



Developed at:



THE LAWRENCE
HALL OF SCIENCE™
UNIVERSITY OF CALIFORNIA, BERKELEY

**Science is best
learned when
it's discovered.**



Active investigation is at the heart of FOSS.

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.

FOSS was designed at the Lawrence Hall of Science 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 in the Oklahoma Academic Standards for Science. 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 significance of each phenomenon as it is introduced. This student-centered approach aligns with Oklahoma standards 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™ Middle School course 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.



“FOSS kits have been a wonderful addition to our school science curriculum. We love the hands-on material, it is well designed with the student in mind. With clear instructions, useful worksheets/lab summaries, and well organized materials, we love FOSS kits!”

Diane H., Teacher
Massachusetts

Equipment Kit

Durable equipment and classroom tested materials, selected and designed expressly for FOSS, lead to successful investigations for all students. Kits include permanent equipment for classes of 32 students (8 groups) with enough consumables for five (5) uses at middle school.

Investigations Guide

This is the core instructional tool that supports the teacher in facilitating student investigations. Chapters include Overview, Framework and NGSS, Materials, Technology, Assessment, and each detailed Investigation. Available in print and digital.

FOSS Science Resources

FOSS student reading materials are in-depth articles that connect students' firsthand experiences to informational text, helping expand understanding from the concrete to the abstract. Available in print, eBook, and audiobook.

FOSS Technology

FOSSweb offers simulations and virtual investigations. Online activities provide differentiating instruction. Student ebooks and streaming video are also included. Comprehensive teacher preparation videos and instructional slides support teachers.

Teacher Resources

Provided in print and available online, resources include grade-level chapters on sense-making and three-dimensional teaching and learning; connections to Common Core ELA and Math standards; taking FOSS outdoors; access and equity in science; science-centered language development; using science notebooks; and notebook, teacher, and assessment masters.

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, teaching slides, and Focus Questions.

Materials management made easy.

We believe that students learn science best by *doing* science. Your commitment to preparing for FOSS hands-on experiences comes to fruition when you see your students' engagement soar and their understanding grow. We've spent decades working in classrooms to provide comprehensive materials management support for teachers of all levels of experience.

- *Investigations Guide* with step-by-step instructions to help you through lesson preparation, facilitation, and assessment.
- Teacher preparation videos to provide visuals for important investigation setups.
- Efficient equipment kits, designed for middle schools—outfit your classroom with materials to complete each investigation with five classes of students.
- Handy refill kits replace consumables so you can make the most of your time teaching science.

INVESTIGATION **1** — *Testing Variables*

NOTE
After you give the *Entry-Level Survey*, plan to spend the rest of the first session setting up science notebooks and starting the course.

Focus question

- How can we describe and measure motion in a system?

NOTE
Preview the teaching slides on FOSSweb for this part.

Embedded Assessment Notes

Embedded Assessment Notes

Assessment Record — *Investigations 1.1-1.24*

Assessment Record

GETTING READY for
Part 1: Air Trolleys

Quick Start

Schedule	1 session assessment 2 sessions active investigation 1 session reading
Preview	<ul style="list-style-type: none"> • Preview the FOSSweb Resources by Investigation for this part (such as printable masters, teaching slides, and online activities) • Preview the videos: <i>What's an Engineer?</i>, Step 3, <i>Engineering Problems</i>, Step 4, and <i>Zip Line</i>, Step 6 • Preview the optional reading: "What's a Trolley?," Step 10 • Preview the in-class reading: "What Do Scientists and Engineers Do?," Step 21 • Plan for homework: plan next trolley test, Step 26
Print or Copy	<p>For each student</p> <ul style="list-style-type: none"> • <i>Entry-Level Survey</i>, or schedule it on FOSSmap • Notebook sheet 1 <p>For each group</p> <ul style="list-style-type: none"> • Teacher master A <p>For the teacher</p> <ul style="list-style-type: none"> • Teacher masters B-D • <i>Embedded Assessment Notes</i> • <i>Assessment Record</i>
Prepare Material	<ul style="list-style-type: none"> • Prepare for initial use and assessment A • Plan for student notebooks B • Construct an air trolley C • Plan trolley storage D • Plan flight lines E • Prepare demo air trolleys and number line F • Plan for student groups G
Plan for Assessment	<ul style="list-style-type: none"> • Review Step 23, "What to Look For" in the notebook entry

FOSS *Investigations Guides* include a streamlined Quick Start Guide for each part of every investigation that highlights exactly what needs to be printed, set up, or prepared in advance of the lesson.

