, and biosphere interact to create a sustainable environment for all life?

### Preview of Phenomena Investigated:

Students make sense of the patterns observed in the sky over a day, a month, a year, and their effect on different systems on Earth.

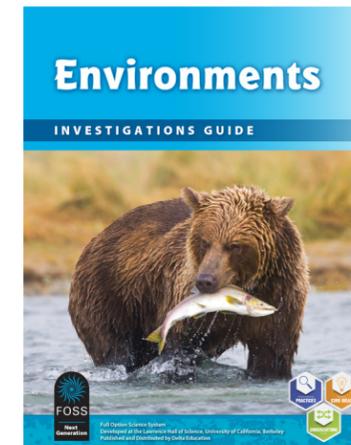
#### SEEd Standards:

*Strand 4.4: Observable Patterns in the Sky*

## Environments

LIFE SCIENCE

The Environments Module focuses on the concepts that organisms need energy and matter to live and grow, and that living organisms depend on one another and on their environment. Students will determine an organism's preferences for various nonliving environmental factors; observe and record changes in organisms and their environment over time; identify and describe ecosystem feeding relationships; and conduct controlled experiments with organisms to discover their range of tolerance for environmental factors.



### Module Driving Question:

How do the structures of terrestrial organisms function to support the survival of the organisms in that environment?

### Preview of Phenomena Investigated:

Students observe the structures and behaviors of organisms and the relationships between one organism and its environment to make sense of environmental conditions for survival.

#### SEEd Standards:

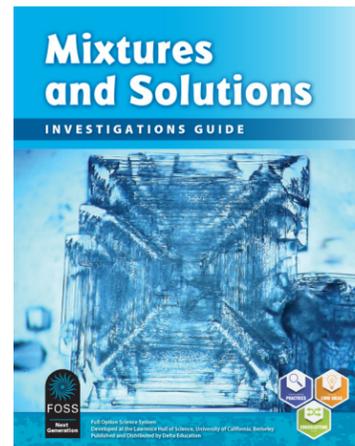
*Strand 4.1: Organisms Functioning in their Environment 4.1.1, 4.1.2*

# Module Descriptions for Grade 5

## Mixtures and Solutions

PHYSICAL SCIENCE

Mixtures and Solutions introduces students to the properties and behaviors of substances and changes in substance, and they develop models to explain how something works. Students will make and separate mixtures; compare the mass of a mixture to the mass of its parts; determine relative concentration; compare the solubility of substances; identify an unknown substance; and observe and compare reactants and products of several chemical reactions.



### Module Driving Question:

What is matter and what happens when samples of matter interact?

### Preview of Phenomena Investigated:

Students investigate mixtures, solutions, solubility, concentration, and chemical reactions in our everyday life to make sense of matter and its interactions.

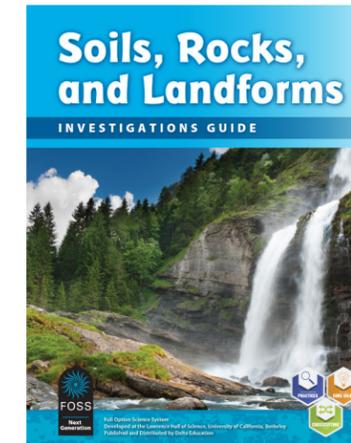
### SEEd Standards:

*Strand 5.2: Properties and Changes of Matter*

## Soils, Rocks, and Landforms

EARTH SCIENCE

The Soils, Rocks, and Landforms Module provides students with firsthand experiences with soils, rocks, and minerals, and modeling experiences to study changes to rocks and landforms at Earth's surface. Students will investigate the processes of physical and chemical weathering, soil composition, and how erosion and deposition alter landforms; analyze and interpret data from maps; identify minerals in common rocks; and observe how earth materials are used in the community around school.



### Module Driving Questions:

- What are Earth's land surfaces made of?
- Why are landforms not the same everywhere?

### Preview of Phenomena Investigated:

Students investigate various observable forms that make up Earth's surface to make sense of forces that change them.

