

SAMPLER

Trees and Weather

INVESTIGATIONS GUIDE



FOSS PATHWAYS™

Developed at

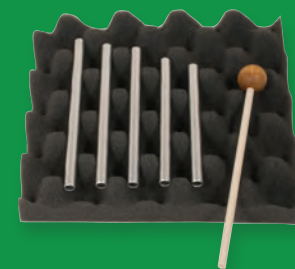
The Lawrence Hall of Science

PreK–5 science that meets the challenge of our time

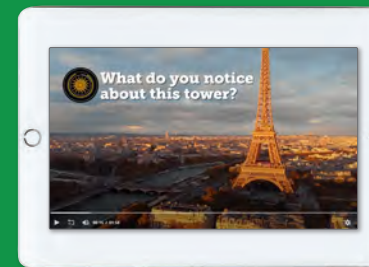
Welcome to new FOSS® Pathways™. Now as never before, the world needs scientific thinkers—to view the world thoughtfully, approach challenges analytically, and embrace opportunities enthusiastically. For educators to help unlock this potential in their students, they need powerful tools that work for the needs of today. A program that engages students of all backgrounds and experiences. Fully leverages modern digital technology. And does it all in the hours available.

A major advancement from a proven leader

FOSS®, a longtime leader in science education, has stepped forward to meet that challenge with the newly streamlined FOSS Pathways™. Pathways was designed to provide teachers with everything they need to meet standards in the time they have allotted to teach science. In these pages, you will see how Pathways:



Aligns to national science standards using three-dimensional teaching, learning, and assessment



Incorporates the digital tools for a flexible multimedia experience



Lends flexibility to teach in the class time allotted for science



Utilizes a multimodal approach to resonate with every student



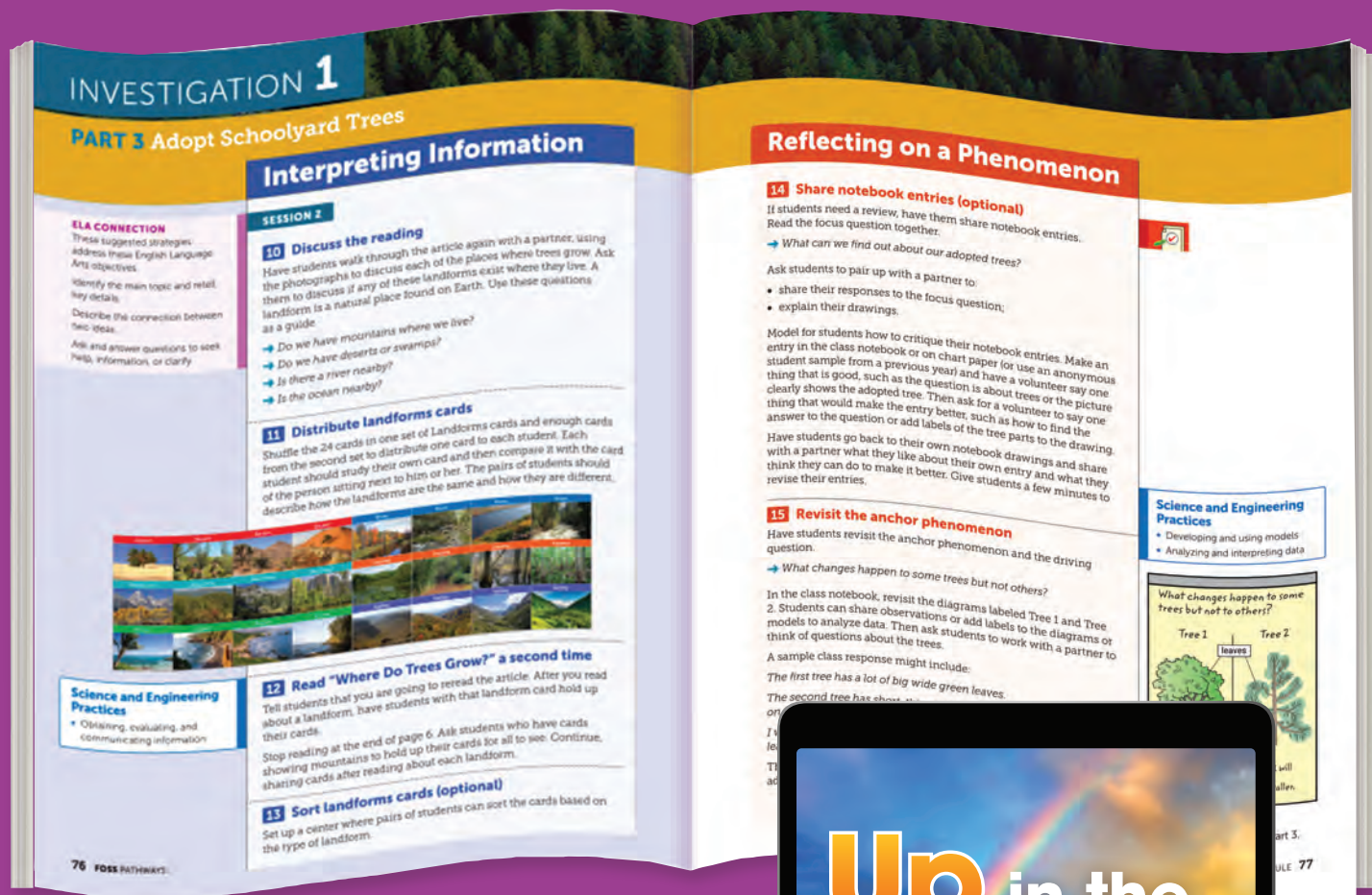
Immerses students in figuring out local and relevant phenomena and engineering problems



