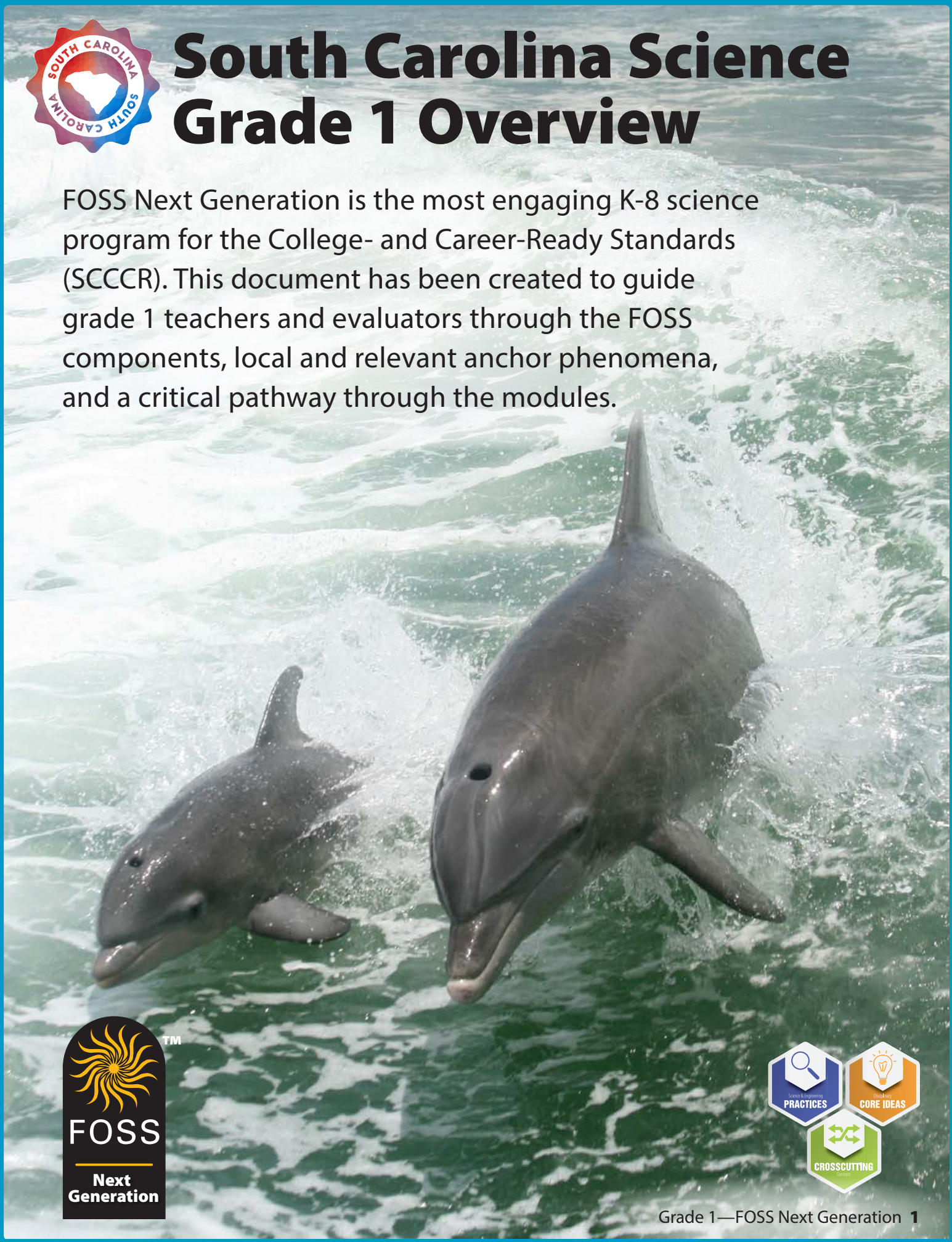
South Carolina Science Grade 1 Overview

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 1 teachers and evaluators through the FOSS components, local and relevant anchor phenomena, and a critical pathway through the modules.



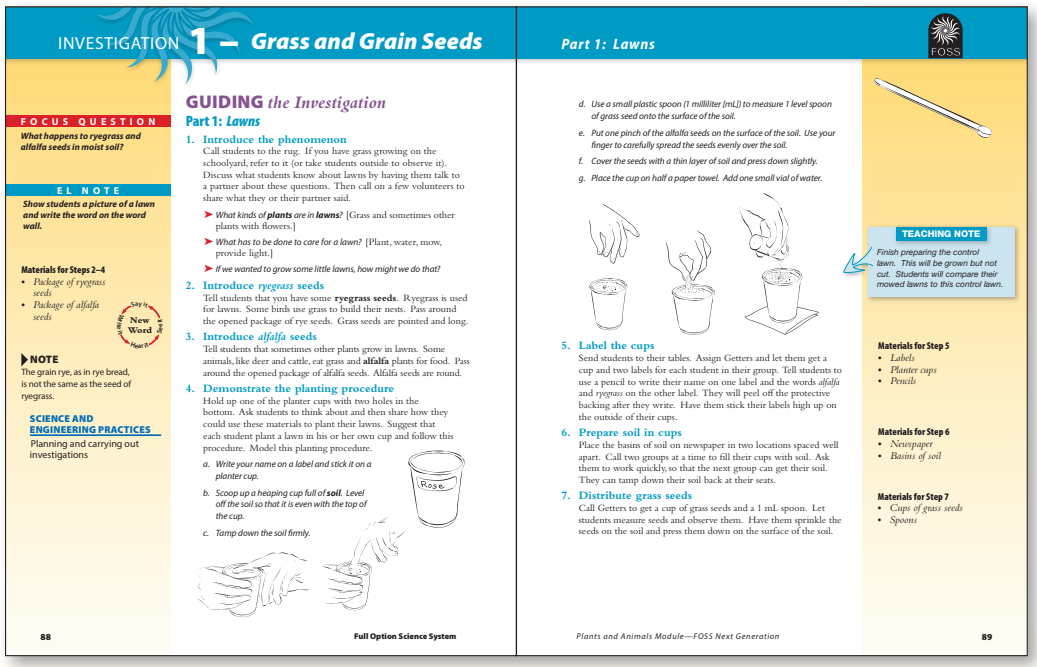
Navigation Guide

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 — Grass and Grain Seeds

FOCUS QUESTION
What happens to ryegrass and alfalfa seeds in moist soil?

EL NOTE
Show students a picture of a lawn and write the word on the word wall.

