



South Carolina Science Grade 5 Overview

FOSS Next Generation is the most engaging K-8 science program for the College- and Career-Ready Standards (SCCCR). This document has been created to guide grade 5 teachers and evaluators through the FOSS components, local and relevant anchor phenomena, and a critical pathway through the modules.



Navigation Guide

How to Review FOSS

Teacher Editions

The **Investigations Guide** is a spiral-bound guide containing the active investigations. FOSS lesson plans include:

- Materials used in the current steps
- Key three-dimensional highlights
- Embedded assessment “What to Look For”
- Sense-making discussions
- Strategies to support English learners
- Vocabulary review
- Teaching notes to facilitate instruction

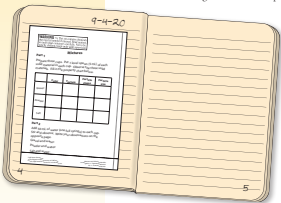
INVESTIGATION 1 — Separating Mixtures

FOCUS QUESTION
How can a mixture be separated?

EL NOTE
To activate prior knowledge, have students compare and contrast what they know about solids and liquids using a graphic organizer.

GUIDING the Investigation
Part 1: Making and Separating Mixtures

- 1. Introduce safety in the classroom**
Tell students they will be investigating solid and liquid materials. Caution them never to taste any materials during science investigations. Explain the policy for using safety goggles during the active investigations and review the FOSS Science Safety poster.
- 2. Organize groups**
Organize the class into collaborative groups of four students, and ask students to choose roles within the groups: Getter 1 gets chemicals from the chemical station; Getter 2 gets equipment from the materials station.
- 3. Introduce the three solids**
Show students the materials—**gravel, powder (diatomaceous earth), and salt (sodium chloride)**. Explain that groups will observe and compare the physical **properties** of the materials. Add the names of the materials to the word wall.
- 4. Introduce science notebooks**
Distribute science notebooks to students. Give students a minute to confirm that the pages are all blank. Have students write the numbers 1–10 on the outside corner of the first ten pages, using the front and back of each page. Reserve pages 1–3 for a table of contents.
Distribute copies of notebook sheet 1, *Mixtures*, and glue sticks. Students should glue the sheet on page 4 and record the date.



106 Full Option Science System

Part 1: Making and Separating Mixtures

5. Prepare for materials distribution
Preview Part 1 on the notebook sheet. Show a sample of the cups that students will use to get their materials for study.
Ask Getter 2 to get three cups and three self-stick notes. Have the groups label the cups “G,” “P,” and “S.” Students can use bits of transparent tape to attach labels that fill off.

6. Observe three materials
Have Getter 1s take the labeled cups to the chemical station to get a sample of each solid material.
• One level spoon of gravel in Cup G
• One level spoon of powder in Cup P
• One level spoon of salt in Cup S
Make sure everyone understands that the supply of solid materials will remain at the chemical station.
Allow 4 minutes for the groups to observe the materials with hand lenses and record their properties in Part 1 of the sheet. Encourage students to feel, but not taste, the materials.

7. Describe the materials
Ask a few students to describe their observations. During this time, you can provide additional information about the solid materials. Students may want to write this additional information on the page facing the notebook sheet.
• The gravel is natural rock material found in rivers and streams.
• The powder (diatomaceous earth) is used in filters, such as swimming-pool filters. It is the shell remains of aquatic organisms called diatoms.
• The salt is sodium chloride, the same salt used to season food.

8. Add water to each cup
Ask,
➤ What do you think might happen if you add water to each cup containing the dry materials?
After students share their ideas, preview Part 2 of the notebook sheet. Have Getter 2s get a basin containing a syringe, three stirring sticks, a container of water, and a paper towel. Outline what students should do.
a. Use the syringe to put 50 mL of water into each cup.
b. Stir the contents with a stick.
c. Observe what happens, and record it in your notebook.

Materials for Step 5

- Cups
- Self-stick notes
- Hand lenses
- Transparent tape

SAFETY NOTE
Students should wear safety goggles when working with chemicals.

EL NOTE
For students who need scaffolding, provide sentence starters such as I observed _____. Or, It looks _____. Or, it feels _____. Or, it reminds me of _____.

Materials for Step 8

- Basins
- Syringes
- Craft sticks
- Containers of water
- Paper towels
- Safety goggles

107 Mixtures and Solutions Module—FOSS Next Generation

Start your review here:

- **Earth and Sun:** pp. 1–5, 93–95, 110–115
- **Mixtures and Solutions:** pp. 1–5, 87–89, 106–111
- **Living Systems:** pp. 1–5, 79–81, 97–103

Teacher Resources (also online) contains teacher-support chapters on three-dimensional teaching and learning, connections to Common Core, access and equity, and environmental literacy.

Student Books

The **FOSS Science Resources** student book contains readings developed to reinforce and extend core ideas covered during FOSS active investigations. Readings give students opportunities to:

- Ask and answer questions
- Use evidence to support their ideas
- Use text to acquire information
- Draw information from multiple sources
- Interpret illustrations to build understanding

But ice melts without heat energy. Why is that? Actually, heat energy does make ice melt. When ice is in the freezer, it doesn't melt. It stays solid, or frozen. When you bring ice out into a room that is warmer than the freezer, the ice melts. That's because heat energy from the room transfers to the ice and causes it to melt.

