West Virginia Science Grade K Overview

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

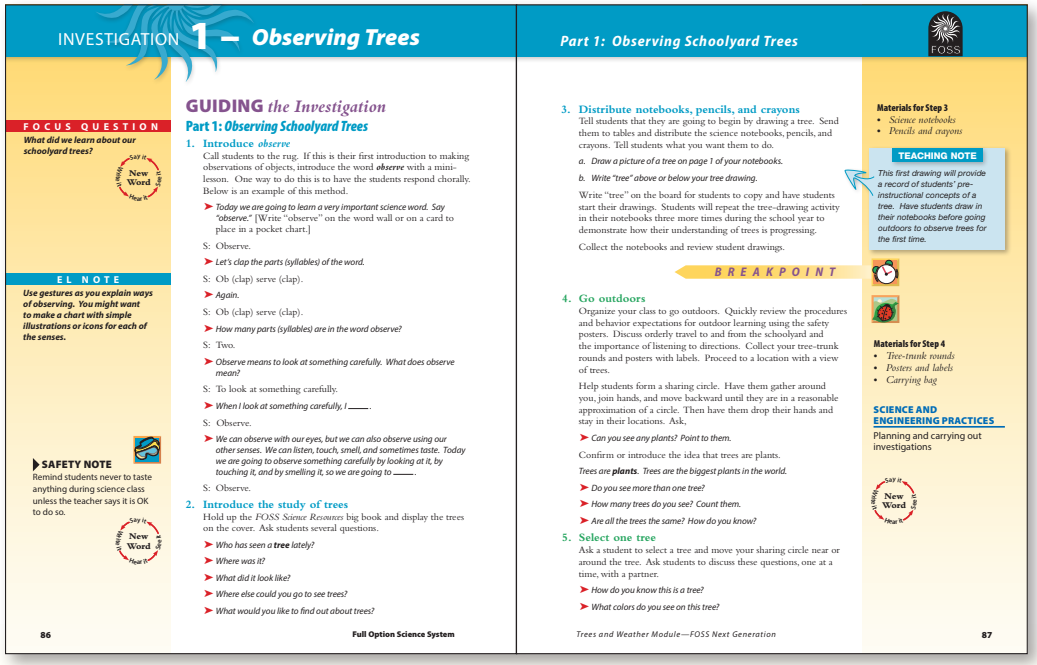
Navigation Guide

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 — *Observing Trees*

FOCUS QUESTION

What did we learn about our schoolyard trees?

EL NOTE

Use gestures as you explain ways of observing. You might want to make a chart with simple illustrations or icons for each of the senses.

SAFETY NOTE

Remind students never to taste anything during science class unless the teacher says it is OK to do so.

GUIDING *the Investigation*

Part 1: *Observing Schoolyard Trees*

1. **Introduce** *observe*

Call students to the rug. If this is their first introduction to making observations of objects, introduce the word ***observe*** with a mini-lesson. One way to do this is to have the students respond chorally. Below is an example of this method.

➤ *Today we are going to learn a very important science word. Say "observe." [*Write "observe" on the word wall or on a card to place in a pocket chart.*]*

S: Observe.

➤ *Let's clap the parts (syllables) of the word.*

S: Ob (clap) serve (clap).

➤ *Again.*

S: Ob (clap) serve (clap).

➤ *How many parts (syllables) are in the word observe?*

S: Two.

➤ *Observe means to look at something carefully. What does observe mean?*

S: To look at something carefully.

➤ *When I look at something carefully, I ____.*

S: Observe.

➤ *We can observe with our eyes, but we can also observe using our other senses. We can listen, touch, smell, and sometimes taste. Today we are going to observe something carefully by looking at it, by touching it, and by smelling it, so we are going to ____.*

S: Observe.

2. **Introduce the study of trees**

Hold up the *FOSS Science Resources* big book and display the trees on the cover. Ask students several questions.

➤ *Who has seen a* ***tree*** *lately?*

➤ *Where was it?*

➤ *What did it look like?*

➤ *Where else could you go to see trees?*

➤ *What would you like to find out about trees?*

86 Full Option Science System

Part 1: Observing Schoolyard Trees

3. **Distribute notebooks, pencils, and crayons**

Tell students that they are going to begin by drawing a tree. Send them to tables and distribute the science notebooks, pencils, and crayons. Tell students what you want them to do.

a. Draw a picture of a tree on page 1 of your notebooks.

b. Write "tree" above or below your tree drawing.

Write "tree" on the board for students to copy and have students start their drawings. Students will repeat the tree-drawing activity in their notebooks three more times during the school year to demonstrate how their understanding of trees is progressing.

Collect the notebooks and review student drawings.

BREAKPOINT

4. **Go outdoors**

Organize your class to go outdoors. Quickly review the procedures and behavior expectations for outdoor learning using the safety posters. Discuss orderly travel to and from the schoolyard and the importance of listening to directions. Collect your tree-trunk rounds and posters with labels. Proceed to a location with a view of trees.

Help students form a sharing circle. Have them gather around you, join hands, and move backward until they are in a reasonable approximation of a circle. Then have them drop their hands and stay in their locations. Ask,

➤ *Can you see any plants? Point to them.*

Confirm or introduce the idea that trees are plants.

Trees are ***plants****. Trees are the biggest plants in the world.*

➤ *Do you see more than one tree?*

➤ *How many trees do you see? Count them.*

➤ *Are all the trees the same? How do you know?*

5. **Select one tree**

Ask a student to select a tree and move your sharing circle near or around the tree. Ask students to discuss these questions, one at a time, with a partner.

