



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 relevant 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, devoting over 50% of instructional time to hands-on investigation in keeping with West Virginia College- and Career-Readiness Standards (CCRS). 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. FOSS also points teachers to phenomena that can be discovered in West Virginia students’ own schoolyard and community. This student-centered approach honors CCRS better by ensuring that all learners can make sense of phenomena and solve problems, helping every student in every classroom to be ready for college and career.

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 key 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 love FOSS because it comes with pretty much everything a teacher would need to complete the hands-on activities. It’s easy to follow and everything is right there for each lesson.”

Leslie L., Teacher
Wetzel County, WV

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 on ThinkLink™ is compatible with Google Classroom and most districts’ LMS. Online activities provide differentiating instruction. Simulations, virtual investigations, and videos of all hands-on experiences support virtual 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 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.

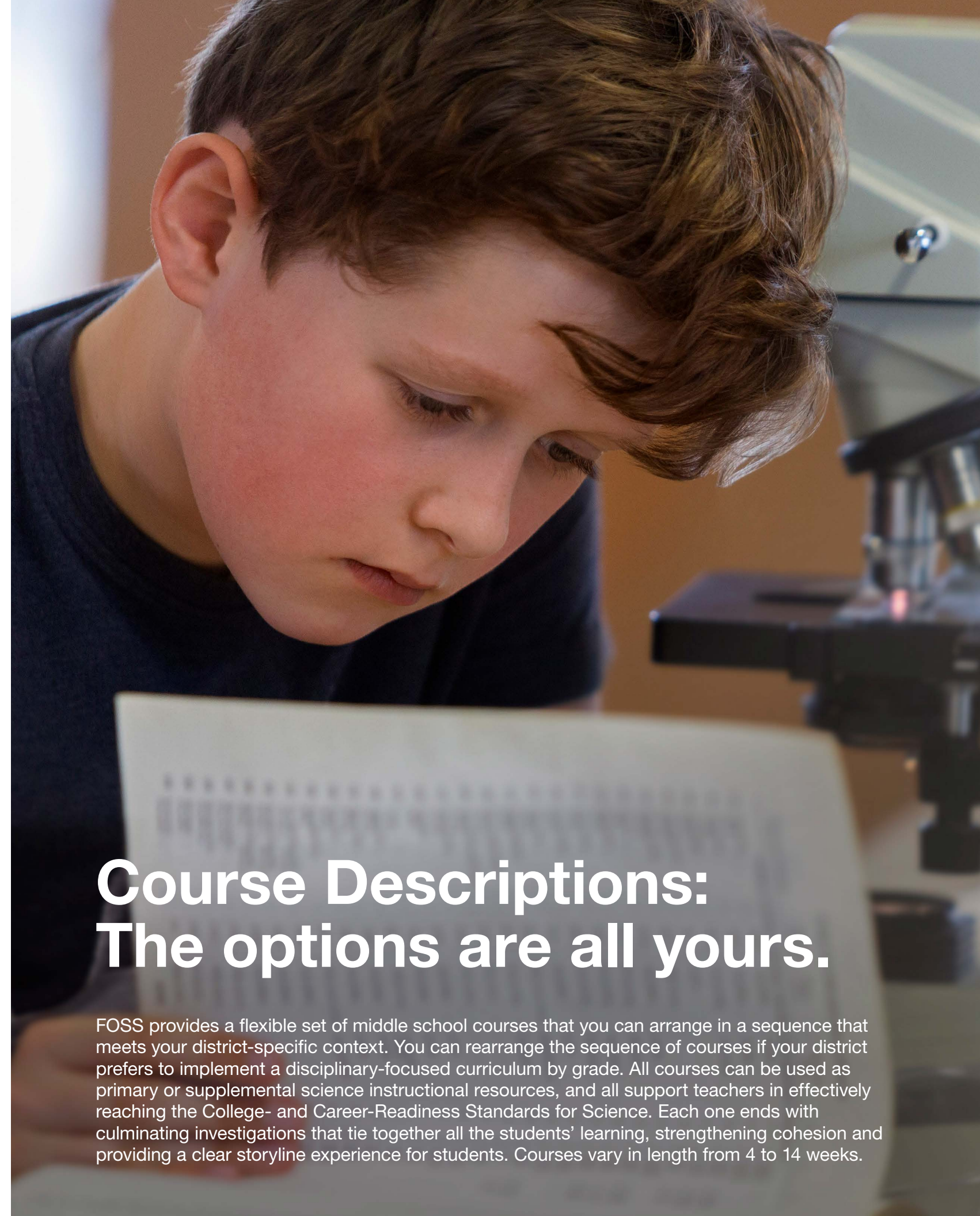
Getting Ready for Part 1: Air Trolleys

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">• Entry-Level Survey, 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• Embedded Assessment Notes• Assessment Record