New equipment options for middle schools

We listened to middle school teachers from across the country when developing FOSS Next Generation Middle School and now offer greater flexibility in equipping your FOSS classroom or lab. **Ask your Regional Sales Manager** which equipment option is the best fit for you.

	FULL KIT	LITE KIT
Consumable items (refill kits available)	X	X
Unique, program-specific permanent items	X	X
Common science lab items (beakers, graduated cylinders, etc.) or items found in multiple FOSS courses	X	

“I love teaching science, but many teachers do not feel confident. FOSS kits are laid out clearly so that a novice teacher can easily guide the investigations. Before FOSS, I had to gather materials myself. Now most materials are included in the kit.”

Robin S., Teacher
Pennsylvania



Course Descriptions: The options are all yours.

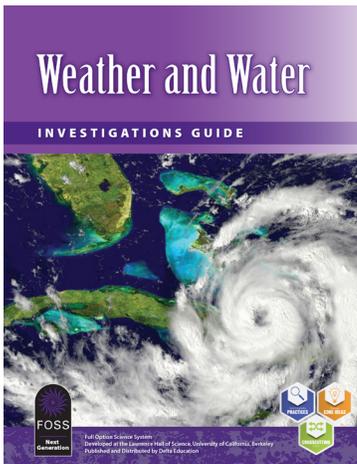
Full Option Science System® courses for the middle school grades are designed for flexibility. FOSS provides a suggested Next Generation scope and sequence for grades 6–8. However, each course can be used as primary or supplemental science education. In addition, you can rearrange the sequence of courses if your district prefers to implement a disciplinary-focused curriculum by grade. Courses vary in length from 4 to 14 weeks.

Course Descriptions for Grade 6

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 Length: 12–14 weeks*



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.

Performance Expectations: MS-PS1-4, MS-PS3-3, MS-PS3-4, MS-PS3-5, MS-ESS1-1, MS-ESS2-4, MS-ESS2-5, MS-ESS2-6, MS-ESS3-2, MS-ESS3-3, MS-ESS3-4, MS-ESS3-5, MS-ETS1-1, MS-ETS1-2, MS-ETS1-3, MS-ETS1-4

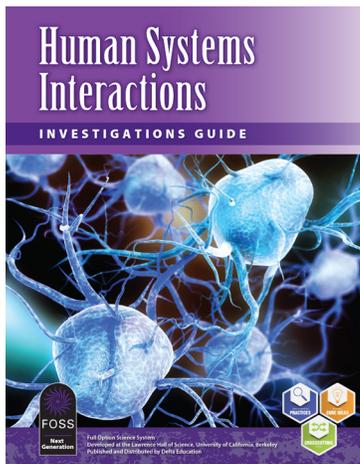
Course Descriptions for Grade 6

(continued)

Human Systems Interactions

LIFE SCIENCE

Students tackle big questions about body systems and the factors that affect them. They learn about what happens when the body is attacked by an invader or an organ system malfunctions, how cells get the resources they need to live, and how systems support the human organism as it senses and interacts with the environment. *Course Length: 5–6 weeks*



Course Driving Question:

How do humans live, grow, and respond to their environment?

Preview of Phenomena Investigated:

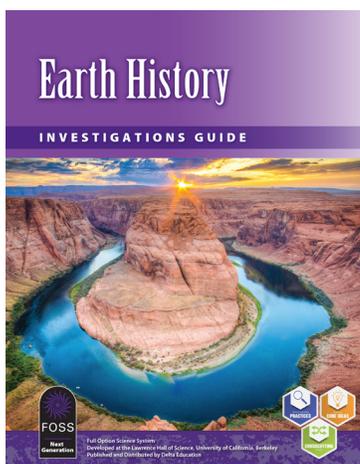
Students engage with the anchor phenomenon of the human body by exploring how organ systems interact to support each and every cell.

Performance Expectations: MS-LS1-1 (foundational), MS-LS1-3, MS-LS1-7, MS-LS1-8

Earth History

PHYSICAL SCIENCE, EARTH SCIENCE, LIFE SCIENCE

Students read evidence from rock, landforms, and fossils. They grapple with Earth's processes and systems that have operated over geologic time to understand the cycling of Earth's materials and the flow of energy that drives this process. They consider human interactions with natural resources and the technology that supports the geosciences. *Course Length: 10–12 weeks*



Course Driving Question:

What do we need to know to tell the geologic story of a place?