➤ *How do you know this is a tree?*

➤ *What colors do you see on this tree?*

Materials for Step 3
- *Science notebooks*
- *Pencils and crayons*

TEACHING NOTE

This first drawing will provide a record of students' pre-instructional concepts of a tree. Have students draw in their notebooks before going outdoors to observe trees for the first time.

Materials for Step 4
- *Tree-trunk rounds*
- *Posters and labels*
- *Carrying bag*

SCIENCE AND ENGINEERING PRACTICES

Planning and carrying out investigations

Trees and Weather Module—FOSS Next Generation 87

Start your review here:

- **Trees and Weather:** pp. 1–3, 69–73, 86–91
- **Materials and Motion:** pp. 1–3, 73–77, 94–103
- **Animals Two by Two:** pp. 1–3, 65–67, 84–85

Teacher Resources (also online) contains teacher–support chapters on three–dimensional teaching and learning, 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

What Do Plants Need?

Plants grow in pots and windows.
Plants grow in gardens and on farms.
What do plants need to grow?

14

Plants need water.
Their roots take in water.
The water moves through the plant.

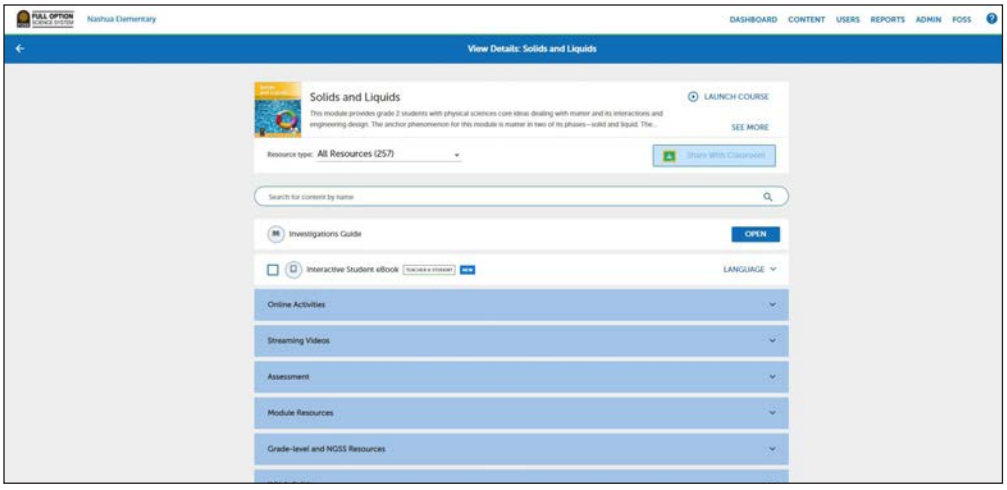
15

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.

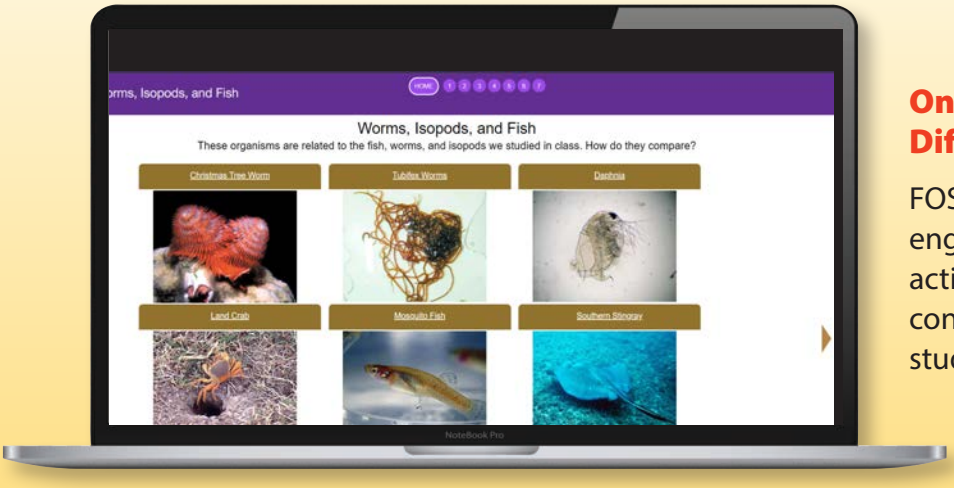


Access:

- 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

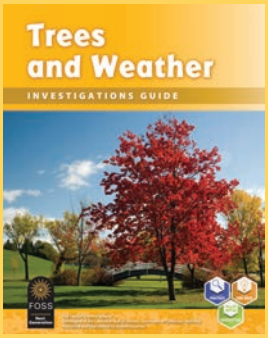
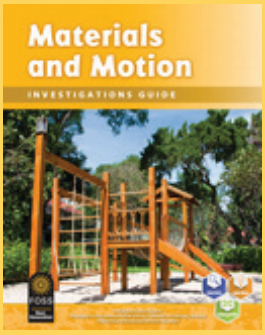
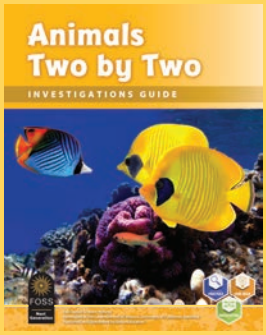
Keep your students engaged while teaching literacy skills with interactive *FOSS Science Resources* eBooks. The eBooks include integrated audio with text syncing and links to online activities and videos that bring the photos to life.