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

86 Full Option Science System

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.



Course Descriptions: The options are all yours.

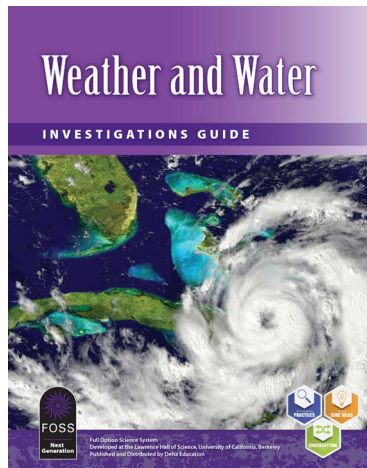
FOSS provides a flexible set of middle school courses that you can arrange in a sequence that meets your district-specific context. You can rearrange the sequence of courses if your district prefers to implement a disciplinary-focused curriculum by grade. All courses can be used as primary or supplemental science instructional resources, and all support teachers in effectively reaching the College- and Career-Readiness Standards for Science. Each one ends with culminating investigations that tie together all the students' learning, strengthening cohesion and providing a clear storyline experience for students. 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:

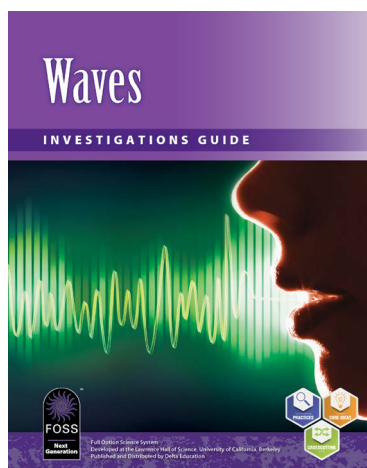
Students engage with the anchor phenomenon of observable local weather conditions to make sense of why weather changes and explore climate patterns.

WVCCR Science Standards: S.6.13, S.6.16, S.6.17, S.6.18, S.6.19, S.6.20, S.6.21, S.7.7, S.7.8, S.7.9, S.7.16, S.7.21, S.8.13, S.8.17

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:

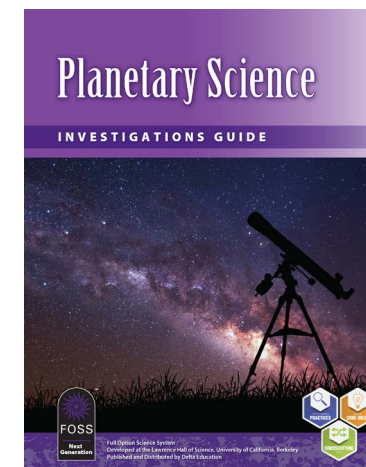
Students engage with the anchor phenomenon of energy transfer by waves to explain mechanical waves, electromagnetic waves, and communication technology.