Materials melt at different **temperatures**. Water melts at 0°C. Water **freezes** at 0°C, too. When water is below 0°C, it is solid. When it is above 0°C, it is liquid. Chocolate melts at about 50°C. Candle wax melts into liquid at around 80°C. And yes, the pebble will melt when it is heated to over 1,000°C! Have you ever seen lava flowing from a volcano? That's melted rock.

Metals melt, too. Jewelers melt gold and silver to make rings and other beautiful things. Sculptors melt bronze to make statues. Iron and copper are melted to separate them from the ores taken from mines. Sand is melted to make glass. Many things that we think are always solid will melt if enough heat energy is transferred to them.

Lava flowing down the side of Kilauea Volcano in Hawaii

Gold melts at 1,064°C.



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Liquid and Gas Changes

When something is wet, it is covered with water, or it has soaked up a lot of water. When it **rains**, everything outside gets wet. When you go swimming, you and your swimsuit get wet. Clothes are wet when they come out of the washer, and a dog is wet after a bath.

But things don't stay wet forever. Things get dry, often by themselves. An hour or two after the rain stops, stairs, sidewalks, and plants are dry. After a break from swimming to eat lunch, you and your swimsuit are dry. After a few hours on the clothesline, clothes are dry. A dog is dry and fluffy a short time after its bath.

Where does the water go?
It evaporates. When water evaporates, it changes from liquid water to **water vapor**, a gas. The gas drifts away in the air.



Wet stairs just after a rainstorm **Dry stairs the next day**

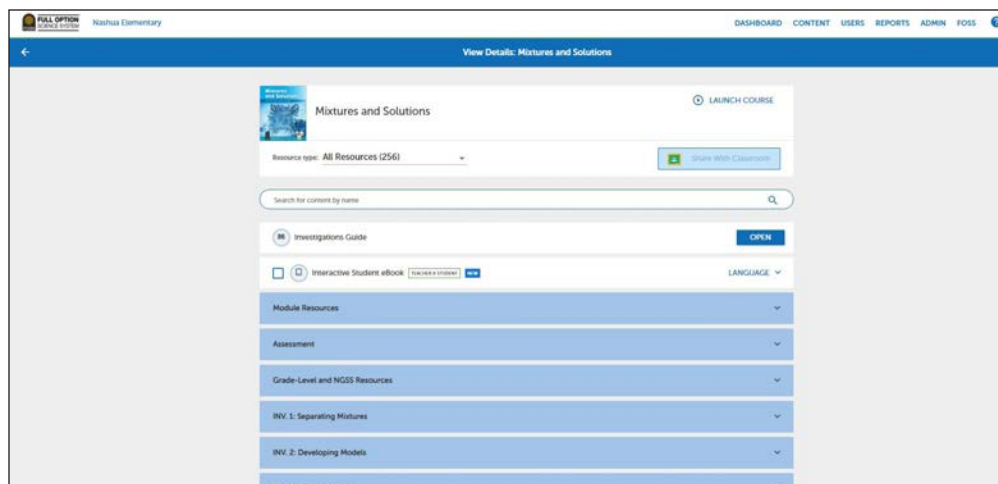
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Also available in Spanish and as interactive eBooks.

FOSSweb on ThinkLink

Technology for Learning Anywhere

FOSSweb digital resources are located on ThinkLink, School Specialty's new cloud-based curriculum platform.

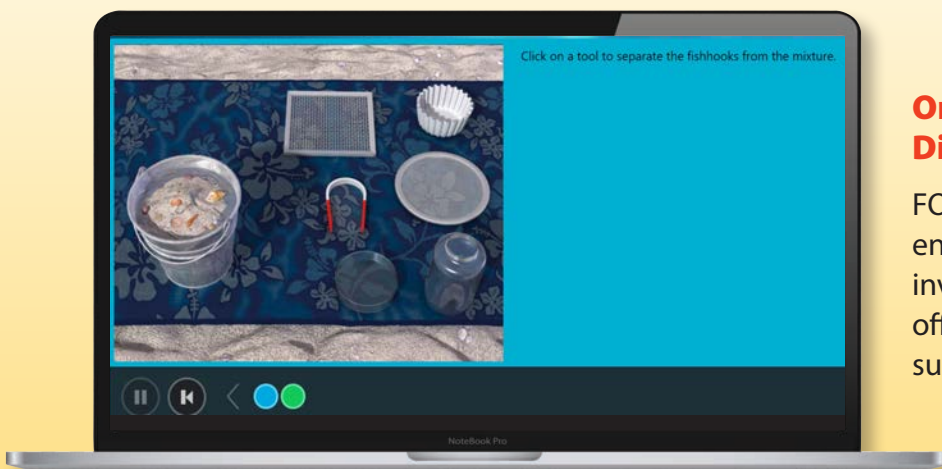
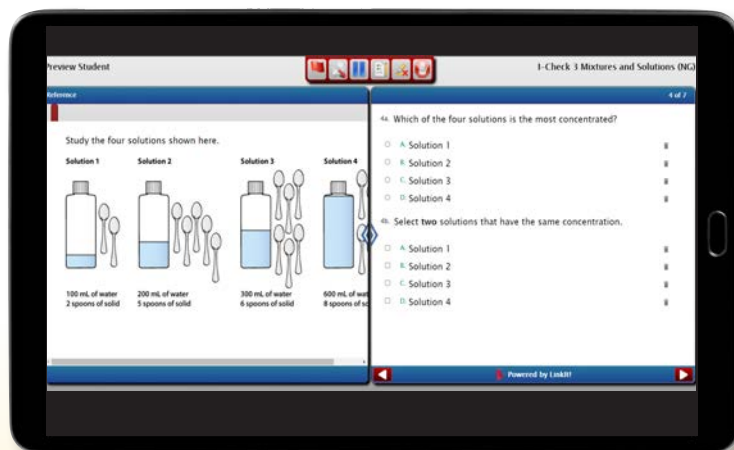