Provides unmatched teacher support to teach phenomena-based science

How Pathways develops the scientific thinkers of tomorrow

New FOSS Pathways supports today's demand to develop scientifically literate thinkers and problem solvers in a multitude of ways.

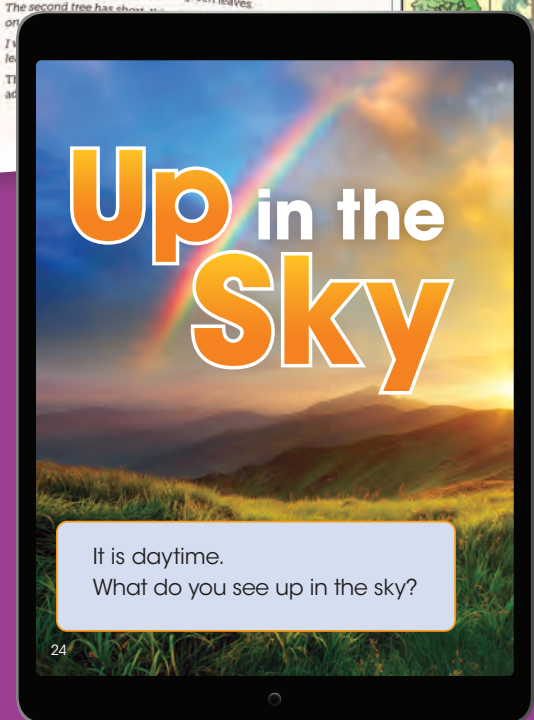


A logical progression

Students develop core ideas in a relevant and coherent learning progression that allows them to construct an explanation of the phenomena they have experienced.

Support for students

Comprehensive support and multimodal instructional experiences engage learners of all languages and cultures, taking advantage of prior experiences so all students can reason scientifically.