Materials for Steps 2–4
- Package of ryegrass seeds
- Package of alfalfa seeds

NOTE
The grain rye, as in rye bread, is not the same as the seed of ryegrass.

SCIENCE AND ENGINEERING PRACTICES
Planning and carrying out investigations

GUIDING the Investigation
Part 1: Lawns

1. Introduce the phenomenon
Call students to the rug. If you have grass growing on the schoolyard, refer to it (or take students outside to observe it). Discuss what students know about lawns by having them talk to a partner about these questions. Then call on a few volunteers to share what they or their partner said.
➤ What kinds of **plants** are in **lawns**? [Grass and sometimes other plants with flowers.]
➤ What has to be done to care for a lawn? [Plant, water, mow, provide light.]
➤ If we wanted to grow some little lawns, how might we do that?
2. Introduce *ryegrass* seeds
Tell students that you have some **ryegrass seeds**. Ryegrass is used for lawns. Some birds use grass to build their nests. Pass around the opened package of rye seeds. Grass seeds are pointed and long.
3. Introduce *alfalfa* seeds
Tell students that sometimes other plants grow in lawns. Some animals, like deer and cattle, eat grass and **alfalfa** plants for food. Pass around the opened package of alfalfa seeds. Alfalfa seeds are round.
4. Demonstrate the planting procedure
Hold up one of the planter cups with two holes in the bottom. Ask students to think about and then share how they could use these materials to plant their lawns. Suggest that each student plant a lawn in his or her own cup and follow this procedure. Model this planting procedure.
a. Write your name on a label and stick it on a planter cup.
b. Scoop up a heaping cup full of **soil**. Level off the soil so that it is even with the top of the cup.
c. Tamp down the soil firmly.

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Part 1: Lawns

d. Use a small plastic spoon (1 milliliter [mL]) to measure 1 level spoon of grass seed onto the surface of the soil.
e. Put one pinch of the alfalfa seeds on the surface of the soil. Use your finger to carefully spread the seeds evenly over the soil.
f. Cover the seeds with a thin layer of soil and press down slightly.
g. Place the cup on half a paper towel. Add one small vial of water.

TEACHING NOTE
Finish preparing the control lawn. This will be grown but not cut. Students will compare their mowed lawns to this control lawn.

5. Label the cups
Send students to their tables. Assign Getters and let them get a cup and two labels for each student in their group. Tell students to use a pencil to write their name on one label and the words *alfalfa* and *ryegrass* on the other label. They will peel off the protective backing after they write. Have them stick their labels high up on the outside of their cups.
6. Prepare soil in cups
Place the basins of soil on newspaper in two locations spaced well apart. Call two groups at a time to fill their cups with soil. Ask them to work quickly, so that the next group can get their soil. They can tamp down their soil back at their seats.
7. Distribute grass seeds
Call Getters to get a cup of grass seeds and a 1 mL spoon. Let students measure seeds and observe them. Have them sprinkle the seeds on the soil and press them down on the surface of the soil.

Materials for Step 5
- Labels
- Planter cups
- Pencils

Materials for Step 6
- Newspaper
- Basins of soil

Materials for Step 7
- Cups of grass seeds
- Spoons

Plants and Animals Module—FOSS Next Generation 89

Start your review here:

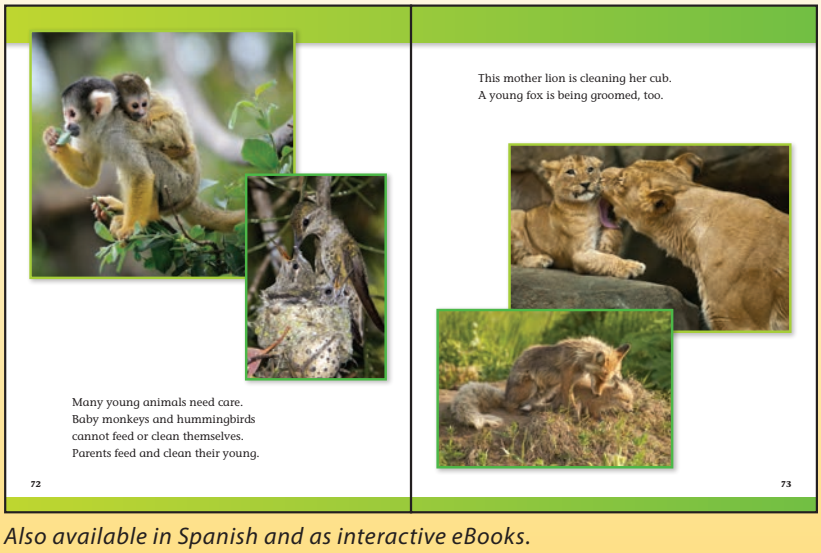
- **Air and Weather:** pp. 1-3, 77-79, 93-96
- **Sound and Light:** pp. 1-3, 75-77, 90-97
- **Plants and Animals:** pp. 1-3, 71-73, 88-95

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


Many young animals need care.
Baby monkeys and hummingbirds
cannot feed or clean themselves.
Parents feed and clean their young.

72

This mother lion is cleaning her cub.
A young fox is being groomed, too.

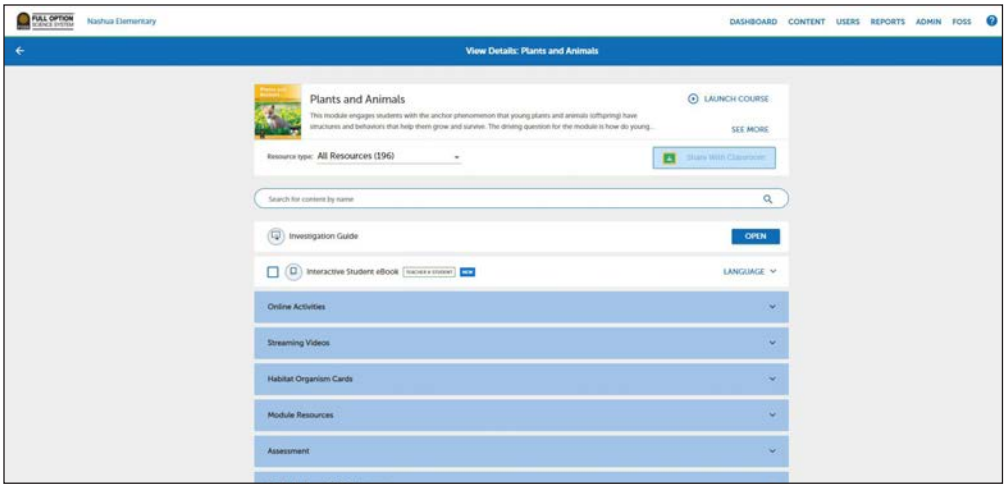
73

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.