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 K

	Module Phenomenon and Driving Question	Module Overview/Bundled Performance Expectations
FOSS Module	**Trees and Weather Module** **Anchor phenomenon:** *Trees are plants that live and grow through the seasons* **Module driving questions:** • *What do trees need to live and grow?* • *How does weather affect trees?* • *What changes do trees cause intheirsurroundings?*  4 investigations **Critical Pathway:** 27 sessions* plus observations through the year	To a kindergartner, the oak on the corner, the pines at the park, and the mulberry tree at school are all phenomena. Systematic investigation of trees over the seasons provides students with a better understanding of the place of trees in the community. Students observe day–to–day changes in weather over the year and the impact weather has on living things. Students have experiences that help them understand what plants (and animals) need to survive and the relationship between their needs and where they live. By monitoring weather, they find patterns and variations in weather and come to understand the importance of weather forecasts to prepare for severe weather. **Earth Sciences:** S.K.7, S.K.4, S.K.5, S.K.8 **Physical Sciences:** S.K.9; **Life Sciences:** S.K.3 **ETAS:** S.K.12
FOSS Module	**Materials and Motion Module** **Anchor phenomenon:** *Objects are made of materials and the properties of those materials determine their use; objects can move* **Module driving questions:** • *What is made of wood, paper, and fabric?* • *How are the properties of those useful to us?* • *How can we change the motion of an object?*  4 investigations **Critical Pathway:** 29 sessions	Students start by investigating materials—wood, paper, and fabric—and determine how material properties determine their use. Students use those materials to engineer structures, applying ideas of energy transfer. Students come to understand that humans use natural resources for everything they do and that people impact the world around them. After building a repertoire of practices with materials and objects, students investigate the effect of pushes and pulls on objects, and apply their intuitive notion of the concept of variables to change the speed and direction of rolling balls and balloon rockets to achieve specific outcomes. **Physical Sciences:** S.K.1, S.K.2, S.K.9, S.K.10 **Earth Sciences:** S.K.6 **ETAS:** S.K.11, S.K.12, S.K.13
FOSS Module	**Animals Two by Two Module** **Anchor phenomenon:** *Animals and their survival needs* **Module driving questions:** • *How are animal structures similar and different?* • *What do animals need to live and grow?*  4 investigations **Critical Pathway:** 26 sessions	Students have close and personal interactions with common land and water animals—observing and describing the structures of fish, birds, snails, earthworms, and isopods. Classroom habitats are established for some organisms and students find out what the animals need to live and grow. Animals are studied in pairs. Students observe and care for one animal over time, and then they are introduced to another animal similar to the first but with differences in structure and behavior. Close–up photos, some related to animals that students have observed in class and some to animals that are new, enhance the firsthand activities for rich comparisons. **Life Sciences:** S.K.3 **Earth Sciences:** S.K.4, S.K.5

* A session is 30 minutes in kindergarten.

The Core Topics of Science	The Practices of Scientists and Engineers	Science Connecting Concepts
Interdependent Relationships in Ecosystems: Animals, Plants, and Their Environment Weather and Climate Engineering Design	• 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 • Structure and function • Stability and change
Forces and Interactions: Pushes and Pulls Interdependent Relationships in Ecosystems: Animals, Plants, and Their Environment Weather and Climate Engineering Design	• 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 • Structure and function
Interdependent Relationships in Ecosystems: Animals, Plants, and Their Environment	• Asking questions and defining problems • Developing and using models • Planning and carrying out investigations • Analyzing and interpreting data • 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

Trees and Weather
Applications of Science

ANCHOR PHENOMENON 1
INVESTIGATIONS 1–2, 4

On a walk around the schoolyard in summer, students notice two different trees. The first tree has lots of big, wide green leaves. The second tree has short, skinny, pointy green leaves. A few months later in fall, the leaves of the first tree are yellow and brown, but the leaves on the second tree look the same as months before. **What are the changes that happen to some trees but not others?**

CONNECTIONS TO COLLEGE– AND CAREER–READINESS STANDARDS

- Interdependent Relationships in Ecosystems: Animals, Plants, and Their Environment
- Patterns; Systems and System Models, Structure and Function
- Planning and Carrying Out Investigations; Developing and Using Models; Constructing Explanations

WVCCR PERFORMANCE EXPECTATIONS
S.K.3, S.K.4, S.K.5

STORYLINE
Students visit the schoolyard to plan and carry out investigations to determine the observable structures of trees that serve functions for growth and survival. They adopt a tree in the schoolyard and make regular visits to observe and record changes. They construct explanations based on experiences that plant structures are similar, but there are differences in their properties and the structures of trees change predictably through the seasons due to changes in the weather.

ANCHOR PHENOMENON 2
INVESTIGATIONS 3–4

A family is planning a camping trip for a weekend in June. The camp is a short drive from their home. The children need to select clothes to pack for the trip. **What information should they gather to make good clothing choices for the trip? Would they select the same clothes for a camping trip in October?**