Evidence of learning

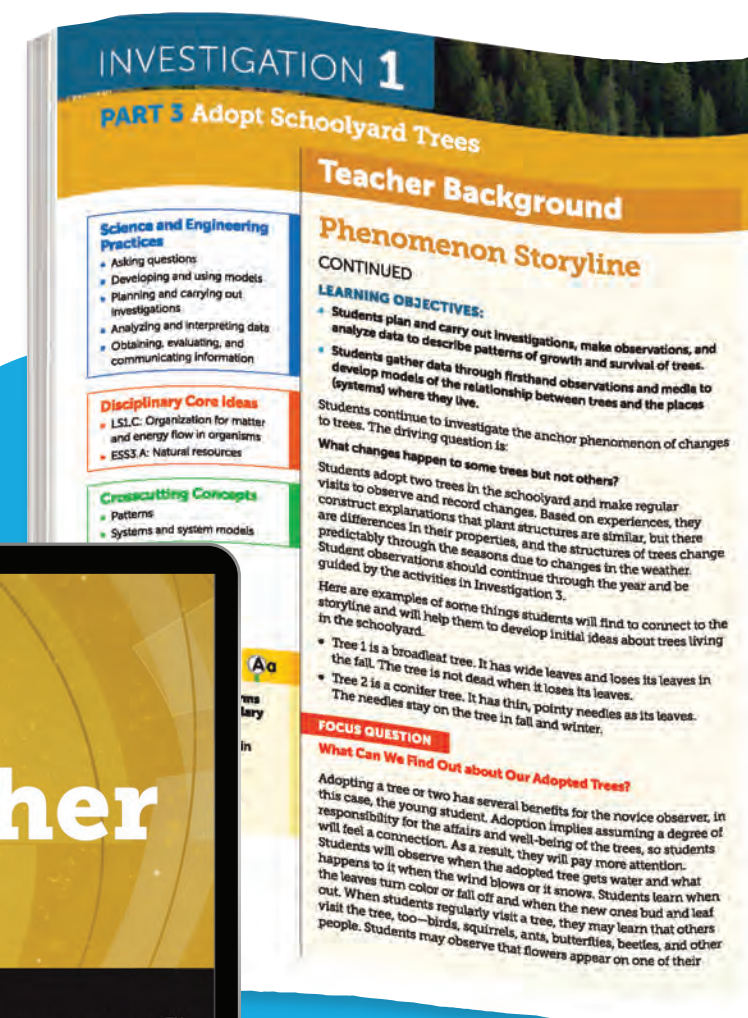
Research-based and field-tested assessments accurately measure student learning and progress. A variety of formative assessment tools provide evidence of students' use of the three dimensions and their knowledge of phenomena.

Support for teachers

Phenomena-based instruction is facilitated by appropriate educative support. This includes explicit background information needed for teachers to engage students in making the connection between the anchor phenomenon being investigated and the core ideas being exposed.

Rich digital resources

Digital resources for students and teachers are provided through FOSSweb on ThinkLink™. These multimedia materials are purposefully designed to enhance the learning experience and lend the flexibility to keep active science teaching viable if classroom circumstances change.



How FOSS Pathways aligns with today's standards

In this Sampler, pages 9-19 and 21-43 are provided from the teacher *Investigations Guide*. As you review, you will begin to witness the numerous ways that FOSS Pathways supports the development of tomorrow's scientists, engineers, and informed citizens. You'll see examples for:



Investigations driven by local, relevant phenomena and real-world problems

Instruction led by multimodal experiences that cognitively engage students to figure out phenomena

Identification of performances to meet targeted learning goals and elicit evidence of students' use of all three dimensions



Instructional support for teachers that provides an explicit connection between the phenomenon, three-dimensional learning, and multimodal learning experiences

Clear integration of ELA/ELD skills and practices, with ties to standards and resources for engaging multilingual students



Cross-curricular activities that give students a choice and voice to differentiate instruction

► Images on this page include actual components, resources and/or materials provided in FOSS kits.