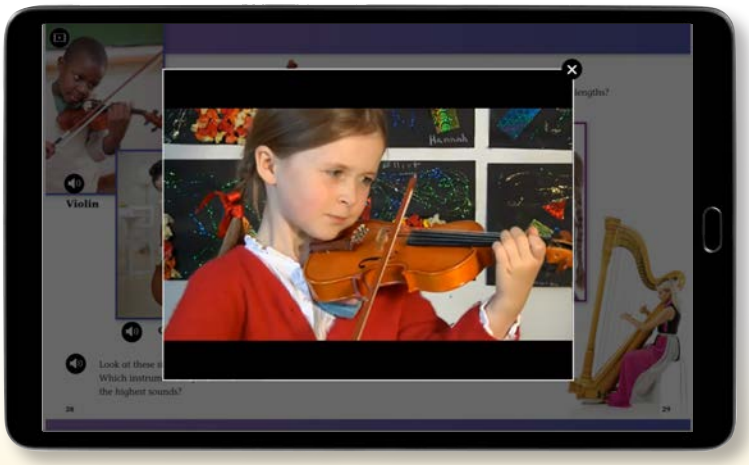


Access:

- 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.

Interactive eBooks

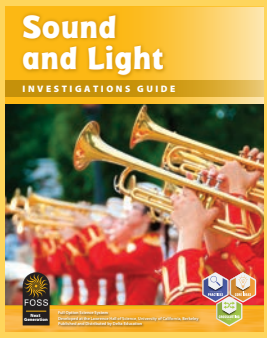
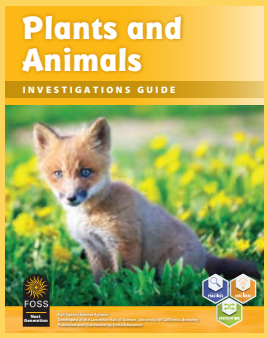
Keep your students engaged while teaching literacy skills with interactive *FOSS Science Resources* eBooks. The eBooks include integrated audio with text syncing and links to online activities and videos that bring the photos to life.



Online Activities for Differentiating Instruction

FOSSweb digital resources provide engaging, interactive online activities that offer additional content and skill support for students.

FOSS Modules—Grade 1

	Module Phenomenon and Driving Question	Module Overview/Bundled Performance Expectations
FOSS Module	**Air and Weather Module** **Anchor phenomenon:** *The air around us and the natural objects that we see in the sky* **Module driving questions:** • *What is all around us?* • *What do we observe in the sky above us?*  4 investigations **Critical Pathway:** 31 sessions**	Students turn their focus upward to explore that objects in the sky change position in predictable ways. They explore the natural world by using simple instruments and calendars to observe and monitor change. They use new tools and methods to build on their understanding of the weather and to find out about properties of air by exploring how objects interact with air. They observe daily changes in air temperature and connect them to the daily movement of the Sun in the sky. 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. **Earth Sciences:** 1-ESS1-1, 1-ESS1-2, K-ESS2-1*, K-ESS3-3* **Physical Sciences:** 2-PS1-1* **ETAS:** K-2 ETS1-1, K-2 ETS1-2, K-2 ETS1-3
FOSS Module	**Sound and Light Module** **Anchor phenomenon:** *Sound and light* **Module driving question:** • *How do sound and light interact with objects?*  4 investigations **Critical Pathway:** 30 sessions	Students develop an understanding of how to observe and manipulate the phenomena of sound and light using simple tools and musical instruments. They learn that sound comes from vibrating objects, has volume and pitch, 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, and explore how to create and change shadows and reflections. Students explore how to use sound and light devices to communicate information and compare the ways that animals use their senses (ears and eyes) to gather information about their environment. **Physical Sciences:** 1-PS4-1, 1-PS4-2, 1-PS4-3, 1-PS4-4 **ETAS:** K-2 ETS1-1, K-2 ETS1-2, K-2 ETS1-3
FOSS Module	**Plants and Animals Module** **Anchor phenomenon:** *Young plants and animals have structures that help them grow and survive* **Module driving question:** • *How do young plants and animals survive in their habitat?*  4 investigations **Critical Pathway:** 36 sessions	Students observe firsthand the structures of plants and discover ways to propagate new plants from mature plants (from seeds, bulbs, roots, and stem cuttings). They observe and describe changes that occur as young plants grow, and compare classroom plants to those in the schoolyard. They design terrariums (habitat systems) and provide for the needs of both plants and animals living together in the classroom. 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. They explore structure and function relationships as they sort different kinds of animal and plant structures, including animal sensory structures. **Life Sciences:** 1-LS1-1, 1-LS1-2, 1-LS3-1 **ETAS:** K-2 ETS1-2