Preview of Phenomena Investigated:

Students engage with the anchor phenomenon of the Grand Canyon by exploring the Earth processes that make up the rock cycle and using their knowledge to tell Earth's geologic story.

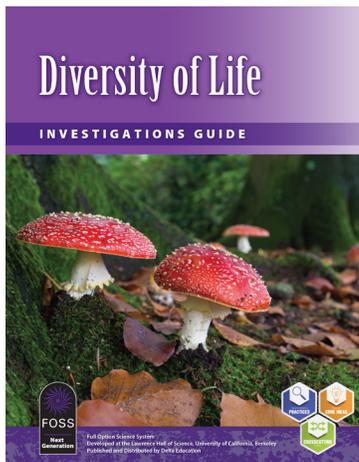
Performance Expectations: MS-ESS1-4, MS-ESS2-1, MS-ESS2-2, MS-ESS2-3, MS-ESS3-1, MS-ESS3-2, MS-ESS3-3, MS-ESS3-4, MS-ESS3-5, MS-LS4-1

Diversity of Life

LIFE SCIENCE

Students discover that all living things share the same basic characteristics, that all organisms are composed of cells, and that a single cell is the fundamental unit of life. Students then explore the relationship of organisms to their environment, and explore the concept of biodiversity.

Course Length: 12-14 weeks



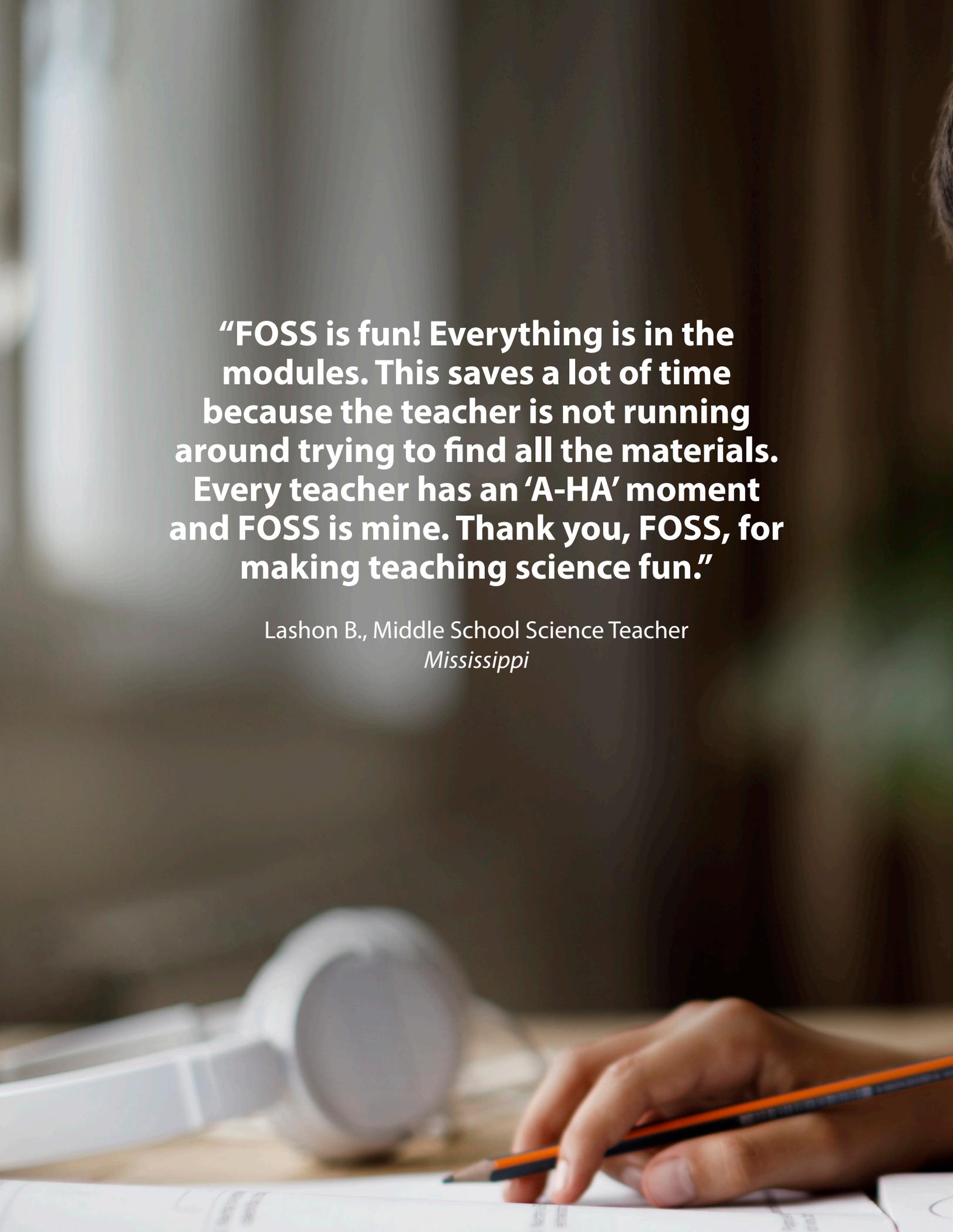
Course Driving Question:

How do you know something is living?

Preview of Phenomena Investigated:

Students engage with the anchor phenomenon of life on Earth to consider what it means to be alive.

Performance Expectations: MS-LS1-1, MS-LS1-2, MS-LS1-3, MS-LS1-4, MS-LS1-5, MS-LS1-6 (foundational), MS-LS1-7 (foundational), MS-LS3-2

A close-up photograph of a person's hand holding a pencil and writing in a notebook. The background is blurred, showing a white container and other desk items. The text is overlaid on the upper half of the image.

“FOSS is fun! Everything is in the modules. This saves a lot of time because the teacher is not running around trying to find all the materials. Every teacher has an ‘A-HA’ moment and FOSS is mine. Thank you, FOSS, for making teaching science fun.”

Lashon B., Middle School Science Teacher
Mississippi



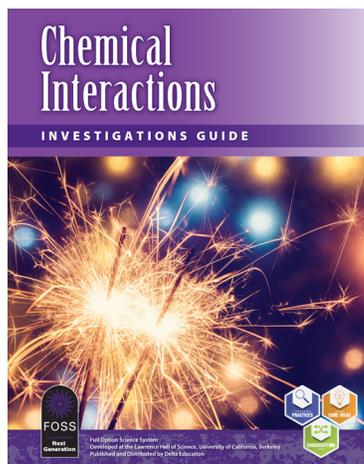
Course Descriptions for Grade 7

Chemical Interactions

PHYSICAL SCIENCE, EARTH SCIENCE, ENGINEERING

Students conduct experiments to observe macroscopic matter transformations and apply kinetic particle theory to explain those transformations at the atomic level. They explore conservation of energy and matter and use those principles to explain phase change and chemical reactions.

Course Length: 10–12 weeks



Course Driving Question:

How does matter interact?

Preview of Phenomena Investigated:

Students engage with the anchor phenomenon of interactions of matter to explain how energy and matter interact, including phase changes and chemical reactions.

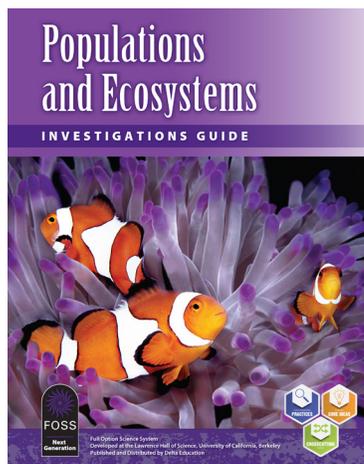
Performance Expectations: MS-PS1-1, MS-PS1-2, MS-PS1-3, MS-PS1-4, MS-PS1-5, MS-PS1-6, MS-PS3-3, MS-PS3-4, MS-PS3-5, MS-ETS1-1, MS-ETS1-2, MS-ETS1-3, MS-ETS1-4

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 Length: 10-12 weeks



Course Driving Question:

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

Preview of Phenomena Investigated:

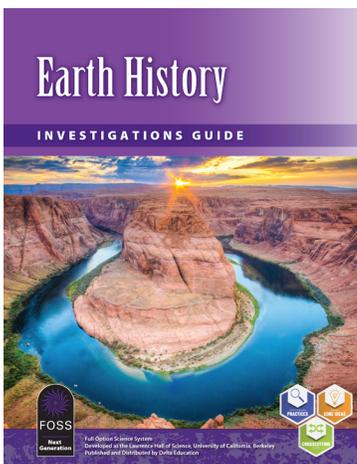
Students engage with the anchor phenomenon of population dynamics within ecosystems by studying matter and energy flow and addressing a student-chosen ecological issue.