Access:

- Supports easy single sign-on and class management with Google classroom and learning management systems.
- Provides easy access to both teacher and student digital resources, including duplication masters, online activities, and streaming videos.

FOSSmap Online Assessment

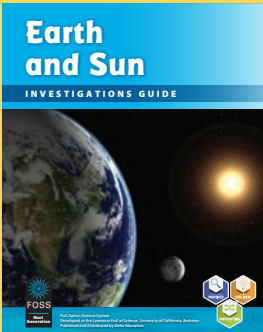
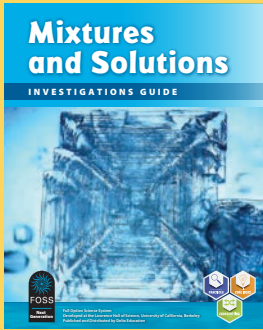
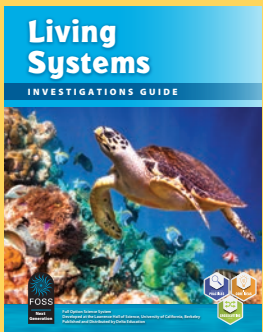
Students in grades 3–5 can take summative assessments online with automatic coding of most responses. Student and class level reports help you identify instructional next steps.



Online Activities for Differentiating Instruction

FOSSweb digital resources provide engaging, interactive virtual investigations and tutorials that offer additional content and skill support for students.

FOSS Modules—Grade 5

	Module Phenomenon and Driving Question	Module Overview/Bundled Performance Expectations
FOSS Module	Earth and Sun Module Anchor phenomenon: <i>Patterns observed in the sky over a day, a month, a year, and more, and their effects on Earth</i> Module driving question: How do Earth's geosphere, hydrosphere, atmosphere, and biosphere interact to create a sustainable environment for all life  5 investigations Critical Pathway: 34 sessions**	The constant renewal of water on Earth's land surfaces by the activities in the atmosphere is one of the defining characteristics of Earth, the water planet. Students investigate the properties of the atmosphere, energy transfer from the Sun to Earth, and the dynamics of weather and water cycling in Earth's atmosphere. Other experiences help students to develop and use models to understand Earth's place in the solar system, and the interactions of Earth, the Sun, and the Moon to reveal predictable patterns—daily length and direction of shadows, day and night, and the seasonal appearance of stars in the night sky. Earth Sciences: 5-ESS1-1, 5-ESS1-2, 5-ESS2-1, 5-ESS2-2, 5-ESS3-1 Physical Sciences: 5-PS1-1, 5-PS2-1 ETAS: 3-5 ETS1-2, 3-5 ETS1-3
FOSS Module	Mixtures and Solutions Module Anchor phenomenon: <i>Matter and its interactions in our everyday life, such as mixtures, solutions, and chemical reactions.</i> Module driving question: What is matter and what happens when samples of matter interact?  5 investigations Critical Pathway: 27 sessions	Students engage with matter and its interactions in our everyday life—mixtures, solutions, solubility, concentration, and chemical reactions. They come to know that matter is made of particles too small to be seen and develop the understanding that matter is conserved when it changes state—from solid to liquid to gas—when it dissolves in another substance, and when it is part of a chemical reaction. Students have experiences with mixtures, solutions of different concentrations, and reactions forming new substances. Knowing about properties and systems of substances, how things go together and are taken apart, enables us to develop models that explain phenomena too small to see directly. Physical Sciences: 5-PS1-1, 5-PS1-2, 5-PS1-3, 5-PS1-4 ETAS: 3-5 ETS1-1, 3-5 ETS1-2, 3-5 ETS1-3
FOSS Module	Living Systems Module Anchor phenomenon: <i>Ecosystems and organisms and their interacting parts</i> Module driving question: How can we describe Earth's biosphere as a system of interacting parts?  4 investigations Critical Pathway: 33 sessions	Students start by looking at Earth as the interaction of four Earth systems or subsystems—the geosphere, the atmosphere, the hydrosphere, and the biosphere. They focus on the biosphere and investigate systems on different scales—nutrient and transport systems within an organism that moves matter and provides energy to the individual organism, and feeding relationships in ecosystems that move matter among plants, animals, decomposers, and the environment. They come to understand that plants get the materials they need for growth primarily from water and air, and that energy in animals' food was once energy from the Sun. Students explore how human activities in agriculture, industry, and everyday life can have major effects on these systems Life Sciences: 5-LS1-1, 5-LS2-1, 4-LS1-2 * Physical Sciences: 5-PS3-1 Earth Sciences: 5-ESS2-1, 5-ESS3-1

* These PEs are addressed in grade 3 and extended in grade 4 or are foundational for grade 5.