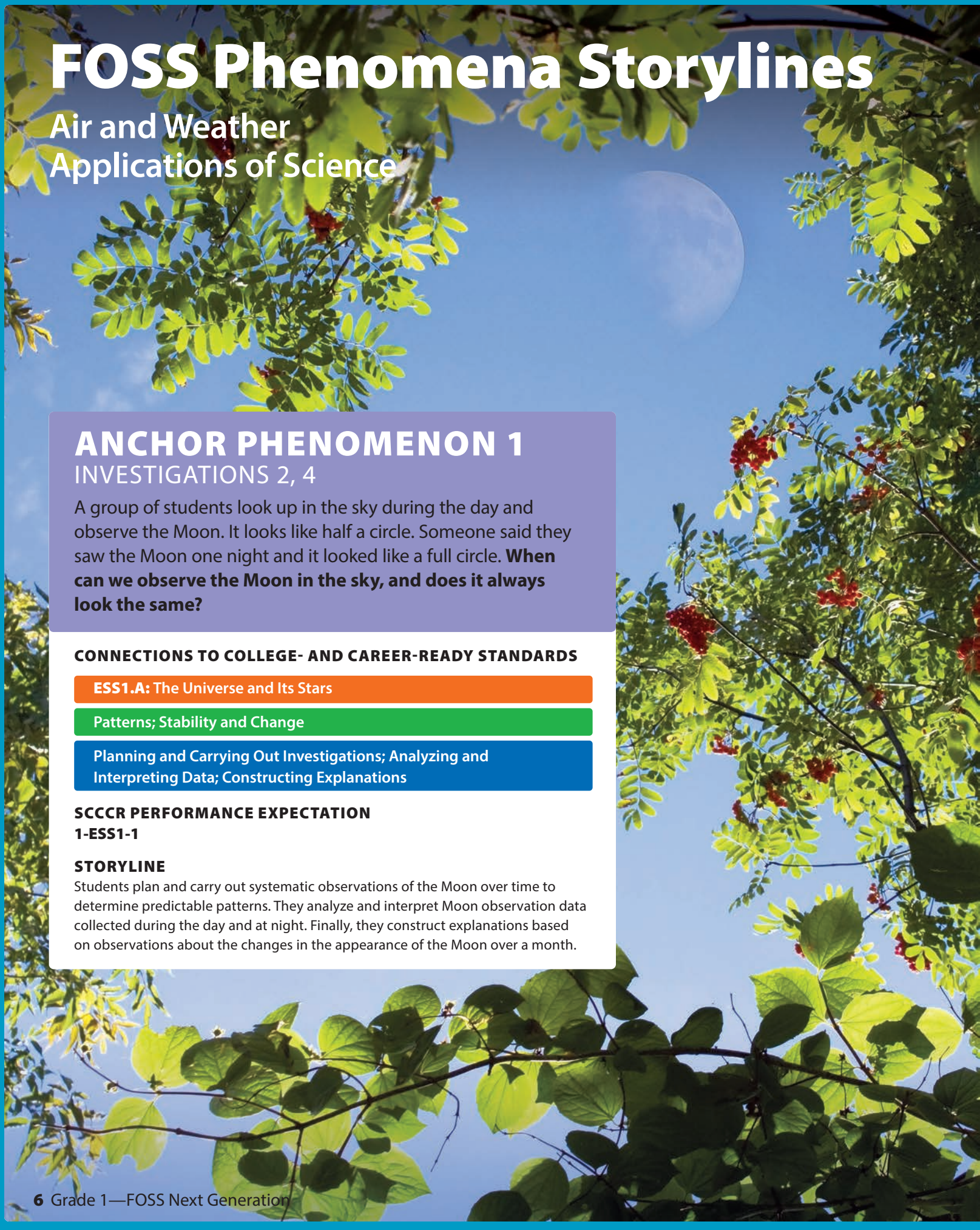
* These PEs are addressed in grade K and extended in grade 1 or are foundational for grade 2

** 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.D: Weather and climate ESS3.A: Natural resources PS1.A: Structures and properties of matter 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 • Obtaining, evaluating, and communicating information	• Patterns • Cause and effect • Scale, proportion, and quantity • Systems and system models • Structure and function • Stability and change
PS4.A: Wave properties PS4.B: Electromagnetic radiation PS4.C: Information technologies and instrumentation LS1.D: Information processing 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 • Constructing explanations and designing solutions • Obtaining, evaluating, and communicating information	• Patterns • Cause and effect • Systems and system models
LS1.A: Structure and function LS1.B: Growth and development of organisms LS1.D: Information processing LS3.A: Heredity: Inheritance of traits LS3.B: Variation of traits 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 • Systems and system models • Structure and function

FOSS Phenomena Storylines

Air and Weather Applications of Science



ANCHOR PHENOMENON 1

INVESTIGATIONS 2, 4

A group of students look up in the sky during the day and observe the Moon. It looks like half a circle. Someone said they saw the Moon one night and it looked like a full circle. **When can we observe the Moon in the sky, and does it always look the same?**

CONNECTIONS TO COLLEGE- AND CAREER-READY STANDARDS

ESS1.A: The Universe and Its Stars

Patterns; Stability and Change

Planning and Carrying Out Investigations; Analyzing and Interpreting Data; Constructing Explanations

SCCCR PERFORMANCE EXPECTATION

1-ESS1-1

STORYLINE

Students plan and carry out systematic observations of the Moon over time to determine predictable patterns. They analyze and interpret Moon observation data collected during the day and at night. Finally, they construct explanations based on observations about the changes in the appearance of the Moon over a month.

ANCHOR PHENOMENON 2
INVESTIGATIONS 2, 4

Two sisters like to practice soccer after dinner. In June, they play for a long time before it gets dark. Four months later, it is already dark before dinner. **How can children determine a schedule for evening soccer practice from June to October?**

CONNECTIONS TO COLLEGE- AND CAREER-READY STANDARDS

ESS1.B: Earth and the Solar System

Patterns; Stability and Change

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

SCCCR PERFORMANCE EXPECTATIONS

1-ESS1-1, 1-ESS1-2

STORYLINE

Students investigate how daylight changes using mathematics and computational thinking to analyze data. They use bar graphs to make predictions about the amount of daylight hours during the year. Then they construct explanations about the changes in daylight through the seasons.

ANCHOR PHENOMENON 3
INVESTIGATIONS 1, 3

While reading a book about air, students observe parachutes and kites moving in the sky. **What are good designs for a parachute to move through the air safely? What are good designs for a kite?**

CONNECTIONS TO COLLEGE- AND CAREER-READY STANDARDS

ETS1.A: Defining and Delimiting an Engineering Problem, **ETS1.B:** Developing Possible Solutions, **ETS1.C:** Optimizing the Design Solution

Cause and Effect, Systems and System Models; Structure and Function

Defining Problems; Designing Solutions; Obtaining, Evaluating and Communicating Information