How FOSS aligns to NGSS Performance Expectations

Grade K NGSS Performance Expectations FOSS Trees and Weather Module

K-PS3-1. Make observations to determine the effect of sunlight on Earth's surface

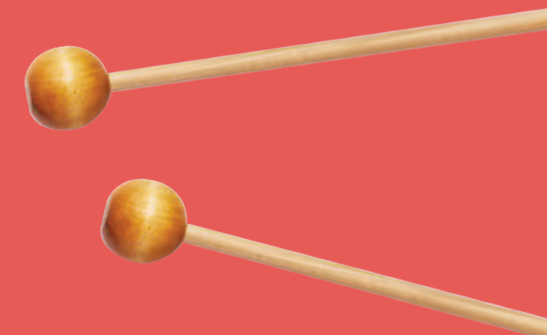
K-LS1-1. Use observations to describe patterns of what plants and animals (including humans) need to survive.

K-ESS2-1. Use and share observations of local weather conditions to describe patterns over time.

K-ESS2-2. Construct an argument supported by evidence for how plants and animals (including humans) can change the environment to meet their needs.

K-ESS3-1. Use a model to represent the relationship between the needs of different plants or animals (including humans) and the places they live.

K-ESS3-2. Ask questions to obtain information about the purpose of weather forecasting to prepare for, and respond to, severe weather.



Trees and Weather Investigations

Investigation 1: Observing Trees

Part 1: Observing Schoolyard Trees
Part 2: Tree Parts

Investigation 2: Observing Weather

Part 1: Weather Calendar
Part 2: Recording Temperature
Part 3: Wind Direction

Investigation 3: Trees Through the Seasons

Part 1: In Fall: Visiting Adopted Trees
Part 2: In Winter: Visiting Adopted Trees
Part 3: In Spring: Visiting Adopted Trees

Trees and Weather

► Start here to begin your review of the Grade K Trees and Weather Investigations Guide.

Introduction

The **Trees and Weather Module** provides students with solid experiences to help them develop an understanding of what plants need to survive and the relationship between their needs and where they live. By monitoring local weather, students experience the patterns and variations in weather and come to understand the importance of weather forecasts to prepare for severe weather. Systematic investigation of trees over the seasons will bring students to a better understanding of the place of trees at school and in the community. Students will observe day-to-day changes in weather over the year as well as the impact weather has on living things.

Students investigate this phenomenon and related problem:

- Anchor phenomenon 1—Changes to trees
- Anchor phenomenon 2—Different clothes for two trips

Throughout the module, students engage in science and engineering practices by asking questions, carrying out investigations, observing, recording, and interpreting data to build explanations, and obtaining information from photographs. Students use models and engage in argument from evidence. They gain experiences that will contribute to an understanding of the crosscutting concepts of patterns; cause and effect; systems and system models; structure and function; and stability and change. It is recommended students engage with this module in the fall and then continue to collect data on trees and weather through the seasons.

CONTENTS

Introduction
Module Matrix
Conceptual Flow of Module
FOSS Pathways Teaching Schedule
FOSS Investigation Organization
The Elements of the FOSS Instructional Design
Diversity, Equity, and Inclusion
Establishing a Classroom Culture

The NGSS Performance Expectations bundled in this module include:

Life Sciences

K-LS1-1 *

Earth and Space Sciences

K-ESS2-1

K-ESS2-2 *

K-ESS3-1 *

K-ESS3-2

Physical Sciences

K-PS3-1*

* The two other FOSS modules for grade K also address these performance expectations.

NOTE

The three modules for grade K in FOSS Pathways are:

- Trees and Weather
- Materials and Forces
- Animals Two by Two

Module Matrix

At a Glance

Phenomenon and Storyline	Driving Question and Focus Questions	Content and Disciplinary Core Ideas	Practices and Crosscutting Concepts	NGSS PEs
<p>INV. 1 Observing Trees</p> <p>Phenomenon 1—Changes to trees: 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, thin, pointy green leaves. A few months later, the leaves of the first tree are yellow and brown, but the leaves on the second tree look the same as months before.</p> <p>Storyline: Students engage with the phenomenon of trees. Students begin the investigation by looking at the variety and structure of trees in the schoolyard. They work with representational materials to look more closely at the shapes of trees and their parts. They adopt schoolyard trees to observe changes through the year. A living tree becomes part of the classroom for several weeks, and students complete the investigation by planting their class tree on the school grounds.</p>	<p><i>Driving question:</i> What changes happen to some trees but not others?</p> <p>FOCUS QUESTIONS:</p> <p>What did we learn about our schoolyard trees?</p> <p>What are the parts of trees?</p> <p>What can we find out about our adopted trees?</p> <p>What do trees need to grow?</p>	<p>LS1.C: Organization for matter and energy flow in organisms ESS2.E: Biogeology ESS3.A: Natural resources</p> <ul style="list-style-type: none"> • Trees are living plants. • Trees provide resources for animals, including people (shade, food, lumber, fuel). • Plants can change their surroundings. • Trees differ in size and shape. • Trees have structures: branches, leaves, trunk, and roots to help them survive. • Trees live in many different environments. • Trees have basic needs: light, air, nutrients, water, and space. 	<p>Science and Engineering Practices Asking questions Developing and using models Planning and carrying out investigations Analyzing and interpreting data Constructing explanations Engaging in argument from evidence Obtaining, evaluating, and communicating information</p> <p>Crosscutting Concepts Patterns Systems and system models Structure and function</p>	<p>K-LS1-1: Use observations to describe patterns of what plants and animals (including humans) need to survive.*</p> <p>K-ESS2-2: Construct an argument supported by evidence for how plants and animals (including humans) can change the environment to meet their needs.*</p> <p>K-ESS3-1: Use a model to represent the relationship between the needs of different plants or animals (including humans) and the places they live.*</p>
<p>INV. 2 Observing Weather</p> <p>Phenomenon 2—Different clothes for two trips: A family is planning a camping trip for a weekend in June. The camp is a short drive from their home. The children select some clothes to pack for the trip. The family wants to go back to the same camp in October. The children select different clothes for the second trip.</p> <p>Storyline: Students engage with the phenomenon of local weather. Students share what they know about weather and how it relates to air. The students begin recording daily weather observations on a class calendar. Students use weather pictures to indicate five basic types of weather. They use a thermometer to measure relative temperature (how hot or cold it is) and make a wind sock to observe the wind direction and speed. They compare weather over several months to look for patterns.</p>	<p><i>Driving question:</i> Why did the children pack different clothes for the two trips?</p> <p>FOCUS QUESTIONS:</p> <p>What is the weather today?</p> <p>How can we measure the air temperature?</p> <p>What does a wind sock tell us about the wind?</p>	<p>ESS2.D: Weather and climate ESS3.B: Natural hazards PS3.B: Conservation of energy and energy transfer</p> <ul style="list-style-type: none"> • Weather is the condition of the air outdoors at a given time. Weather changes. • Weather can be described as sunny, partly cloudy, overcast, rainy, or snowy. • Air temperature is how hot or cold it is outside and tells us about weather. Temperature changes during the day. • Thermometers measure temperature. • Sunlight warms Earth’s surface. • A wind sock indicates wind direction and speed. • Some severe weather conditions are more likely in certain places and in certain months. • Weather forecasts help people to prepare for severe weather. • Certain months (seasons) have more days of some kinds of weather than do other months. 	<p>Science and Engineering Practices Asking questions Planning and carrying out investigations Analyzing and interpreting data Using mathematics and computational thinking Constructing explanations Obtaining, evaluating, and communicating information</p> <p>Crosscutting Concepts Patterns Cause and effect</p>	<p>K-ESS2-1: Use and share observations of local weather conditions to describe patterns over time.</p> <p>K-ESS3-2: Ask questions to obtain information about the purpose of weather forecasting to prepare for, and respond to, severe weather.</p> <p>K-PS3-1: Make observations to determine the effect of sunlight on Earth’s surface.*</p> <p>* These performance expectations are also addressed in K modules Animals Two by Two and Materials and Forces.</p>

Module Matrix

At a Glance CONTINUED



Phenomenon and Storyline

Driving Question and Focus Questions

Content and Disciplinary Core Ideas

Practices and Crosscutting Concepts

NGSS PEs

INV. 3 Trees Through the Seasons

Continue Phenomenon 1—Changes to trees: The phenomenon storyline from Investigation 1 is continued: 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, thin, pointy green leaves. A few months later, the leaves of the first tree are yellow and brown, but the leaves on the second tree look the same as months before.