WVCCR Science Standards: S.6.10, S.6.11, S.6.12, S.6.20, S.6.21

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:

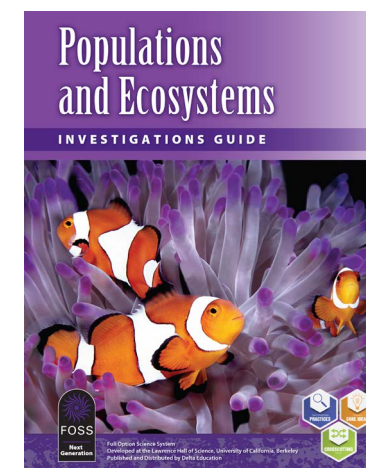
Students engage with the anchor phenomenon of Earth, an object in space, to explain day, night, seasons, solar system formation, and human impact to Earth's systems.

WVCCR Science Standards: S.6.11, S.6.13, S.6.14, S.6.15, S.6.20, S.7.13, S.7.16, S.7.17, S.7.18, S.7.19, S.7.21, S.8.17

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.

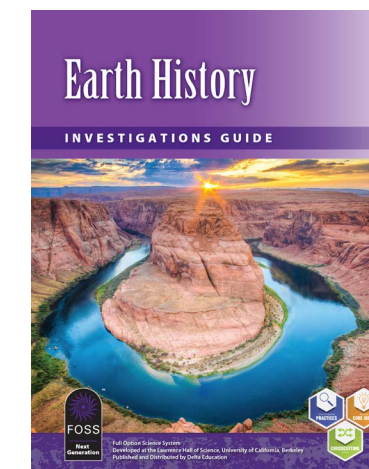
WVCCR Science Standards: S.6.1, S.6.2, S.6.3, S.6.4, S.6.5, S.6.6, S.6.7, S.6.20, S.7.8, S.7.21, S.8.17

Course Descriptions for Grade 7

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.

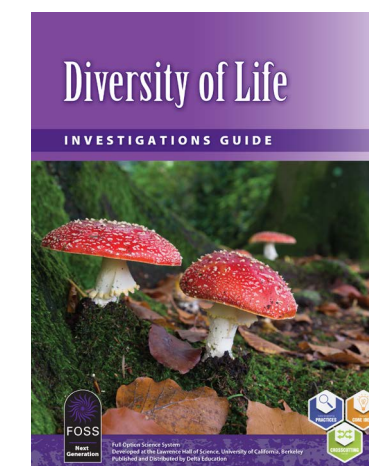
WVCCR Science Standards: S.6.18, S.6.19, S.7.15, S.7.17, S.7.18, S.7.19, S.7.20, S.7.21, S.8.6, S.8.17

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.

WVCCR Science Standards: S.6.3, S.6.4, S.7.1, S.7.2, S.7.3, S.8.1, S.8.2, S.8.4

“FOSS helps level the playing field for students. Student interest is high. Those with various exceptionalities can shine when they are engaged in FOSS activities. These students can succeed.”

Libby S., Curriculum Materials Coordinator
West Virginia

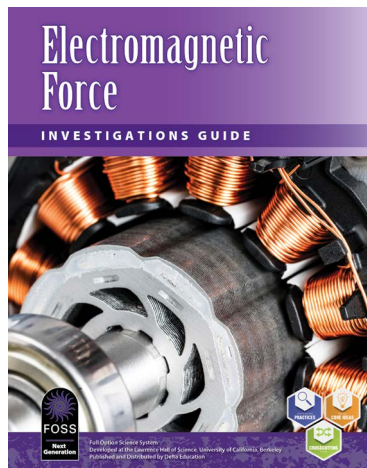
Course Descriptions for Grade 7

(continued)

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:

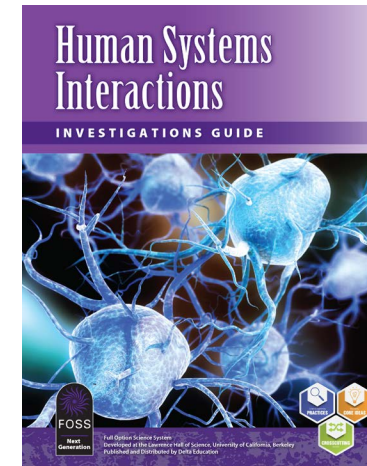
Students engage with the anchor phenomena of magnetic and electric forces by exploring their interactions and effects.