Performance Expectations: MS-LS1-6, MS-LS1-7, MS-LS2-1, MS-LS2-2, MS-LS2-3, MS-LS2-4, MS-LS2-5, MS-PS3-4 (foundational), MS-ESS3-3, MS-ESS3-4, MS-ETS1-1, MS-ETS1-2

Earth History/Geoscenarios

PHYSICAL SCIENCE, EARTH SCIENCE, LIFE SCIENCE

In Geoscenarios, students apply prior knowledge from the Earth History Course and new, site-specific information to develop a geologic story of a place or process. Students are introduced to four sites across the United States that represent one of four geologic phenomena: glaciers, coal, hotspots, and oil. Each team of students researches the story of one of those places, the processes that shaped it, and the implications of the story for human society.



Course Driving Question:

What do we need to know to tell the geologic story of a place?

Preview of Phenomena Investigated:

Students engage with the anchor phenomenon of how Earth's surface processes and human activities affect each other.

Performance Expectations: MS-ESS3-1, MS-ESS3-2, MS-ESS3-3, MS-ESS3-4, MS-ESS3-5

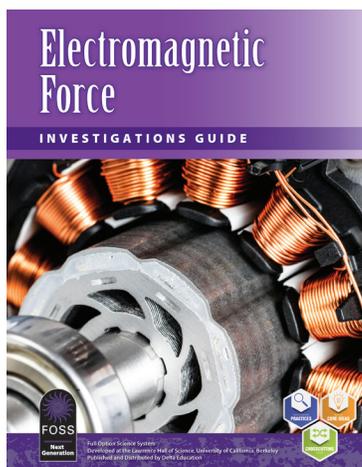


Course Descriptions for Grade 8

Electromagnetic Force

PHYSICAL SCIENCE, EARTH SCIENCE, ENGINEERING

Students begin to explore the concept of force. They measure the force of invisible magnetic fields, learn to build a circuit, design an electromagnet, and explain the energy transfers that make it all possible. They consider energy sources for human use and limitations of renewable and nonrenewable resources. *Course Length: 5–6 weeks*



Course Driving Question:

What is the relationship between magnetic and electric forces?

Preview of Phenomena Investigated:

Students engage with the anchor phenomena of magnetic and electric forces by exploring their interactions and effects.

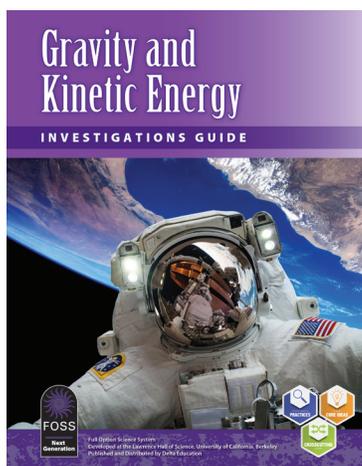
Performance Expectations: MS-PS2-2, MS-PS2-3, MS-PS2-5, MS-PS3-2, MS-PS3-5, MS-ESS3-4, MS-ETS1-1, MS-ETS1-2, MS-ETS1-3, MS-ETS1-4

Gravity and Kinetic Energy

PHYSICAL SCIENCE, ENGINEERING

Students explore speed, acceleration, gravity, and collision physics. They explore how the force of gravity is related to the mass of objects and distance between them, and how this relates to gravity on various celestial objects. They learn Newton's laws and engage in an engineering challenge to design a helmet that will provide protection during impact.

Course Length: 5–6 weeks



Course Driving Question:

How can we explain the motion of objects?

Preview of Phenomena Investigated:

Students explore the anchor phenomena of falling objects and collisions to understand energy and forces, including gravity.

Performance Expectations: MS-PS2-1, MS-PS2-2, MS-PS2-4, MS-PS2-5 (foundational), MS-PS3-1, MS-PS3-2, MS-PS3-5, MS-ESS1-2 (foundational), MS-ETS1-1, MS-ETS1-2, MS-ETS1-3, MS-ETS1-4

Course Descriptions for Grade 8

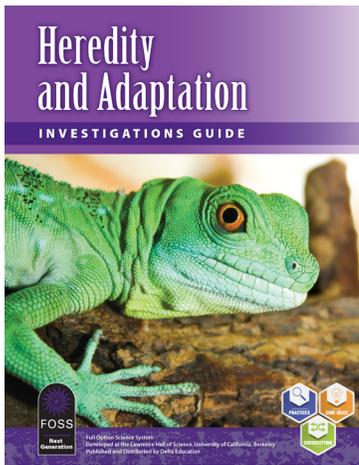
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Heredity and Adaptation

EARTH SCIENCE, LIFE SCIENCE

Students explore evidence for evolution, including the fossil record, the similarities between past and present organisms, the genetic principles of inheritance, and how natural selection produces adaptations that lead to changes in species and eventually the creation of new species.