** A session is 45 minutes.

Disciplinary Core Ideas	Science and Engineering Practices	Crosscutting Concepts
ESS1.A: The universe and its stars ESS1.B: Earth and the solar system ESS2.A: Earth materials and systems ESS2.C: The roles of water in Earth's surface processes ESS3.C: Human impacts on Earth systems PS1.A: Structure and properties of matter PS2.B: Types of interactions ETS1.A: Defining and delimiting engineering problems ETS1.B: Developing possible solutions ETS1.C: Optimizing the design solutions	• 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	• Patterns • Cause and effect • Scale, proportion, and quantity • Systems and system models • Energy and matter
PS1.A: Structure and properties of matter PS1.B: Chemical reactions ETS1.A: Defining and delimiting engineering problems ETS1.B: Developing possible solutions ETS1.C: Optimizing the design solution	• 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	• Patterns • Cause and effect • Scale, proportion, and quantity • Systems and system models • Energy and matter
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 PS3.D: Energy in chemical processes and everyday life ESS2.A: Earth materials and systems ESS3.C: Human impacts on Earth systems	• 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	• Patterns • Scale, proportion, and quantity • Systems and system models • Energy and matter • Structure and function • Stability and change

FOSS Phenomena Storylines

Earth and Sun Applications of Science

ANCHOR PHENOMENON 1 INVESTIGATION 1

A family is planning on having lunch at the park on a clear, sunny day. When they arrive, they sit down at a table in the shade of a nearby tree. After an hour, their table is not in the shade anymore. **What causes a family's table to be in the shade for part of the day and in the sunlight the other part?**

CONNECTIONS TO COLLEGE- AND CAREER-READY STANDARDS

ESS1.B: Earth and the Solar System

Patterns, Cause and Effect; Systems and System Models

Planning and Carrying Out Investigations; Developing and Using Models, Constructing Explanations

SCCCR PERFORMANCE EXPECTATION 5-ESS1-2

STORYLINE

Students plan and carry out investigations examining patterns of shadows throughout the day. They develop and use models of Earth and the Sun to explain what causes changes such as day and night, and the size and direction of shadows. Finally, students construct an explanation using evidence about the Sun in the sky to answer the question.

ANCHOR PHENOMENON 2

INVESTIGATION 2

Two friends who live in different parts of the world are talking on the phone. One says they can see only one large bright star in the sky. The other says they can see hundreds of small stars, but they aren't very bright. **How do you explain the difference in the appearance of the stars that each friend is observing?**

CONNECTIONS TO COLLEGE- AND CAREER-READY STANDARDS

PS2.B: Types of Interactions; **ESS1.A:** The Universe and Its Stars;
ESS1.B: Earth and the Solar System

Patterns; Cause and Effect; Scale, Proportion, and Quantity;
Systems and System Models

Analyzing and Interpreting Data; Using Mathematics and Computational Thinking; Constructing Explanations

SCCCR PERFORMANCE EXPECTATIONS

5-PS2-1, 5-ESS1-1, 5-ESS1-2

STORYLINE

Students analyze and interpret data to make sense of the apparent movement of objects in the night sky. They use mathematics and computational thinking to develop scale models of Earth, the Moon, the Sun, and the solar system. Finally, they construct explanations based on data about the relative scale between Earth, the Sun, and the Moon as well as other stars.



ANCHOR PHENOMENON 3

INVESTIGATIONS 3-4

You are at a beach on a warm and pleasant day. You take off your shoes and the sand is so hot you can barely walk on it. You run into the lake water and the water is cold. **Why is the sand so hot at the beach while the water is so cool?**

CONNECTIONS TO COLLEGE- AND CAREER-READY STANDARDS

PS1.A: Structures and Properties of Matter; **ESS2.A:** Earth Materials and Systems; **ESS3.C:** Human Impacts on Earth Systems

Cause and Effect; Systems and System Models

Planning and Carrying Out Investigations; Constructing Explanations; Engaging in Argument from Evidence

SCCCR PERFORMANCE EXPECTATIONS

5-PS1-1, 5-ESS2-1, 5-ESS3-1, 3-5-ETS1-2, 3-5-ETS1-3

STORYLINE

Students plan and conduct investigations to determine cause-and-effect relationships between the compression and expansion of air. They construct explanations about interactions between Earth systems, such as the atmosphere, hydrosphere, and geosphere. Finally, they engage in argumentation to explain energy transfer from the Sun to various systems.



FOSS Phenomena Storylines

Mixtures and Solutions Applications of Science

ANCHOR PHENOMENON 1 INVESTIGATIONS 1–3

After a hard rain, some students noticed a small pond next to a construction site. The water was brown right after the rain. The next day, they saw the pond water was clearer, and rocks and mud were on the bottom. Near the edge of the pond, the plants started to turn brown and die. **What caused the formation of the pond and how do you explain the changes observed to the water and plants?**

CONNECTIONS TO COLLEGE- AND CAREER-READY STANDARDS

PS1.A: Structures and Properties of Matter

Cause and Effect; Scale, Proportion and Quantity

Developing and Using Models; Engaging in Argument From Evidence

SCCCR PERFORMANCE EXPECTATIONS

5-PS1-1, 5-PS1-2, 3-5-ETS1-1, 3-5-ETS1-2, 3-5-ETS1-3

STORYLINE

Students investigate the changes to water and plants in a pond after a hard rain. They begin to construct an explanation of the changes in the water by mixing three solid materials (gravel, powder, and salt) into cups of water to observe three types of mixtures, revealing a phenomenon—dissolving. Next, they use measurement tools to gather evidence that the dissolved material (salt) is still present, but not visible (conservation of matter), and develop a model for the dissolved salt in water. Then, they use evaporation to separate salt from water. They apply what they learned about separating mixtures to construct an explanation of the changes to the water that has ponded. Finally, they analyze solutions and develop a model for concentration and use this model to determine impact of concentration of solutions on plants.