WVCCR Science Standards: S.7.6, S.7.9, S.7.11, S.7.12, S.7.14, S.7.22, S.7.23, S.8.17

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:

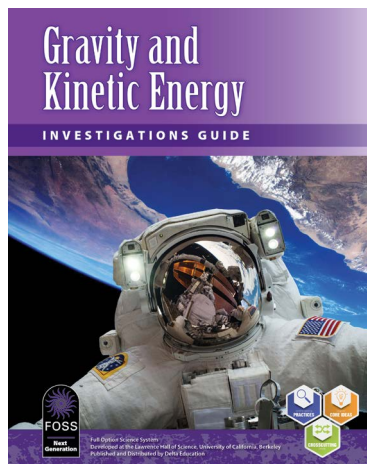
Students engage with the anchor phenomenon of the human body by exploring how organ systems interact to support each and every cell.

WVCCR Science Standards: S.6.4, S.7.1, S.7.3, S.7.4

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.

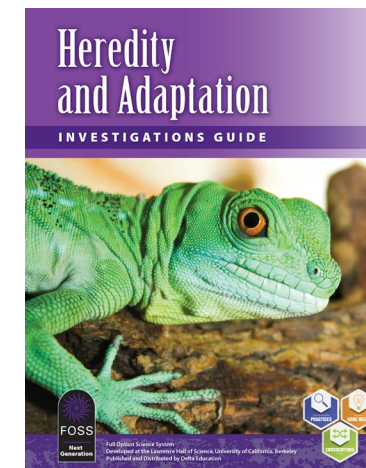
WVCCR Science Standards: S.6.14, S.7.5, S.7.6, S.7.9, S.7.10, S.7.11, S.7.13, S.7.14, S.7.22, S.7.23

Course Descriptions for Grade 8

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.

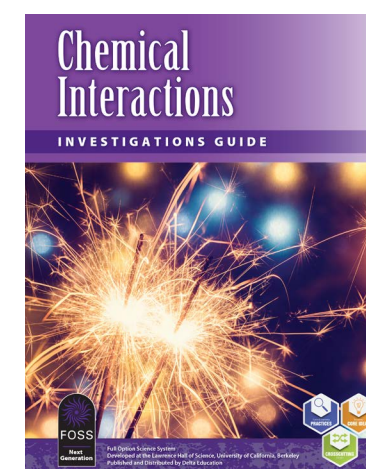
WVCCR Science Standards: S.7.18, S.8.3, S.8.4, S.8.5, S.8.6, S.8.7, S.8.8, S.8.9, S.8.10

Chemical Interactions

PHYSICAL SCIENCE, EARTH SCIENCE, ENGINEERING

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.

WVCCR Science Standards: S.6.8, S.7.7, S.7.8, S.7.9, S.8.11, S.8.12, S.8.13, S.8.14, S.8.15, S.8.16, S.8.18, S.8.19

“A lot of thought was put into each piece of the teacher toolkit. These resources really made me feel comfortable facilitating learning experiences in my classroom.”

Nicole B., Coordinator of Diversion & Transition
WV Schools

FOSS® 6–8 Recommended Scope & Sequence for West Virginia CCRS

Grade 6	Grade 7	Grade 8
<p>Weather & Water PS, ES, E</p> <p>Planetary Science PS, ES</p> <p>Populations & Ecosystems ES, LS, E</p> <p>Waves PS, E</p>	<p>Earth History PS, ES, LS</p> <p>Diversity of Life LS</p> <p>Electromagnetic Force PS, ES, E</p> <p>Gravity & Kinetic Energy PS, E</p> <p>Human Systems Interactions LS</p>	<p>Heredity & Adaptation ES, LS</p> <p>Chemical Interactions PS, ES, E</p>

PS: Physical Science content, ES: Earth Science content, LS: Life Science content, E: Engineering content

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.

Go to FOSSNextGeneration.com/West-Virginia or contact your local FOSS representatives:

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