Course Length: 5–6 weeks



Course Driving Question:

How can we explain the diversity of life that has lived on Earth?

Preview of Phenomena Investigated:

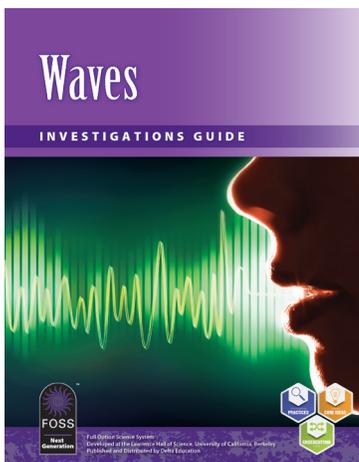
Students search for evidence that explains the anchor phenomenon of biodiversity on Earth.

Performance Expectations: MS-LS3-1, MS-LS3-2, MS-LS4-1, MS-LS4-2, MS-LS4-3, MS-LS4-4, MS-LS4-5, MS-LS4-6, MS-ESS1-4 (foundational)

Waves

PHYSICAL SCIENCE, ENGINEERING

Students learn about mechanical and electromagnetic waves. They manipulate springs and lasers to determine properties of waves that are eventually used to explain how their cell phones and other modes of modern communications work. They create designs that affect transmission of sound waves in an engineering challenge. *Course Length: 5–6 weeks*



Course Driving Question:

How is energy transferred through waves?

Preview of Phenomena Investigated:

Students engage with the anchor phenomenon of energy transfer by waves to explain mechanical waves, electromagnetic waves, and communication technology.

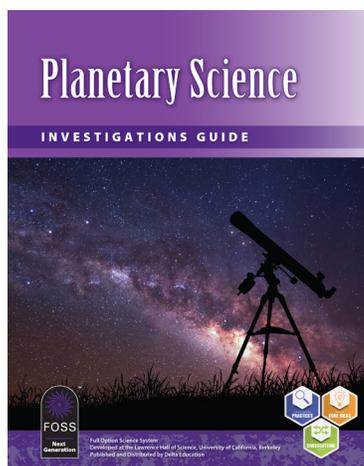
Performance Expectations: MS-PS4-1, MS-PS4-2, MS-PS4-3, MS-ETS1-1, MS-ETS1-2, MS-ETS1-3, MS-ETS1-4

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 Length: 10–12 weeks



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.

Performance Expectations: MS-PS2-4 (foundational), MS-PS4-2 (foundational), MS-ESS1-1, MS-ESS1-2, MS-ESS1-3, MS-ESS1-4 (foundational), MS-ESS2-2, MS-ESS2-4 (foundational), MS-ESS3-1 (foundational), MS-ESS3-2 (foundational), MS-ESS3-3, MS-ESS3-4, MS-ETS1-1 (foundational)

CAPSTONE PROJECT

FOSS® Next Generation™ is based on the principles of three-dimensional active learning. The program elaborates learning progressions for core ideas in science for kindergarten through grade 8. At the end of eighth grade, in the Planetary Science course, FOSS Next Generation students complete a capstone project in which they integrate understandings developed throughout their K–8 science education to analyze human impact on Earth's systems. Students use their understandings of phenomena to consider both sudden and gradual changes to Earth's systems (ranging from human resource use to meteor impacts) and to make connections between these events as a driving force which influences evolution of life on Earth.

FOSS® 6–8 Recommended Scope & Sequence for Oklahoma Academic Standards

Grade	Integrated Middle Grades				
8	Electromagnetic Force* PS, ES, E	Gravity & Kinetic Energy* PS, E	Heredity & Adaptation* ES, LS	Waves* PS, E	Planetary Science PS, ES
7	Chemical Interactions PS, ES, E		Populations and Ecosystems ES, LS, E		Earth History/Geoscenarios PS, ES, LS
6	Diversity of Life LS	Earth History PS, ES, LS		Human Systems Interactions* LS	Weather and Water PS, ES, E

PS: Physical Science content, ES: Earth Science content, LS: Life Science content, E: Engineering content *Half-length courses

Your partners in supporting quality science education.

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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