ANCHOR PHENOMENON 2

INVESTIGATION 4

A teacher finds a white substance found in an unmarked container inside the classroom supply closet. The teacher wants to create a label for the container with the name of the substance and asks you to help figure out what the substance is using what you know about how different materials interact with water.

How can you identify the mystery substance safely?

CONNECTIONS TO COLLEGE- AND CAREER-READY STANDARDS

PS1.A: Structures and Properties of Matter

Patterns; Scale, Proportion, and Quantity

Planning and Carrying Out Investigations; Using Mathematics and Computational Thinking

SCCCR PERFORMANCE EXPECTATIONS

5-PS1-1, 5-PS1-2, 5-PS1-3, 3-5-ETS1-1, 3-5-ETS1-2

STORYLINE

Students are given a problem to determine a mystery substance. They compare the amount of different substances that dissolve in a given amount of water. They analyze the crystal signature of different substances and then plan and carry out investigations using the properties of solubility and crystal pattern to identify the mystery substance.



ANCHOR PHENOMENON 3

INVESTIGATION 5

When your stomach hurts, you might eat an antacid. A few minutes later, you burp and feel a little better. **What causes you to burp?**

CONNECTIONS TO COLLEGE- AND CAREER-READY STANDARDS

PS1.B: Chemical Reactions

Planning and Carrying Out Investigations

Cause and Effect; Energy and Matter

SCCCR PERFORMANCE EXPECTATIONS

5-PS1-1, 5-PS1-2, 5-PS1-3, 5-PS1-4

STORYLINE

Students combine two substances with water to discover a chemical reaction. They collect and analyze data about the effects of mixing different combinations of substances with water to discover that new substances with different properties form. They construct explanations about the amount of a new substance produced in different chemical reactions and they apply these ideas to explain what causes a burp.



FOSS Phenomena Storylines

Living Systems Applications of Science

ANCHOR PHENOMENON 1

INVESTIGATIONS 1–2, 4

The school cafeteria wants to reduce the trash from lunch. Food scraps and some paper will go into the compost bin for the school vegetable garden. **How can composted food scraps and paper provide improved soil to grow plants that produce more food for student lunches?**

CONNECTIONS TO COLLEGE- AND CAREER-READY STANDARDS

LS1.C: Organization for Matter and Energy Flow in Organisms;
LS2.A: Interdependent Relationships in Ecosystems; **LS2.B:** Cycles of Matter and Energy Transfer in Ecosystems

Systems and System Models; Energy and Matter

Planning and Carrying Out Investigations; Developing and Using Models; Constructing Explanations

SCCCR PERFORMANCE EXPECTATIONS

5-PS3-1, 5-LS1-1, 5-LS2-1, 5-ESS2-1, 5-ESS3-1

STORYLINE

Students plan and carry out investigations with redworm composting jars and examine the role of organisms in an ecosystem. They use information from organism cards to develop and use models to explain the flow of energy and matter through an ecosystem. Finally, they describe how to improve soil and increase food production.



ANCHOR PHENOMENON 2

INVESTIGATIONS 2–3

A family wants to eat garden-fresh tomatoes, but they live in an apartment and don't have a garden. They try a technique without using soil. **How can tomatoes be grown without soil?**

CONNECTIONS TO COLLEGE- AND CAREER-READY STANDARDS

PS3.D: Energy in Chemical Processes and Everyday Life; **LS1.C:** Organization for Matter and Energy Flow in Organisms; **LS2.B:** Cycles of Matter and Energy Transfer in Ecosystems

Cause and Effect; Systems and System Models; Energy and Matter

Analyzing and Interpreting Data; Developing and Using Models; Constructing Explanations

SCCCR PERFORMANCE EXPECTATIONS

5-PS3-1, 5-LS1-1, 5-LS2-1

STORYLINE

Students analyze and interpret data from an investigation in which they grow wheat under different conditions to make sense of the processes of photosynthesis in plants and digestion in animals. They use models to explain how plants make their own food and transport it to all parts of the plant. Finally, they construct an explanation based on data about how organisms get nutrients to support life and how tomato plants grow without soil.