SCCCR PERFORMANCE EXPECTATIONS

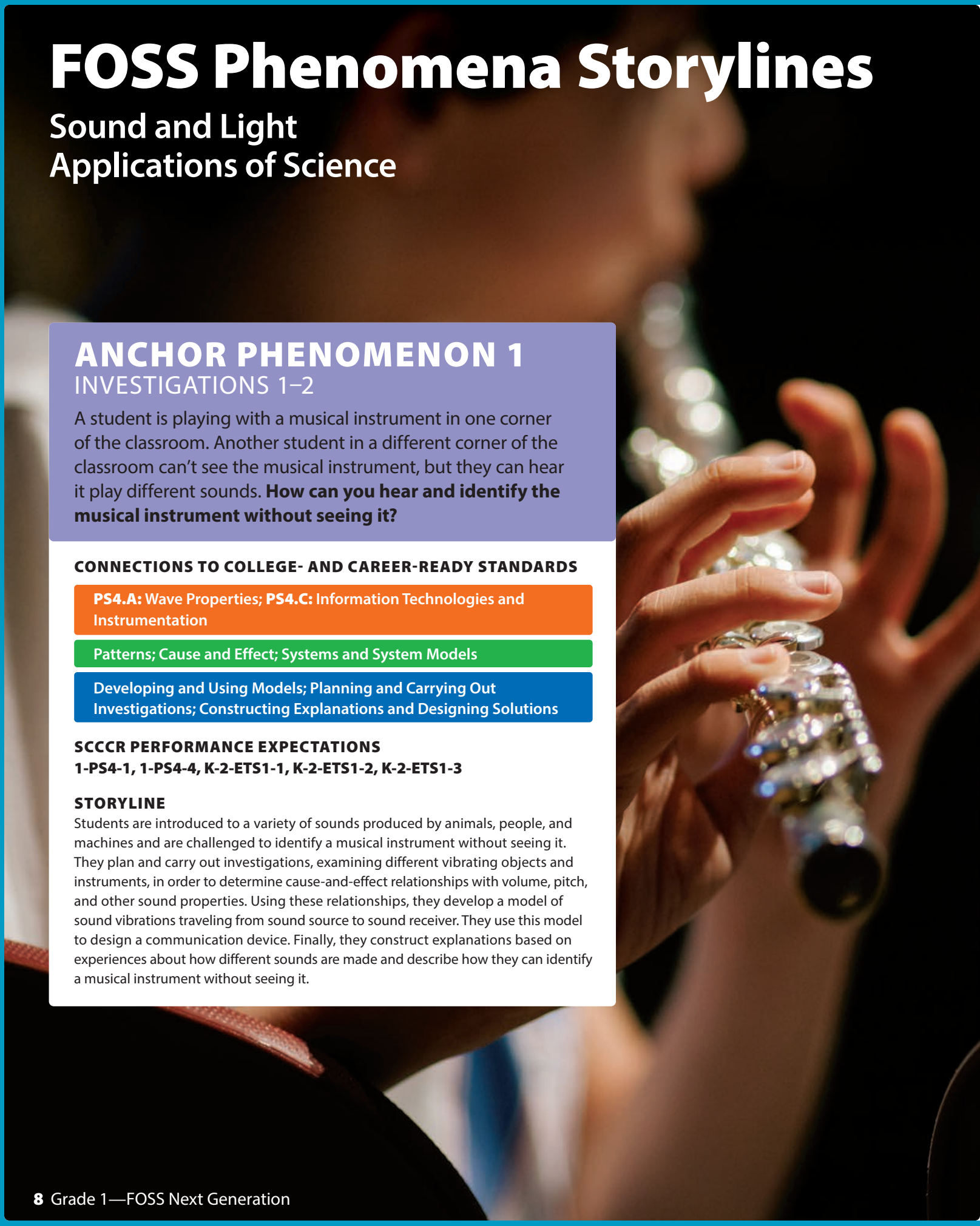
K-2-ETS1-1, K-2-ETS1-2, K-2-ETS1-3

STORYLINE

Students design and construct parachutes to figure out how people use air to fly. They test parachute designs to ensure they land safely. Then students apply ideas about moving air (wind) to construct and fly a kite.

FOSS Phenomena Storylines

Sound and Light
Applications of Science



ANCHOR PHENOMENON 1
INVESTIGATIONS 1–2

A student is playing with a musical instrument in one corner of the classroom. Another student in a different corner of the classroom can't see the musical instrument, but they can hear it play different sounds. **How can you hear and identify the musical instrument without seeing it?**

CONNECTIONS TO COLLEGE- AND CAREER-READY STANDARDS

PS4.A: Wave Properties; **PS4.C:** Information Technologies and Instrumentation

Patterns; Cause and Effect; Systems and System Models

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

SCCCR PERFORMANCE EXPECTATIONS

1-PS4-1, 1-PS4-4, K-2-ETS1-1, K-2-ETS1-2, K-2-ETS1-3

STORYLINE

Students are introduced to a variety of sounds produced by animals, people, and machines and are challenged to identify a musical instrument without seeing it. They plan and carry out investigations, examining different vibrating objects and instruments, in order to determine cause-and-effect relationships with volume, pitch, and other sound properties. Using these relationships, they develop a model of sound vibrations traveling from sound source to sound receiver. They use this model to design a communication device. Finally, they construct explanations based on experiences about how different sounds are made and describe how they can identify a musical instrument without seeing it.

ANCHOR PHENOMENON 2
INVESTIGATIONS 3–4

A class is preparing for a school performance. During the performance, the teacher who can't be seen around a corner, needs to communicate to the students about when they should stand and when they should sit down without using sound. **Design a way for teachers and students to communicate during a performance without letting an audience know.**

CONNECTIONS TO COLLEGE- AND CAREER-READY STANDARDS

PS4.B: Electromagnetic Radiation; **ETS1.A:** Defining and Delimiting Engineering Problems; **ETS1.B:** Developing Possible Solutions; **ETS1.C:** Optimizing the Design Solution

Cause and Effect; Systems and System Models

Asking Questions and Defining Problems; Analyzing and Interpreting Data; Constructing Explanations and Designing Solutions