CONNECTIONS TO COLLEGE– AND CAREER–READINESS STANDARDS

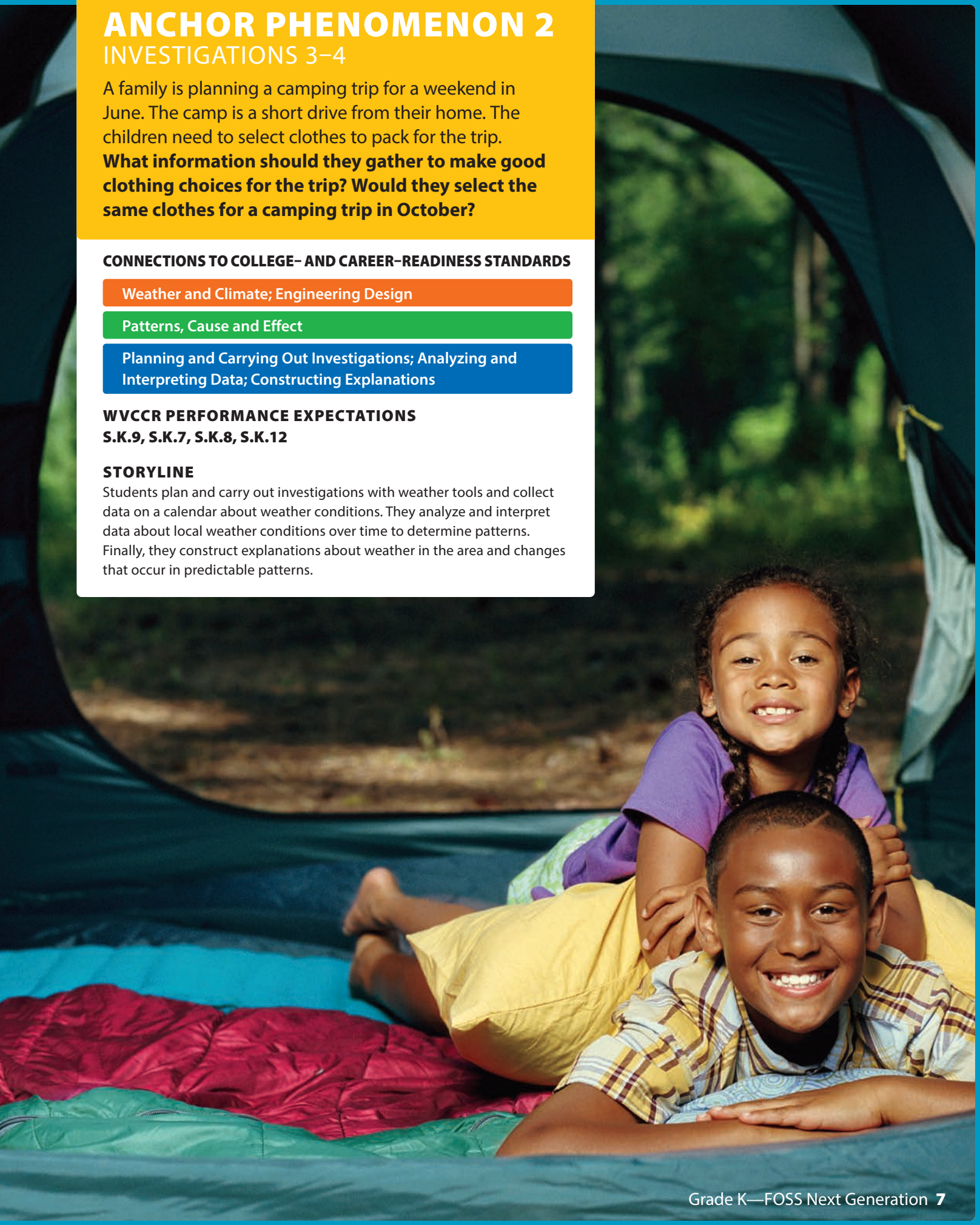
- Weather and Climate; Engineering Design
- Patterns, Cause and Effect
- Planning and Carrying Out Investigations; Analyzing and Interpreting Data; Constructing Explanations