ANCHOR PHENOMENON 3

INVESTIGATIONS 1–4

A group of friends went fishing at a local pond when school was out in early June. The pond provides an environment for lots of healthy fish. The friends return to the pond in August after a hot summer to find dead fish and aquatic plants in the pond. **What ecosystem interactions might have caused the death of the fish and plants in a local pond over the summer?**

CONNECTIONS TO COLLEGE- AND CAREER-READY STANDARDS

LS1.C: Organization for Matter and Energy Flow in Organisms; **LS2.A:** Interdependent Relationships in Ecosystems; **LS2.B:** Cycles of Matter and Energy Transfer in Ecosystems

Systems and System Models; Energy and Matter

Developing and Using Models; Constructing Explanations

SCCCR PERFORMANCE EXPECTATIONS

5-PS3-1, 5-LS1-1, 5-LS2-1, 5-ESS2-1, 5-ESS3-1

STORYLINE

Students obtain information and construct explanations to explain how aquatic ecosystems demonstrate interactions between Earth systems such as the atmosphere, hydrosphere, and biosphere. They consider Earth's four systems and determine possible causes of death of the fish and plants in the pond.



Critical Pathway

South Carolina Science

Today, many elementary educators face the reality that time for science instruction is limited. The FOSS developers have determined a Critical Pathway through each module that is faithful to the standards in the time you have to teach with the flexibility to expand or differentiate instruction. There are 94 total sessions for grade 5.

EARTH AND SUN

SESSION	INV./PART	CRITICAL PATHWAY	IG PAGES
1	Inv 1.1	Shadow Shifting, Steps 1–13	110–113
2	Inv 1.1	Shadow Shifting, Steps 14–18	113–115
3	Inv 1.2	Sun Tracking, Steps 1–12 *	119–121
4	Inv 1.2	Sun Tracking, Steps 13–19	122–124
5	Inv 1.2	Sun Tracking, Steps 20–25	125–128
6	Inv 1.3	Day and Night, Steps 1–13	132–136
7	Inv 1.3	Day and Night, Steps 14–12	136–140
8	Inv 1.3	Day and Night, Steps 23–27	141–142
9	Inv 1.3	Day and Night, Step 28 (skip 29), Review, Steps 30–31	143–145
10	Inv 1.3	I-Check 1, Step 32	145
11	Inv 2.1	Night-Sky Observations, Steps 1–8 (optional Step 4)	174–177
12	Inv 2.1	Night-Sky Observations, Steps 9–11 (optional Steps 12–13)	177–178
13	Inv 2.1	Night-Sky Observations, Steps 14–18	180–182
	Inv 2.1	Night-Sky Observations, Steps 19–22—Focus on Reading	177–185
14	Inv 2.2	How Big and How Far?, Steps 1–9	188–191
	Inv 2.2	How Big and How Far?, Steps 10–15—Focus on Readings	192
	Inv 2.3	Phases of the Moon, Steps 1–18—Focus on Computational Thinking	199–205
	Inv 2.4	The Solar System, Steps 1–16	208–211
	Inv 2.4	The Solar System, Steps 17–20—Focus on Readings	212–214
15	Inv 2.4	The Solar System, Steps 21–27	214–217
16	Inv 2.4	The Solar System, Steps 31–32 (skip Steps 28–30 video)	218–219
17	Inv 2.5	Stars, Steps 1–5; 8–11 (skip Steps 6–7)	223–227
18	Inv 2.5	Stars, Steps 12–15	228–229
19	Inv 2.5	Stars, Steps 16–20, Review Steps 22 and 24	230–235
	Inv 2.5	Stars, Steps 21 and 23—Focus on Two Readings	232 and 234
20	Inv 2.5	I-Check 2, Step 25	235

CONTACT YOUR SALES REPRESENTATIVE IF YOUR DISTRICT
NEEDS A CUSTOMIZED CRITICAL PATHWAY.

EARTH AND SUN (continued)

SESSION	INV./PART	CRITICAL PATHWAY	IG PAGES
21	Inv 3.1	The Air Around Us, Steps 1–17	257–262
	Inv 3.1	The Air Around Us, Steps 18–21—Focus on Reading	263–264
22	Inv 3.2	The Atmosphere, Steps 1–2; 4–12 (Skip Step 3, video)	267–273
	Inv 3.2	The Atmosphere, Steps 13–15—Focus on Discussion, Tutorial	273
	Inv 3.3	Local Weather, Steps 1–6; 10–15, Review Steps 19–20	279–287
	Inv 3.3	Local Weather, Steps 7–9 (tools); 16–18, 21—Focus on Media	281, 284–5, 287
	Inv 3.3	I-Check 3, Step 22	287
23	Inv 4.1	Heating Earth Materials, Steps 1–10	312–314
24	Inv 4.1	Heating Earth Materials, Steps 11–15	314–315
25	Inv 4.1	Heating Earth Materials, Steps 16–22	316–318
26	Inv 4.1	Heating Earth Materials, Steps 23–27	319–320
27	Inv 4.2	Conduction, Steps 1–13	324–328
28	Inv 4.2	Conduction, Steps 14–21	328–330
29	Inv 4.2	Conduction, Steps 22–29	331–334
30	Inv 4.3	Convection, Steps 1–23	337–343
31	Inv 4.3 Inv 4.4	Convection, Steps 24–29, Review Steps 28–29	344–347 361
	Inv 4.4	Color and Energy Transfer, Steps 1–27—Focus on Engineering	352–360
32	Inv 4.4	Investigation 4 I-Check, Step 30	362
	Inv 5.1	Condensation, Steps 1–23—Focus on Environmental Literacy	383–389
	Inv 5.2	Evaporation, Steps 1–10—Focus on Environmental Literacy	392–395
33	Inv 5.3	Water Cycle, Steps 1–7	399–402
34	Inv 5.3	Water Cycle, Steps 8–25	402–408
	Inv 5.3	Water Cycle, Steps 26–29—Focus on Reading	409–411
	Inv 5.4	Climate, Steps 1–24—Focus on Environmental Literacy	415–423
	Inv 5.4	Posttest, Step 25	423