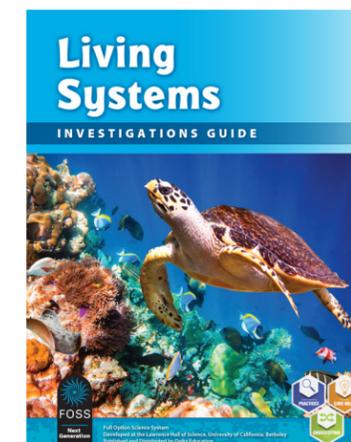
### SEEd Standards:

*Strand 5.1: Characteristics and Interactions of Earth's Systems*  
5.1.1, 5.1.3, 5.1.5

## Living Systems

LIFE SCIENCE

The Living Systems Module looks at life at every level of organization—biosphere to individual organisms—to acknowledge that it is complex, involving multiple parts working together in systems to maintain the viability and vigor of the system. Students will observe and draw conclusions regarding the decomposition of organic matter; use models to explain how biological systems function; design and conduct investigations to discover how food is processed; and compare food webs on land and in marine ecosystems.



### Module Driving Question:

How can we describe Earth's biosphere as a system of interacting parts?

### Preview of Phenomena Investigated:

Students make sense of the biosphere in terms of its interacting organisms, environments, and ecosystems.

### SEEd Standards:

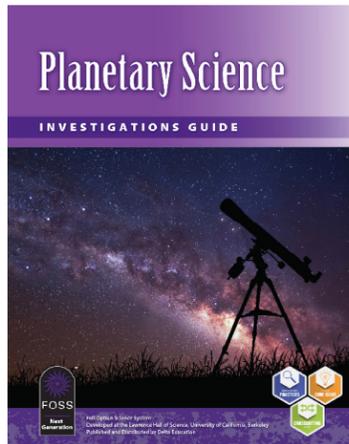
*Strand 5.1: Characteristics and Interactions of Earth's Systems* 5.1.4  
*Strand 5.3: Cycling of Matter in Ecosystems*

# Course Descriptions for Grade 6

## Planetary Science

PHYSICAL SCIENCE, EARTH SCIENCE

Students develop a thorough understanding of the local cosmos — including the organization of the solar system and day/night/seasons—before turning their study to the top planetary science headlines of our times, in particular, the hunt for exoplanets. In a capstone project that completes students' middle school science careers, students use satellite images to analyze changes to Earth's systems and draw conclusions about human impact upon Earth's systems.



### Course Driving Question:

What is my cosmic address?

### Preview of Phenomena Investigated:

Students engage with the anchor phenomenon of Earth, an object in space, to explain day, night, seasons, solar system formation, and human impact to Earth's systems.

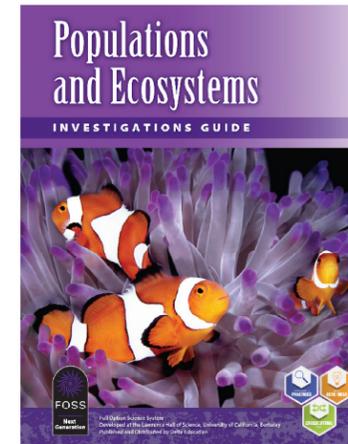
#### SEEd Standards:

*Strand 6.1: Structure and Motion within the Solar System*

## Populations and Ecosystems

EARTH SCIENCE, LIFE SCIENCE, ENGINEERING

Students learn that every organism has a role to play in its ecosystem. To understand how ecosystems work and what they need to remain healthy, students explore how changes to one part of the ecosystem affect others by studying ecosystem interactions of matter and energy.



### Course Driving Question:

How do organisms, matter, and energy interact in an ecosystem?

### Preview of Phenomena Investigated:

Students engage with the anchor phenomenon of population dynamics within ecosystems by studying matter and energy flow and addressing a student-chosen ecological issue.