SCCCR PERFORMANCE EXPECTATIONS

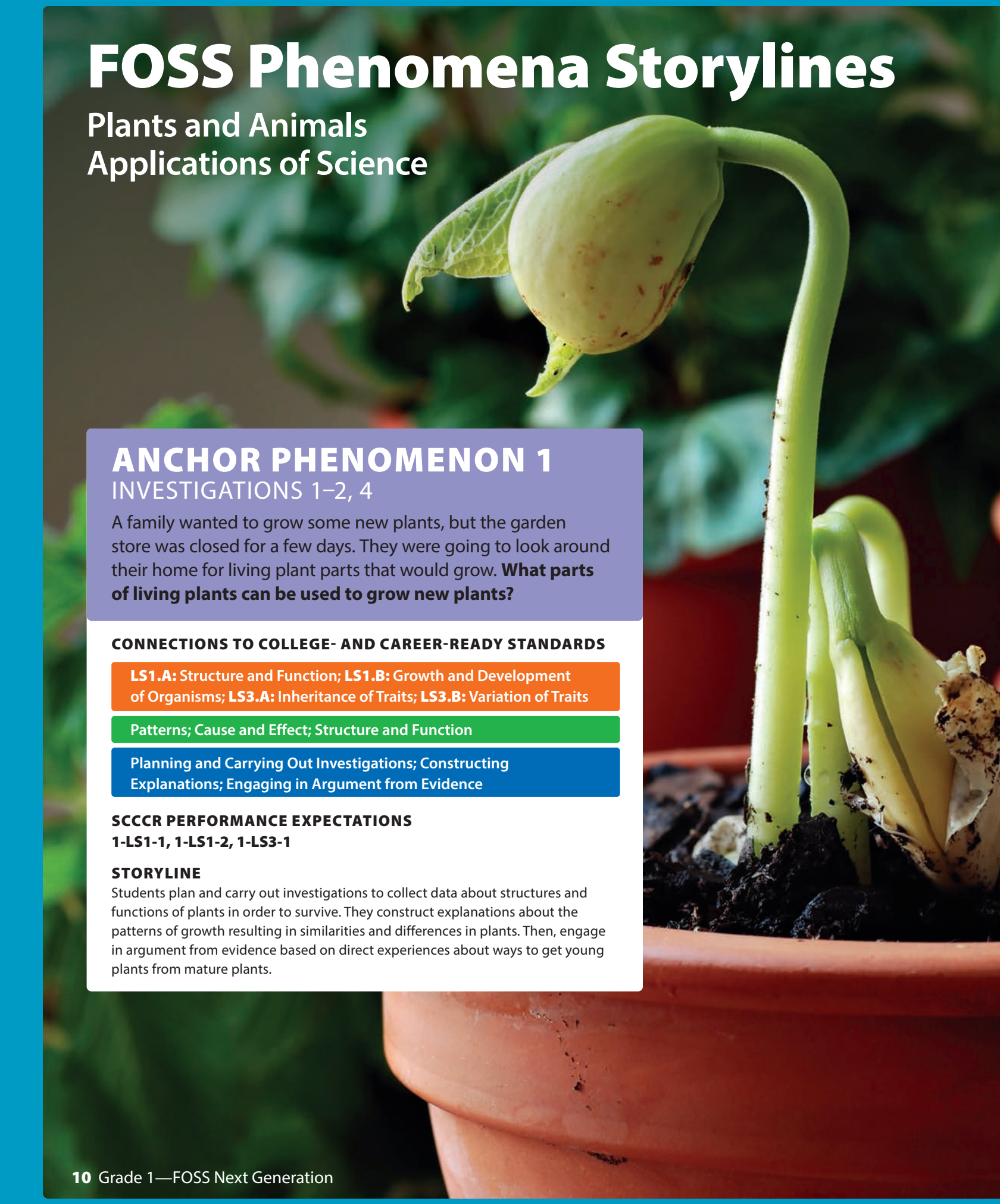
1-PS4-2, 1-PS4-3, 1-PS4-4, K-2-ETS1-1, K-2-ETS1-2, K-2-ETS1-3

STORYLINE

Students work with light sources and mirrors to explore light interactions. They plan and carry out investigations examining how shadows are made and how light goes through different materials. Using the data from the investigations, students develop a model of how humans are able to see objects when there is light. Next, they construct explanations based on experiences about how light travels using mirrors. Finally, they design a solution to communicate around a corner using light, so teachers and students can communicate during a performance.

FOSS Phenomena Storylines

Plants and Animals
Applications of Science



ANCHOR PHENOMENON 1
INVESTIGATIONS 1–2, 4

A family wanted to grow some new plants, but the garden store was closed for a few days. They were going to look around their home for living plant parts that would grow. **What parts of living plants can be used to grow new plants?**

CONNECTIONS TO COLLEGE- AND CAREER-READY STANDARDS

LS1.A: Structure and Function; **LS1.B:** Growth and Development of Organisms; **LS3.A:** Inheritance of Traits; **LS3.B:** Variation of Traits

Patterns; Cause and Effect; Structure and Function

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

SCCCR PERFORMANCE EXPECTATIONS
1-LS1-1, 1-LS1-2, 1-LS3-1

STORYLINE
Students plan and carry out investigations to collect data about structures and functions of plants in order to survive. They construct explanations about the patterns of growth resulting in similarities and differences in plants. Then, engage in argument from evidence based on direct experiences about ways to get young plants from mature plants.

ANCHOR PHENOMENON 2
INVESTIGATIONS 3–4

An injured duckling (baby duck) was brought to a local nature center. The nature center cares for injured animals and returns them to their natural homes when they are healthy. **How will the nature center know what kind of duck it is? When is the right time to return an injured duck back to its natural habitat?**

CONNECTIONS TO COLLEGE- AND CAREER-READY STANDARDS

LS1.A: Structure and Function; **LS1.B:** Growth and Development of Organisms; **LS3.A:** Inheritance of Traits

Structures and Function; Systems and System Models

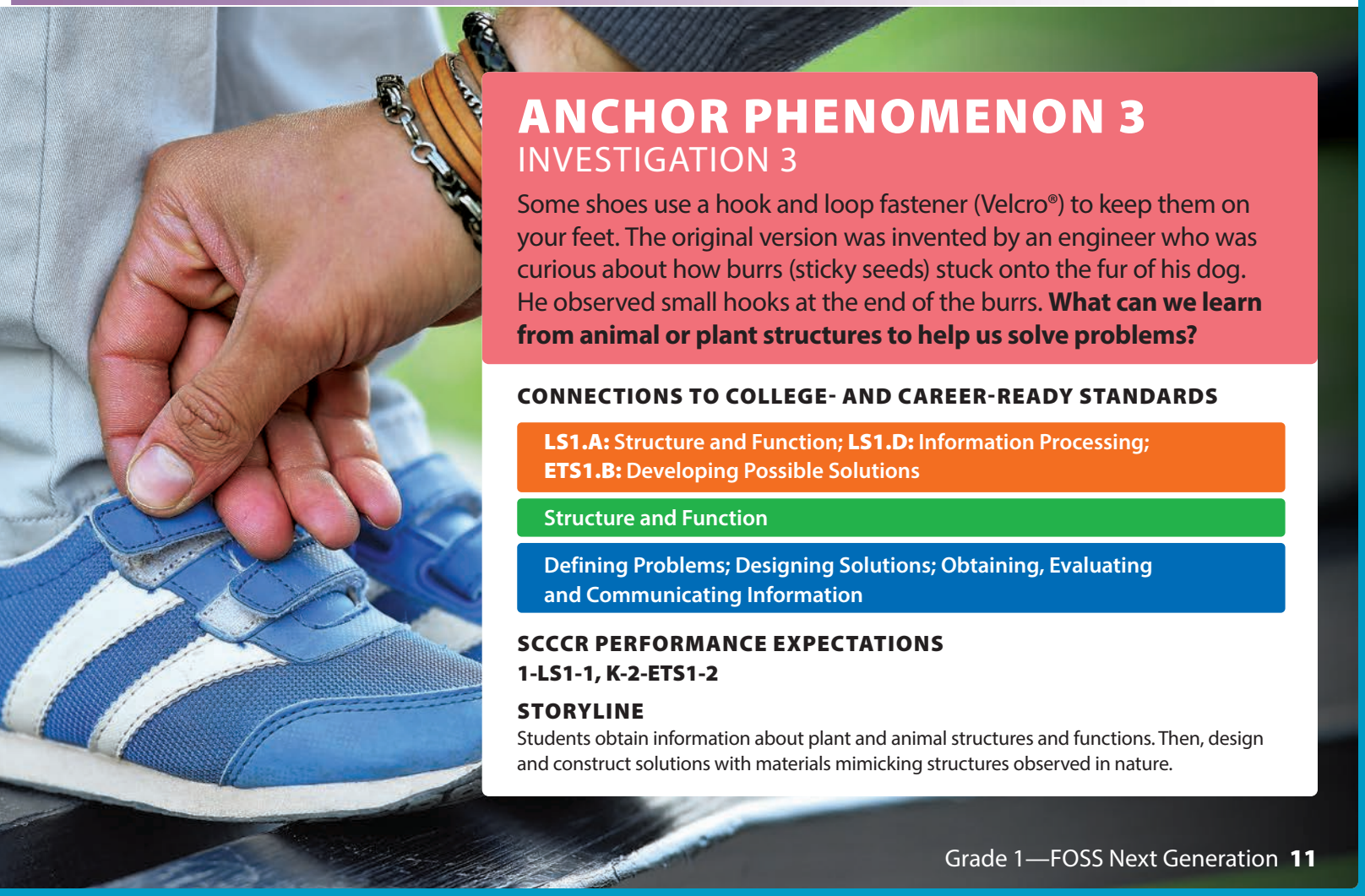
Planning and Carrying Out Investigations; Analyzing and Interpreting Data; Constructing Explanations; Obtaining, Evaluating, and Communicating Information