Investigation sessions, with references to the pages and step numbers in the Guide

Optional short sessions within a critical pathway part

Entire parts of the investigation that are not included in this critical pathway; these activities provide additional opportunities to deepen the learning experience

MIXTURES AND SOLUTIONS

SESSION	INV./PART	CRITICAL PATHWAY	IG PAGES
1	Inv 1.1	Making and Separating Mixtures, Steps 1–13, 17 (clean up)	106–109
2	Inv 1.1	Making and Separating Mixtures, Steps 14–16, 18–22	109–111
3	Inv 1.2	Separating a Salt Solution, Steps 1–13 (10 evaporate*)	114–117
4	Inv 1.2	Separating a Salt Solution, Steps 14*–20	117–118
5	Inv 1.2	Separating a Salt Solution, Steps 21–25 (reading)	119–122
6	Inv 1.3	Separating a Dry Mixture, Steps 1–13 (13 response sheet)	126–128
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MIXTURES AND SOLUTIONS (continued)

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16	Inv 4.1	Salt Saturation, Steps 1–21	264–269
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17	Inv 4.2	Epsom Salts Saturation, Steps 1–19	276–279
18	Inv 4.3	The Saturation Puzzle, Steps 1–14	283–285
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20	Inv 4.4	Inv. 4 I-Check, Step 31	302
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24	Inv 5.2	Reaction Products, Steps 9–15	331–332
25	Inv 5.2	Reaction Products, Steps 16–21	333–336
26	Inv 5.3	Reactions in a Zip Bag, Steps 1–17 Review, Steps 20–21	340–345, 347
	Inv 5.3	Reactions in a Zip Bag, Steps 18–19—Focus on Engineering Reading	346
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 Investigation sessions, with references to the pages and step numbers in the *Guide*

 Optional short sessions within a critical pathway part

 Entire parts of the investigation that are not included in this critical pathway; these activities provide additional opportunities to deepen the learning experience

LIVING SYSTEMS

SESSION	INV./PART	CRITICAL PATHWAY	IG PAGES
1	Inv 1.1	Everyday Systems, Steps 1–14 Note: Condense Steps 4–7 and focus on final question is Step 7	97–103
2	Inv 1.2	The Earth System, Steps 1–3	106
3	Inv 1.2	The Earth System, Steps 4–6	107–108
4	Inv 1.2	The Earth System, Steps 7–23	108–113
5	Inv 1.2	The Earth System, Steps 24–30	114–116
6	Inv 1.3	Kelp Forest Food Web, Steps 1–14	121–123
7	Inv 1.3	Kelp Forest Food Web, Step 18 first, followed by Steps 15–17	124–125
8	Inv 1.3	Kelp Forest Food Web, Steps 19–21	126
9	Inv 1.4	Recycling, Steps 1–13* (redworm observations through Inv 4.4)	130–134
10	Inv 1.4	Recycling, Steps 14–16, Review Steps 18–19	135–137
11	Inv 1.4	I-Check 1, Step 20 (Later plan self-assessment)	138
12	Inv 2.1	Yeast Nutrition, Steps 1–18	157–161
13	Inv 2.1	Yeast Nutrition, Steps 19–27 (Step 28 optional)	161–165
14	Inv 2.2	Plant Nutrition, Steps 1–6* (Getting Ready schedule pp. 167)	169–170
15	Inv 2.2	Plant Nutrition, Steps 7–11 (could do Step 10, then Steps 7–9, 11)	171–173
16	Inv 2.2	Plant Nutrition, Steps 12–17	174–175
17	Inv 2.2	Plant Nutrition, Steps 18–20	176
18	Inv 2.3	Animal Nutrition, Steps 1–4* (Getting Ready for larvae pp. 178)	181–182
19	Inv 2.3	Animal Nutrition, Steps 5–7; Step 8, Chapters 2–7 (16 min)	183–185
20	Inv 2.3	Animal Nutrition, Steps 9–10; Step 11, Chapters 2–3, 5–7 only	186–187
21	Inv 2.3	Animal Nutrition, Steps 13–17 (skip Step 12)	188–190
22	Inv 2.3	Animal Nutrition, Steps 18–24, Review Steps 25–26	190–194
23	Inv 2.3	I-Check 2, Step 27 (Later plan self-assessment)	194

*Indicates the need to allow for growth time

LIVING SYSTEMS (continued)