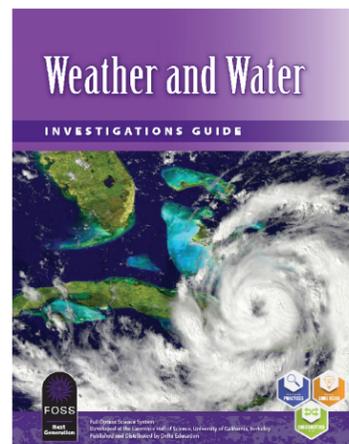
#### SEEd Standards:

*Strand 6.4: Stability and Change in Ecosystems*

## Weather and Water

PHYSICAL SCIENCE, EARTH SCIENCE, ENGINEERING

Students explore physical science processes to explain earth science phenomena. They learn about atoms and molecules, density, wind, and energy transfer and then investigate phase change, the water cycle, ocean currents, climate change, and meteorology.



### Course Driving Question:

What makes weather happen?

### Preview of Phenomena Investigated:

Students engage with the anchor phenomenon of observable local weather conditions to make sense of why weather changes and explore climate patterns.

#### SEEd Standards:

*Strand 6.2: Energy Affects Matter 6.2.2-6.2.4*

*Strand 6.3: Earth's Weather Patterns and Climate*



# FOSS<sup>®</sup> Pre-K–6 Recommended Scope & Sequence

FOSS<sup>®</sup> & Delta Education Recommended Scope & Sequence for the Utah Pre-Kindergarten through 6th Grade SEEd Standards

Grade	Strand	FOSS Module
6	Strand 6.1: Structure and Motion Within the Solar System	Planetary Science
	Strand 6.2: Energy Affects Matter	Weather and Water
	Strand 6.3: Earth's Weather Patterns and Climate	Weather and Water
	Strand 6.4: Stability and Change in Ecosystems	Populations and Ecosystems
5	Strand 5.1: Characteristics and Interactions of Earth's Items	Soils, Rocks and Landforms • Living Systems
	Strand 5.2: Properties and Changes of Matter	Mixtures and Solutions
	Strand 5.3: Cycling of Matter in Ecosystems	Living Systems
4	Strand 4.1: Organisms Functioning in Their Environment	Environments
	Strand 4.2: Energy Transfer	Energy
	Strand 4.3: Wave Patterns	Energy
	Strand 4.4: Observable Patterns in the Sky	Earth and Sun
3	Strand 3.1: Weather and Climate Patterns	Water and Climate
	Strand 3.2: Effects of Traits on Survival	Structures of Life
	Strand 3.3: Force Affects Motion	Motion and Matter
2	Strand 2.1: Changes in Earth's Surface	Pebbles, Sand and Silt
	Strand 2.2: Living Things and Their Habitats	Insects and Plants
	Strand 2.3: Properties of Matter	Solids and Liquids • Pebbles, Sand and Silt
1	Strand 1.1: Seasons and Space Patterns	Air and Weather • Sound and Light
	Strand 1.2: The Needs of Living Things and Their Offspring	Plants and Animals
	Strand 1.3: Light and Sound	Sound and Light
K	Strand K.1: Weather Patterns	Trees and Weather • Materials and Motion
	Strand K.2: Living Things and Their Surroundings	Animals 2x2 • Trees and Weather Materials and Motion
	Strand K.3: Forces, Motion and Interactions	Materials and Motion
Pre-K	Strand Pre-K.1: Weather	DSM Weather and Sky+
	Strand Pre-K.2: Light	DSM Weather and Sky+
	Strand Pre-K.3: Living Things	Observing Nature
	Strand Pre-K.4: Matter and Motion	Observing Nature

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At School Specialty, providing science curriculum is our specialty, every day of every year. We'll be right there with you, from purchase through implementation and ongoing annual professional development. Our team is supported by experienced FOSS consultants and by the program authors themselves at the Lawrence Hall of Science. We go beyond the ordinary to ensure that you have all you need to ignite your students' curiosity. With decades of combined FOSS experience, we stand ready to support your success.

## Learn more.

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