Storyline: Students engage with seasons. Students extend their understanding of trees as a growing, changing, living part of their world. During each season, students visit the schoolyard trees; observe their twigs, leaves, flowers, and seeds; and compare them to those from a previous season. They observe how trees can change their surroundings. Each time students go outdoors, they dress for the weather. The weather calendar, class notebook, and student notebooks document the changes over the year.

Driving question:
What changes happen to some trees but not others?

- FOCUS QUESTIONS:**
- What do fall trees look like?
 - What do winter trees look like?
 - What do spring trees look like?

- LS1.C:** Organization for matter and energy flow in organisms
ESS2.D: Weather and climate
- Trees are living, growing plants.
 - Trees change through the seasons.
 - Bark, twigs, leaves, buds, flowers, fruits, and seeds are parts of trees.
 - Twigs have structures such as leaf scars and buds.
 - Trees can change their surroundings.
 - The weather in fall, winter, and spring in our area is predictable.
 - Seasons have a predictable annual pattern: fall, winter, spring, and summer.

- Science and Engineering Practices**
- Asking questions
 - Planning and carrying out investigations
 - Analyzing and interpreting data
 - Constructing explanations
 - Obtaining, evaluating, and communicating information
- Crosscutting Concepts**
- Patterns
 - Structure and function
 - Stability and change

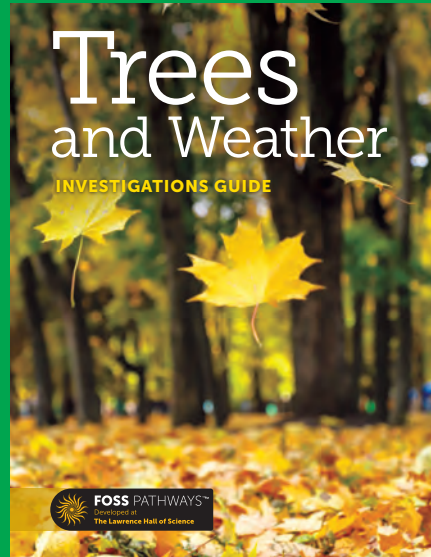
- K-LS1-1:** Use observations to describe patterns of what plants and animals (including humans) need to survive.*
- K-ESS2-1:** Use and share observations of local weather conditions to describe patterns over time.
- * These performance expectations are also addressed in K modules **Animals Two by Two** and **Materials and Forces**.

FOSS Pathways includes:

Investigations Guide

The *Investigations Guide* is a spiral-bound guide containing everything you need to teach the module. FOSS active investigation lesson plans include:

- Three-dimensional learning objectives
- Relevant and local phenomena storylines with driving questions
- Sense-making discussions
- Embedded assessment and “What to Look For” guidance
- Vocabulary reviews
- English language support strategies
- ELA strategies and connections



Science Resources Student Book

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

- Use text to obtain, evaluate, and communicate information
- Use evidence to support their ideas during sense-making discussions and focus question responses
- Integrate information from multiple sources
- Interpret graphs, diagrams, and photographs to build understanding