SCCCR PERFORMANCE EXPECTATIONS

1-LS1-1, 1-LS1-2, 1-LS3-1

STORYLINE

Students develop and use a terrarium as a model to observe interactions of plants and animals. They make observations to analyze and interpret data about changes to the terrarium system overtime. In their notebook, they gather data from media to construct explanations about how plants and animals use structures to meet their needs, and how adult animals help their young survive.



ANCHOR PHENOMENON 3
INVESTIGATION 3

Some shoes use a hook and loop fastener (Velcro®) to keep them on your feet. The original version was invented by an engineer who was curious about how burrs (sticky seeds) stuck onto the fur of his dog. He observed small hooks at the end of the burrs. **What can we learn from animal or plant structures to help us solve problems?**

CONNECTIONS TO COLLEGE- AND CAREER-READY STANDARDS

LS1.A: Structure and Function; **LS1.D:** Information Processing; **ETS1.B:** Developing Possible Solutions

Structure and Function

Defining Problems; Designing Solutions; Obtaining, Evaluating and Communicating Information

SCCCR PERFORMANCE EXPECTATIONS

1-LS1-1, K-2-ETS1-2

STORYLINE

Students obtain information about plant and animal structures and functions. Then, design and construct solutions with materials mimicking structures observed in nature.

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 97 total sessions for grade 1.

AIR AND WEATHER

SESSION	INV./PART	CRITICAL PATHWAY	IG PAGES
1	Inv 1.1	Air Is There, Steps 1–9	93–94
2	Inv 1.1	Air Is There, Steps 10–15	95–96
3	Inv 1.2	Parachutes, Steps 1–8	100–103
4	Inv 1.2	Parachutes, Steps 9–13; 15–17 *(optional video clip Step 14)*	103–105
5	Inv 1.2	Parachutes, Steps 18–21	106–107
6	Inv 1.2	Parachutes, Steps 22–27	108–109
	Inv 1.3	*Pushing on Air, Steps 1–17—Focus on Conducting Investigations*	*113–117*
7	Inv 1.4	Air and Water, Steps 1–6 Step 19 (use top of notebook sheert 4 only); Steps 20–23	121–122 125–126
	Inv 1.4	*Air and Water, Steps 7–18—Focus on Analyzing Data*	*122–125*
	Inv 1.5	*Balloon Rockets Steps 1–6, 8–9—Focus on Investigations*	*129–131*
8	Inv 1.5	Review Steps 7, 10; I-Check 1, Step 11	131–132
9	Inv 2.1	Weather Calendars, Steps 1–14	149–152
10	Inv. 2.2	Measuring Temperature and Daylight, Steps 1–13	157–160
11	Inv 2.2	Measuring Temperature and Daylight, Steps 14–22	160–162
12	Inv 2.2	Measuring Temperature and Daylight, Steps 23–25	163–164
	Inv 2.3	*Watching Clouds, Steps 1–4—Focus on Environmental Literacy*	*168–169*
13	Inv 2.3	Watching Clouds, Steps 5–11	170–171
	Inv 2.3	*Watching Clouds, Steps 12–24—Focus on Reading and Media*	*172–175*
14	Inv 2.4	Observing the Moon, Steps 1–6	179–180
15	Inv 2.4	Observing the Moon, Steps 7–9	181
16	Inv 2.4	Observing the Moon, Steps 10–13	182
17*	Inv 2.4	Observing the Moon, Steps 14–16 *	183
18	Inv 2.4	Review, Step 17; I-Check 2, Step 18	184

**Indicates the need to allow for growth time*

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

AIR AND WEATHER (continued)

SESSION	INV./PART	CRITICAL PATHWAY	IG PAGES
19*	Inv 2.4	Observing the Moon, Steps 19–20 * (continue Moon observations over 4 weeks)	185
20	Inv 3.1	Bubbles in the Wind, Steps 1–11	204–206
21	Inv 3.2	Wind Speed, Steps 1–13	210–212
**	*Inv 3.3*	*Pinwheels, Steps 1–12—Focus on Outdoor Investigations* **	*215–217*
22	Inv 3.4	Wind Vanes, Steps 1–4; Steps 12–13	221–222; 224
23	Inv 3.4	Wind Vanes, Steps 5–11	222–223
**	*Inv 3.5*	*Kites, Steps 1–13—Focus on Engineering of Kites;* *Outdoor Investigations invoving wind* **	*228–231*
24	Inv 3.5	Review Step 14; I-Check 3, Step 15	232
25	Inv 4.1	Change Over a Month, Steps 1–9	248–250
26	Inv 4.1	Change Over a Month, Steps 10–12	250–251
27	Inv 4.2	Daylight through the Year, Steps 1–10	255–256
28	Inv 4.2	Daylight through the Year, Steps 11–14	257
29*	Inv 4.3	Comparing the Seasons, Steps 1–3 Steps 4–8, continue data analysis through the seasons *	262 263
30	Inv 4.3	Comparing the Seasons, Steps 9–10	264–265
31	Inv 4.4	Comparing the Seasons, Steps 11–12; Review Step 13 I-Check 4, Step 23	266 267