WVCCR PERFORMANCE EXPECTATIONS

S.K.9, S.K.7, S.K.8, S.K.12

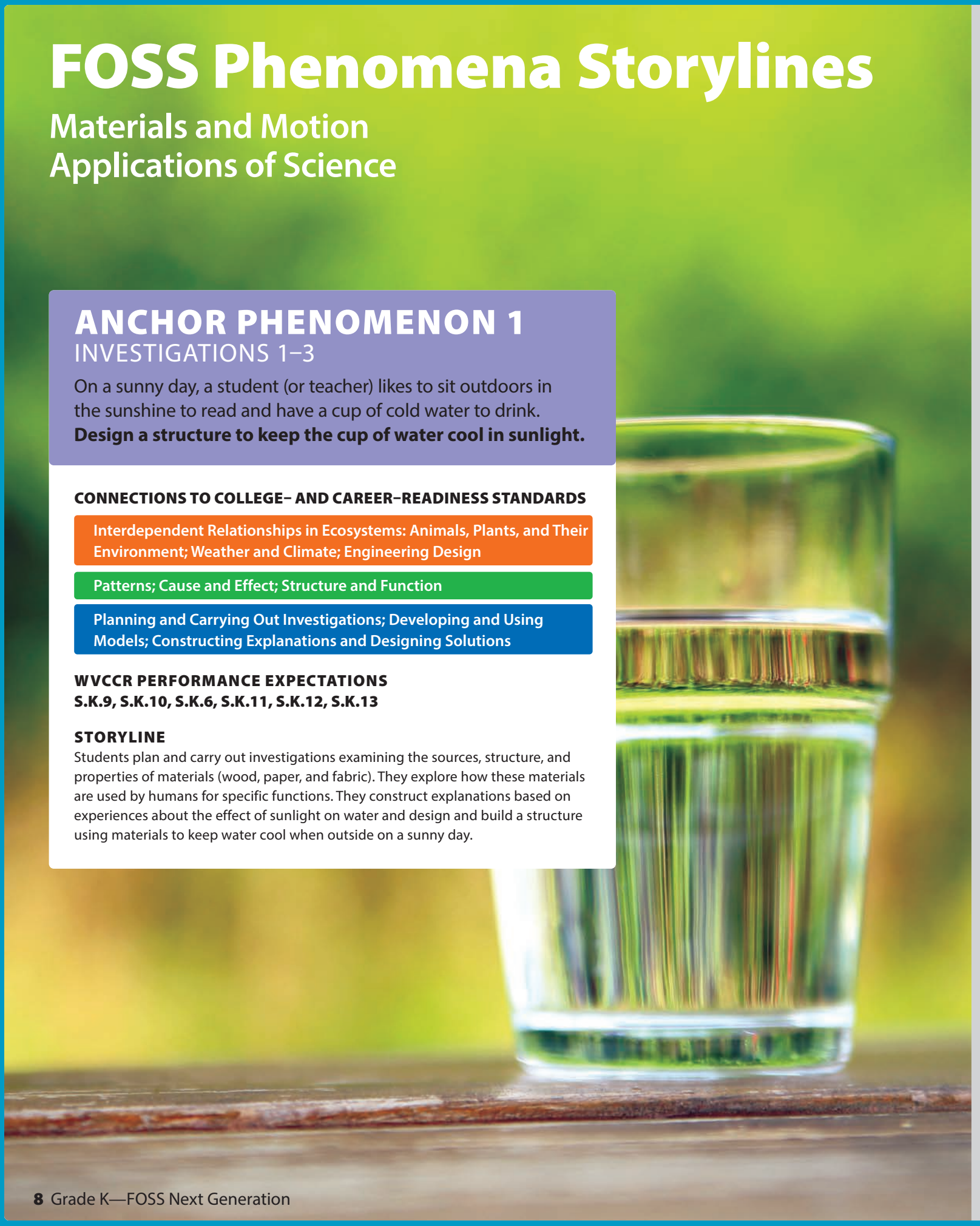
STORYLINE

Students plan and carry out investigations with weather tools and collect data on a calendar about weather conditions. They analyze and interpret data about local weather conditions over time to determine patterns. Finally, they construct explanations about weather in the area and changes that occur in predictable patterns.



FOSS Phenomena Storylines

Materials and Motion
Applications of Science



ANCHOR PHENOMENON 1
INVESTIGATIONS 1–3

On a sunny day, a student (or teacher) likes to sit outdoors in the sunshine to read and have a cup of cold water to drink. **Design a structure to keep the cup of water cool in sunlight.**

CONNECTIONS TO COLLEGE– AND CAREER–READINESS STANDARDS

Interdependent Relationships in Ecosystems: Animals, Plants, and Their Environment; Weather and Climate; Engineering Design

Patterns; Cause and Effect; Structure and Function

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

WVCCR PERFORMANCE EXPECTATIONS
S.K.9, S.K.10, S.K.6, S.K.11, S.K.12, S.K.13

STORYLINE

Students plan and carry out investigations examining the sources, structure, and properties of materials (wood, paper, and fabric). They explore how these materials are used by humans for specific functions. They construct explanations based on experiences about the effect of sunlight on water and design and build a structure using materials to keep water cool when outside on a sunny day.

ANCHOR PHENOMENON 2
INVESTIGATION 4

Two students were rolling balls down a hill on the playground. They each roll a ball down the hill. One ball rolls all the way to the soccer field. The other ball rolls in a different direction to the slide. **How can the balls roll in different directions?**