SESSION	INV./PART	CRITICAL PATHWAY	IG PAGES
24	Inv. 3.1	Plant Vascular Systems, Steps 1–10	215–217
	Inv. 3.1	<i>Plant Vascular Systems, Steps 11–12—Focus on Reading</i>	218
25	Inv. 3.1	Plant Vascular Systems, Steps 13–16	219–220
26	Inv. 3.1	Plant Vascular Systems, Steps 17–18	221
	Inv. 3.1	<i>Plant Vascular Systems, Steps 19–26—Focus on Environmental literacy</i>	221–223
	Inv. 3.1	<i>Plant Vascular Systems, Steps 27–29—Focus on Environmental literacy</i>	223–224
27	Inv. 3.1	Plant Vascular Systems, Steps 30–34, return to Step 29	225–27, 224
	Inv. 3.1	<i>Plant Vascular Systems, Steps 35–36—Focus on Reading</i>	228
28	Inv. 3.1	Plant Vascular Systems, Steps 37–41 (Step 38, Video, Ch. 5–7 only)	229–231
	Inv. 3.2	<i>Circulatory Systems, Steps 1–23—Using Models and Engineering</i>	234–244
	Inv. 3.3	<i>Respiratory Systems, Steps 1–23—Focus on Experimentation, Reading</i>	248–258
	Inv. 4.1	<i>Stimulus/Response, Steps 1–32—Focus on Experimentation, Media</i>	277–287
	Inv. 4.2	<i>Attention, Steps 1–21—Focus on Outdoor, Environmental Literacy</i>	291–299
	Inv. 4.3	<i>Instinct and Learning, Steps 1–8—Focus on Systems and Modeling</i>	303–305
29	Inv. 4.4	Ecosystems, Steps 1–5* (Redworm recycling jars observed)	311–312
30	Inv. 4.4	Ecosystems, Steps 6–9 (Step 7, focus on video chapters 2–7, 15 min.)	312–313
31	Inv. 4.4	Ecosystems, Steps 10–12	314–315
32	Inv. 4.3 Inv. 4.4	Instinct and Learning, Steps 9–11; Step 12, 7 minute video only Review Step 13 (focus on last 2 bullets) and Step 15	306–307 316–317
33	Inv. 4.4	Posttest, Step 16	317

*Indicates the need to allow for growth time

Investigation sessions, with references to the pages and step numbers in the *Guide*

Optional short sessions within a critical pathway part

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Diverse Learning Needs

Designed for All Learners

Access and Equity

The FOSS Program has been designed to maximize the science learning opportunities for all students, including those who have traditionally not had access to or have not benefited from equitable science experiences—students with special needs, ethnically diverse learners, English learners, students living in poverty, girls, and advanced and gifted learners. FOSS is rooted in a 30-year tradition of multisensory science education and informed by recent research on UDL and culturally and linguistically responsive teaching and learning. See the **Access and Equity** chapter on FOSSweb for strategies and suggestions.

English Language Development (ELD)

The FOSS active investigations, science notebooks, *FOSS Science Resources* articles, and formative assessments provide rich contexts in which students develop and exercise thinking and communication in both science and language arts. Students experience the natural world in real and authentic ways and use language to inquire, process information, and communicate their thinking about scientific phenomena.



Strategies for Effective Learning

Engaging Students

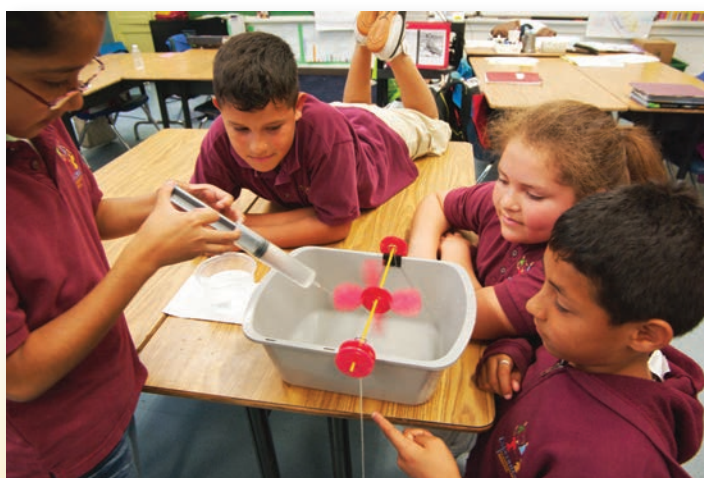
English Language Art Connections

FOSS leverages the natural connection between science and language arts. Students read articles and think critically to enhance their understanding. Students practice ELA skills as well as scientific thinking by organizing their thoughts in a science notebook.



Engineering

FOSS provides meaningful engineering design challenges to students across the grade bands. Students take on the role of scientists to problem-solve and then take on the role of engineers to design and innovate.



Environmental Literacy

FOSS throws open the classroom door and takes students outdoors to apply scientific principles to natural systems.

Custom Professional Learning

FOSS can help you build a customized professional learning plan for your district, through its experienced network of consultants to facilitate workshops and sustain the progress of your implementation through ongoing support.

SOUTH CAROLINA FOSS NEXT GENERATION K–8 SCOPE AND SEQUENCE

Grade	Integrated Middle Grades				Digital Only Investigations
6–8	 Heredity and Adaptation	 Electromagnetic Force	 Waves	 Planetary Science	Diversity of Life Online (Investigation 6)
	 Populations and Ecosystems	 Chemical Interactions	 Gravity and Kinetic Energy	 Variables and Design	Earth History Online (Investigation 8)
	 Weather and Water	 Earth History	 Diversity of Life	 Human Systems Interactions	Wave Models

*Half-length courses



Physical Science content



Earth Science content



Life Science content



Engineering content

Grade	Physical Science	Earth Science	Life Science
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
PreK	Observing Nature		