*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

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

SOUND AND LIGHT

SESSION	INV./PART	CRITICAL PATHWAY	IG PAGES
1	Inv 1.1	Making Sounds, Steps 1–7	90–92
2	Inv 1.1	Making Sounds, Steps 8–12	93–95
3	Inv 1.1	Making Sounds, Steps 13–20	95–97
4	Inv. 1.2	Hearing Sounds, Steps 1–16	104–107
5	Inv. 1.2	Hearing Sounds, Steps 17–25	108–111
	Inv 1.3	*Outdoor Sounds, Steps 1–10—Focus on Applying Concepts Locally*	*114–115*
6	Inv 1.3	Review Steps 11–13; I-Check 1, Step 14	116–117
7	Inv 2.1	Changing Volume, Steps 1–12	135–137
8	Inv 2.1	Changing Volume, Steps 13–20	137–140
9	Inv. 2.2	Changing Pitch, Steps 1–13	143–146
10	Inv 2.2	Changing Pitch, Steps 14–18	147–148
11	Inv 2.3	Spoon Gong Systems, Steps 1–10, 12–14	152–156
	Inv 2.3	*Spoon Gong Systems, Step 11—Focus on Media, Video*	*155*
	Inv 2.3	*Spoon Gong Systems, Steps 15–18—Focus on Reading*	*157–158*
12	Inv 2.3	Sound Challenges, Steps 1–7	161–163
13	Inv 2.4	Sound Challenges, Steps 8–16	163–164
14	Inv 2.4	Review, Step 17; I-Check 2, Step 18	165

SOUND AND LIGHT (continued)

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18	Inv 3.3	Light and Materials, Steps 1–10	196–198
19	Inv 3.3	Light and Materials, Steps 11–14	199–200
20	Inv 3.3	Review Steps 15–17; I-Check 3, Step 18	200–201
21	Inv 4.1	Light and Mirrors, Steps 1–8	219–221
22	Inv 4.1	Light and Mirrors, Steps 9–16	221–223
23	Inv 4.2	Reflections, Steps 1–14	226–228
24	Inv 4.2	Reflections, Steps 15–18	229–230
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26	Inv 4.3	Eyes and Seeing, Steps 13–18	238–240
27	Inv 4.4	Designing with Light, Steps 1–10	244–246
28	Inv 4.4	Designing with Light, Steps 11–19	246–247
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30	Inv 4.4	Review Step 22; I-Check 4, Step 23	249

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

PLANTS AND ANIMALS

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4 *	Inv 1.2	Mowing the Lawn, Steps 1–7	98–99
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6 *	Inv 1.2	Mowing the Lawn, Steps 13–16	101–102
7	Inv 1.3	Wheat, Steps 1–12	107–110
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9 *	Inv 1.3	Wheat, Steps 16–21 (Reading Step 20) Step 24 (After 3 weeks, end to wheat growth investigation)	107–114, 124
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10 *	Inv 1.4	Variation, Steps 1–12	120–123
11 *	Inv 1.4	Variation, Steps 13–16 (Reading Step 13)	124
	Inv 1.4	*Variation, Step 17—Focus on Video*	*125*
12	Inv 1.4	Review Step 18; I-Check 1, Step 19	125
1	Inv 2.1	(Stems) Rooting Stem Cuttings, Steps 1–11	141–143
2	Inv 2.1	Rooting Stem Cutting, Steps 12–19	143–145
	Inv 2.2	*Spuds, Steps 1–15—Focus on Investigation and Analysis*	*149–152*
	Inv 2.2	*Spuds, Steps 16–21—Focus on Sense-Making*	*152–154*
3 *	Inv 2.3	New Plants from Cuttings, Steps 1–11 Step 12, Observe growth over time *	157–159
4	Inv 2.3	Review, Step 12, Discuss Guiding Question; I-Check 2, Step 13	159

**Indicates the need to allow for growth time*

PLANTS AND ANIMALS (continued)

SESSION	INV./PART	CRITICAL PATHWAY	IG PAGES
1	Inv 3.1	**(Terrariums) Setting Up Terrariums, Steps 1–13**	179–181
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3	Inv 3.1	**Setting Up Terrariums, Steps 20–23** (Reading, Step 20)	183–184
4	Inv 3.2	**Animals in the Terrarium, Steps 1–3**	188
5	Inv 3.2	**Animals in the Terrarium, Steps 4–15**	189–191
6 *	Inv 3.2	**Animals in the Terrarium, Steps 16–18; Steps 19–21**	191–194
7	Inv 3.2	**Animals in the Terrarium, Steps 22–27** (Reading Step 22)	195–198
8	Inv 3.3	**Habitat Match, Steps 1–8;** (skip Step 9, Video)	202–204
9	Inv 3.3	**Habitat Match, Steps 10–14** (Online activites, Step 13, in Centers)	205–106
	Inv 3.4	***Squirrel Behavior, Steps 1–15—Focus on Environmental Literacy***	*210–214*
10	Inv 3.4	**Squirrel Behavior, Steps 16–18 (Reading Step 16)**	215–216
11	Inv 3.4	**Squirrel Behavior, Step 19** (see FOSSweb: Teacher Masters No. 13B Engineering 3 of 3; Multimedia, Organisms Cards for Engineering)	217
12	Inv 3.4	**Review Step 20; I-Check 3, Step 21**	217
1	Inv 4.1	**(Growth and Change) Planting Bulbs, Steps 1–9**	235–236
2	Inv 4.1	**Planting Bulbs, Steps 10–12**	236–237
3 *	Inv 4.1	**Planting Bulbs, Steps 13–18**	237–238
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4	Inv 4.3	**Plant and Animal Growth, Steps 1–10**	251–252
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7	Inv 4.3	**Plant and Animal Growth, Step 20 (Video); Step 21** (Online activity)	255
8	Inv 4.3	**Review Step 22; I-Check 4, Step 23**	256

**Indicates the need to allow for growth time*

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

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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		