CONNECTIONS TO COLLEGE– AND CAREER–READINESS STANDARDS

Forces and Interactions: Pushes and Pulls; Engineering Design

Patterns, Cause and Effect; Systems and System Models

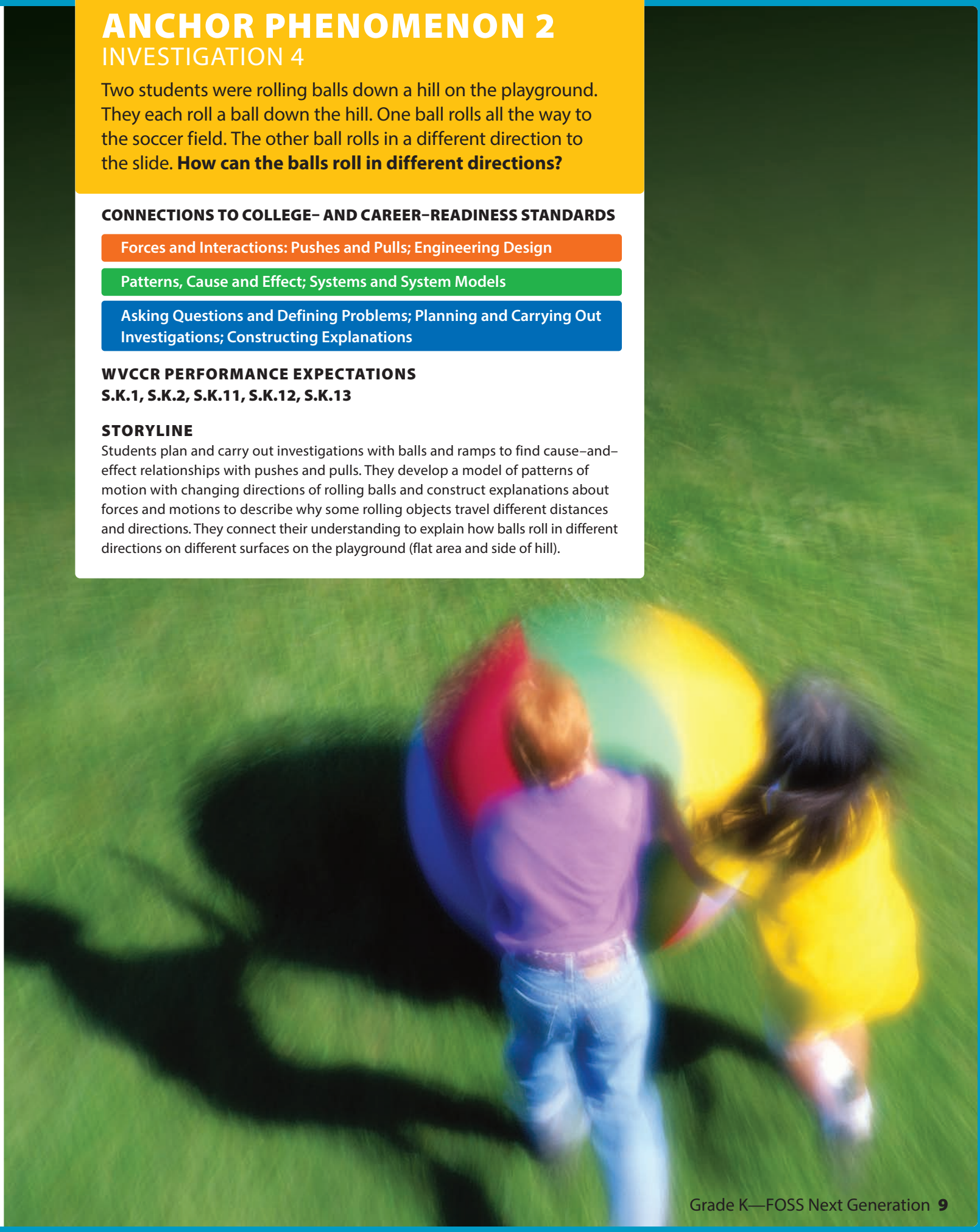
Asking Questions and Defining Problems; Planning and Carrying Out Investigations; Constructing Explanations

WVCCR PERFORMANCE EXPECTATIONS

S.K.1, S.K.2, S.K.11, S.K.12, S.K.13

STORYLINE

Students plan and carry out investigations with balls and ramps to find cause–and–effect relationships with pushes and pulls. They develop a model of patterns of motion with changing directions of rolling balls and construct explanations about forces and motions to describe why some rolling objects travel different distances and directions. They connect their understanding to explain how balls roll in different directions on different surfaces on the playground (flat area and side of hill).



FOSS Phenomena Storylines

Animals Two by Two
Applications of Science

ANCHOR PHENOMENON 1
INVESTIGATIONS 1–4

A teacher finds a large clear container with a screen cover in a closet. He tells the class the container could be a habitat to observe animals. (It could be an aquarium or terrarium.)
What animals could live in this habitat, and what do the animals need to survive?

CONNECTIONS TO COLLEGE– AND CAREER–READINESS STANDARDS

Interdependent Relationships in Ecosystems: Animals, Plants, and Their Environment

Patterns; Cause and Effect; Structure and Function

Asking Questions; Developing and Using Models; Planning and Carrying Out Investigations; Constructing Explanations; Obtaining, Evaluating, and Communicating Information

WVCCR PERFORMANCE EXPECTATIONS
S.K.3, S.K.4, S.K.5

STORYLINE
Students, with guidance, ask questions and then plan and carry out investigations with peers comparing the structures and behaviors of similar kinds of animals, some that live in water, like fish and snails, and others that live on land, like birds, worms, snails, and isopods. Next, they use models to represent relationships in the natural world (animals in their habitat). Then they construct explanations about the needs of animals based on firsthand observations and media. Finally, students communicate information orally and using models and drawings about the needs of animals in different habitats to live and grow.

Critical Pathway

West Virginia 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 82 total sessions for grade K.

TREES AND WEATHER

SESSION	INV./PART	CRITICAL PATHWAY	IG PAGES
1	Inv 1.1	**Observing Schoolyard Trees, Steps 1–3**	86–87
2	Inv 1.1	**Observing Schoolyard Trees, Steps 4–11**	87–90
3	Inv 1.1	**Observing Schoolyard Trees, Steps 12–16**	90–91
4	Inv 1.2	**Tree Parts, Steps 1–6**	95–96
	Inv 1.3	***Tree Puzzles, Steps 1–6—Focus on Analysis of Tree Parts and Form*** *(Can be done as free–choice center activity; can also do online on FOSSweb)*	*99–100*
	Inv 1.4	***Tree–Silhouette Cards, Steps 1–6—Focus on Analysis of Tree Shape***	*103–104*
5	Inv 1.5	**Adopt Schoolyard Trees, Steps 1–8**	108–110
6	Inv 1.5	**Adopt Schoolyard Trees, Steps 9–14** (Reading and discussion)	111–113
	Inv 1.6	***A Tree Comes to Class, Steps 1–9***	*117–121*
7	Inv 1.6	**A Tree Comes to Class, Steps 10–11 (Reading)**	122–123
8	Inv 2.1	**Leaf Walk, Steps 1–7** (Reading and outdoor walk)	139–140
9	Inv 2.1	**Leaf Walk, Steps 8–14**	140–141
	Inv 2.2	***Leaf Shapes, Steps 1–9—Focus on Analysis***	*145–147*
10	Inv 2.3	**Comparing Leaves, Steps 1–9** (Step 10 optional)	150–152
	Inv 2.4	***Matching Leaf Silhouettes, Steps 1–8 —Focus on Analysis*** *(Can be done as free–choice center activity)*	*156–157*
	Inv 2.5	***Leaf Books, Steps 1–5—Focus on Communicating Information***	*160*
11	Inv 2.5	**Leaf Books, Steps 6–10** (Reading and Video)	161–162