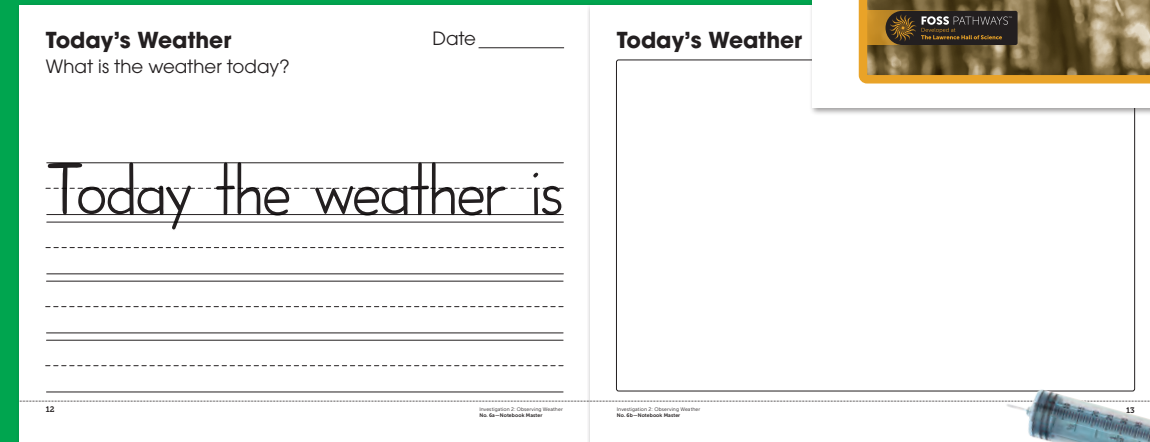
Available in print and as an interactive eBook in English and Spanish.



► Images on this page include actual components, resources and/or materials provided in FOSS kits.

Consumable Booklets

FOSS Booklets contain the Science Notebook Masters in a convenient booklet along with additional pages for writing and/or drawing opportunities and anchor phenomena explanations. There is one copy included in the kit. Additional copies are sold separately.



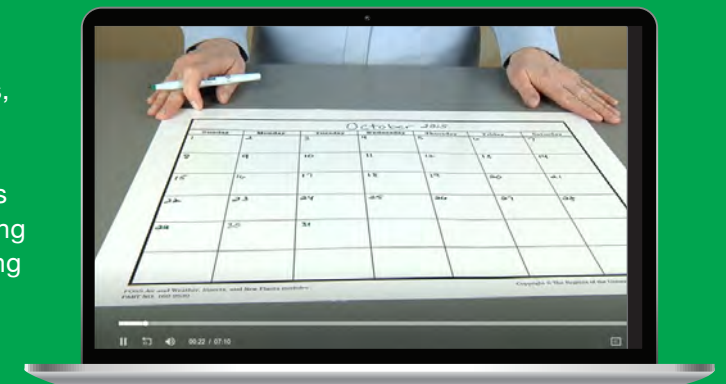
Equipment Kit

FOSS provides the equipment needed for all the investigations, including metric measuring tools. Our high-quality, classroomtested materials are long-lasting and packaged by investigation to facilitate preparation and clean up. There is enough permanent equipment in each kit for 24 students. Consumable materials are supplied for three uses. Convenient grade-level and refill kits are available.



Technology

Online resources include duplication masters, Investigations Guide, teaching slides, FOSSmap online assessment, streaming videos, virtual investigations, and tutorials, as well as a library of teacher resources, including access and equity, three-dimensional teaching and learning, and environmental literacy.





**SCAN HERE FOR A
TOUR OF FOSSWEB!**

FOSSweb

FOSSweb digital resources are delivered on School Specialty's curriculum platform called ThinkLink.

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

Teaching Slides

Downloadable and editable slides from FOSSweb can be used to facilitate each part of each investigation. Teaching slides are available as Google slides in English and Spanish.



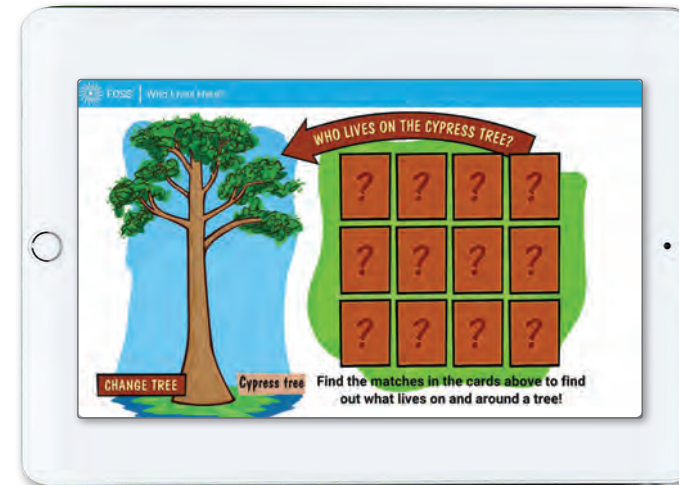
Streaming Videos

New engaging content videos in English and Spanish were developed to specifically support FOSS investigations.