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

TREES AND WEATHER (continued)

SESSION	INV./PART	CRITICAL PATHWAY	IG PAGES
12	Inv 3.1	**Weather Calendar, Steps 1–8**	179–180
13	Inv 3.1	**Weather Calendar, Steps 9–11** (Reading)	181–182
14	Inv 3.2	**Recording Temperature, Steps 1–8**	186–188
15	Inv 3.2	**Recording Temperature, Steps 9–14**	188–189
16	Inv 3.3	**Wind Direction, Steps 1–2**	194–195
17	Inv 3.3	**Wind Direction, Steps 3–7**	195–197
18	Inv 3.3	**Wind Direction, Step 8**	197
19	Inv 3.3	**Wind Direction, Steps 9–14** (Reading; optional discussion Steps 11–12)	198–200
20	Inv 3.3	**Wind Direction, Steps 15–19, 20***	201–202
21	Inv 3.3	**Wind Direction, Step 21**	202
	Inv 4.1	***Fall: What Comes from Trees, Steps 1–4—Focus on Environmental Literacy***	*218*
	Inv 4.2	***Fall: Food from Trees, Steps 1–6—Focus on Environmental Literacy***	*221*
22	Inv 4.2	**Fall: Food from Trees, Step 7** (Reading)	222–223
23*	Inv 4.3	**Fall: Visiting Adopted Trees, Steps 1–6** (Optional Step 6, multimedia)	227–228
	Inv. 4.4	***Winter: Evergreen Hunt, Steps 1–7—Focus on Analysis***	*232–233*
24	Inv 4.4	**Winter: Evergreen Hunt, Steps 8–9 (Reading)**	234
	Inv 4.5	***Winter: Twigs Steps 1–7—Focus on Environmental Literacy***	*237–238*
25*	Inv 4.6	**Winter: Visiting Adopted Trees, Steps 1–8**	241–243
	Inv 4.7	***Spring: Forcing Twigs, Steps 1–3—Focus on Environmental Literacy***	*246*
	Inv 4.8	***Spring: Bark Hunt, Steps 1–5—Focus on Analysis***	*250–251*
26*	Inv 4.9	**Spring: Visiting Adopted Trees, Steps 1–7**	254–255
27	Inv 4.9	**Spring: Visiting Adopted Trees, Steps 8–10** (Reading and Video)	256–257

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

MATERIALS AND MOTION

SESSION	INV./PART	CRITICAL PATHWAY	IG PAGES
1	Inv 1.1	**Observing Wood, Steps 1–9**	94–98
2	Inv 1.1	**Observing Wood, Steps 10–19**	98–100
3	Inv 1.1	**Observing Wood, Steps 20–23** (Reading and discussion)	101–103
4	Inv 1.2	**Wood and Water, Steps 1–12**	107–110
5	Inv 1.2	**Wood and Water, Steps 13–18**	110–111
6	Inv 1.3	**Testing a Raft, Steps 1–12**	115–117
7	Inv 1.3	**Testing a Raft, Steps 13–21** (Optional Step 22)	118–120
	Inv 1.4	*Sanding Wood, Steps 1–12—Focus on Engineering*	*125–127*
	Inv 1.5	*Sawdust and Shavings, Steps 1–17—Focus on Engineering*	*131–134*
	Inv 1.6	*Making Particleboard, Steps 1–12—Focus on Engineering*	*138–140*
	Inv 1.6	*Making Particleboard, Steps 13–16—Focus on Engineering*	*140–141*
	Inv 1.7	*Making Plywood, Steps 1–7—Focus on Engineering*	*144–145*
	Inv 1.7	*Making Plywood, Steps 8–12—Focus on Engineering (Includes reading. The reading can be used in Inv 3.6, Session 20)*	*146–147*
8	Inv 2.1	**Paper Hunt, Steps 1–10**	168–170
9	Inv 2.1	**Paper Hunt, Steps 11–16** (Reading and discussion; online activity)	171–173
	Inv 2.2	*Using Paper, Steps 1–19—Focus on Analyzing (Can be done as free–choice center activity)*	*176–180*
10	Inv 2.3	**Paper and Water, Steps 1–7**	184–185
11	Inv 2.3	**Paper and Water, Steps 8–15**	186–187
12	Inv 2.4	**Paper Recycling, Steps 1–8**	191–193
13	Inv 2.4	**Paper Recycling, Steps 9–11**	194–195
	Inv 2.5	*Papier Mâché, Steps 1–8—Focus on Engineering and Art*	*199–200*
	Inv 2.5	*Papier Mâché, Steps 9–14—Focus on Engineering and Art*	*201–202*

MATERIALS AND MOTION (continued)

SESSION	INV./PART	CRITICAL PATHWAY	IG PAGES
14	Inv 3.1	**Fabric Hunt, Steps 1–5, 9, 12, 15–19**	223–226
	Inv 3.1	***Fabric Hunt, Steps 6–8, 10–11, 13–14 —Focus on Analyzing***	*223–225*
	Inv 3.2	***Taking Fabric Apart, Steps 1–9—Focus on Engineering***	*229–230*
15	Inv 3.2	**Taking Fabric Apart, Steps 10–12, 15** (Reading and discussion)	231–233
	Inv 3.2	***Taking Fabric Apart, Steps 13–14—Focus on Engineering with Media***	*232–233*
16	Inv 3.3	**Water and Fabric, Steps 1–10**	236–237
17	Inv 3.4	**Graphing Fabric Uses, Steps 1–6** (Optional Step 7)	240–241
18	Inv 3.4	**Graphing Fabric Uses, Steps 8–10** (Reading and discussion)	242–243
	Inv 3.5	***Reuse and Recycling Resources, Steps 1–9—Focus Environmental Literacy***	*247–249*
	Inv 3.5	***Reuse and Recycling Resources, Steps 10–14—Focus Environmental Literacy***	*249–250*
19	Inv 3.6	**Building Structures, Steps 1–8**	254–255
20	Inv 3.6	**Building Structures, Steps 9–12**	256
21	Inv 3.6	**Building Structures, Steps 13–20** (Use Reading from Inv 1.7, pp. 147)	257–258
22	Inv 3.6	**Building Structures, Steps 21–26**	258–260
23	Inv 4.1	**Pushes and Pulls, Steps 1–15**	277–280
24	Inv 4.1	**Pushes and Pulls, Steps 16–18** (Reading and discussion)	281–282
25	Inv 4.2	**Colliding Objects, Steps 1–8**	286–288
26	Inv 4.2	**Colliding Objects, Steps 9–15**	288–290
27	Inv 4.2	**Colliding Objects, Steps 16–18** (Reading and discussion)	291–292
28	Inv 4.3	**Rolling Outdoors, Steps 1–6**	296–298
29	Inv 4.3 Inv 4.4	**Rolling Outdoors, Steps 7–11** **Balloon Rockets, Step 12**	298–299 305
	Inv 4.4	***Balloon Rockets, Steps 1–11—Focus on Analyzing***	*303–305*

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

ANIMALS TWO BY TWO

SESSION	INV./PART	CRITICAL PATHWAY	IG PAGES
1	Inv 1.1	The Structure of Goldfish, Steps 1–6	84–85
2	Inv 1.2	Caring for Goldfish, Steps 1–6	88–89
3	Inv 1.2	Caring for Goldfish, Steps 7–11	90
4	Inv 1.3	Goldfish Behavior, Steps 1–8	93–95
5	Inv 1.4	Comparing Goldfish to Guppies, Steps 1–5	98–99
6	Inv 1.4	Comparing Guppies to Goldfish, Steps 7–14 (Two readings)	100–103
7	Inv 1.5	Comparing Schoolyard Birds , Steps 1–6	107–108
8	Inv 1.5	Comparing Schoolyard Birds, Steps 7–13	108–110
9	Inv 1.5	Comparing Schoolyard Birds, Steps 13–20	110–112
10	Inv 1.5	Comparing Schoolyard Birds, Steps 21–24 (Reading)	113–114
11	Inv 2.1	Observing Water Snails, Steps 1–8	133–135
12	Inv 2.1	Observing Water Snails, Steps 9–13	135–136
13	Inv 2.2	Shells, Steps 1–9	139–141
	Inv 2.3	*Land Snails, Steps 1–6—Focus on Analysis and Environmental Literacy*	*145–146*
	Inv 2.3	*Land Snails, Steps 7–17—Focus on Analysis*	*146–148*
14	Inv 2.3	Land Snails, Steps 18–23 (Reading)	149–151

**Indicates the need to allow for growth time*

ANIMALS TWO BY TWO (continued)

SESSION	INV./PART	CRITICAL PATHWAY	IG PAGES
15	Inv 3.1	**The Structure of Redworms, Steps 1–11**	172–173
16	Inv 3.2	**Redworm Behavior, Steps 1–13**	177–179
17 *	Inv 3.2	**Redworm Behavior, Steps 14–16**	179–180
18 *	Inv 3.2	**Redworm Behavior, Steps 17–19**	180–181
	Inv 3.3	***Comparing Redworms to Night Crawlers, Steps 1–8—Focus on Analysis***	*184–185*
19	Inv 3.3	**Comparing Redworms to Night Crawlers, Steps 10–14** (Reading)	186–189
20	Inv 4.1	**Isopod Observations, Steps 1–13**	205–207
21	Inv 4.2	**Identifying Isopods, Steps 1–9**	210–211
22	Inv 4.2	**Identifying Isopods, Steps 10–14**	212–214
	Inv 4.3	***Isopod Movement, Steps 1–4—Focus on Environmental Literacy***	*218*
	Inv 4.3	***Isopod Movement, Steps 5–10—Focus on Analysis***	*219–220*
23	Inv 4.3	**Isopod Movement, Steps 11–14** (Reading)	221–223
24	Inv 4.4	**Animals Living Together, Steps 1–10**	227–228
25	Inv 4.4	**Animals Living Together, Steps 11–12** (Reading)	229
26	Inv 4.4	**Animals Living Together, Steps 13–14** (Reading)	230
	Inv 4.4	***Animals Living Together, Step 15—Focus on Analysis with Media***	*230*

**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.

WEST VIRGINIA FOSS NEXT GENERATION K–8 SCOPE AND SEQUENCE

Grade	Integrated Middle Grades				
6–8	Heredity and Adaptation*	Chemical Interactions			
	Earth History	Diversity of Life	Human Systems Interactions*	Electromagnetic Force*	Gravity and Kinetic Energy*
	Planetary Science	Weather and Water	Populations and Ecosystems	Waves*	

*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		