Online Activities

New engaging simulations developed to address core ideas in FOSS, and interactive virtual investigations and tutorials offer additional content support for students.



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.

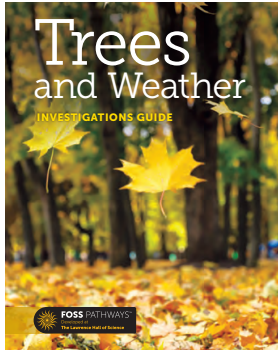
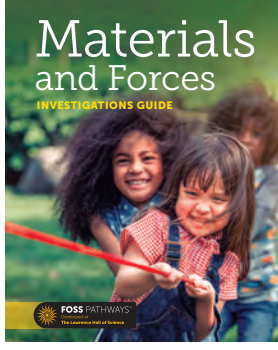
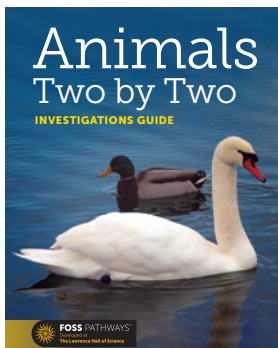


FOSSmap Online Assessment

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

Grade Level Planning Guide

FOSS Pathways Modules Grade K

FOSS Module	Module Overview/Bundled Performance Expectations	Disciplinary Core Ideas	Science and Engineering Practices	Crosscutting Concepts
 <p>Trees and Weather INVESTIGATIONS GUIDE</p> <p>Earth Science</p>	<p>The Trees and Weather Module provides students with experiences to develop an understanding of what plants need to survive in their environment. Systematic investigation of trees over the seasons will bring students to a better understanding of trees at school and in the community. Students will observe day-to-day changes and patterns in weather over the year as well as the impact weather has on living things.</p> <p>NGSS PEs: Life Sciences: K-LS1-1 Earth Sciences: K-ESS2-1 K-ESS2-2 K-ESS3-1 K-ESS3-2 Physical Sciences: K-PS3-1</p>	<p>LS1.C: Organization for matter and energy flow in organisms ESS2.D: Weather and climate ESS2.E: Biogeology ESS3.A: Natural resources ESS3.B: Natural hazards PS3.B: Conservation of energy and energy transfer</p>	<ul style="list-style-type: none"> Asking questions Developing and using models Planning and carrying out investigations Analyzing and interpreting data Using mathematics and computational thinking Constructing explanations Engaging in argument from evidence Obtaining, evaluating, and communicating information 	<ul style="list-style-type: none"> Patterns Cause and effect Systems and system models Structure and function Stability and change
 <p>Materials and Forces INVESTIGATIONS GUIDE</p> <p>Physical Science * Still in development</p>	<p>The Materials and Forces Module provides experiences that heighten students' understanding of the physical world as they perform tests to observe properties of materials such as wood, paper, and fabric. They learn about different materials to engineer a shade structure. Students observe and compare pushes and pulls, the speed and motion of moving objects, and collisions.</p> <p>NGSS PEs: Physical Sciences: K-PS2-1 K-PS2-2 K-PS3-1 K-PS3-2 Earth Sciences: K-ESS2-2 K-ESS3-3 ETAS: K-2-ETS1-1 K-2-ETS1-2 K-2-ETS1-3</p>	<p>PS2.A: Forces and motion PS2.B: Types of interactions PS3.B: Conservation of energy and energy transfer PS3.C: Relationship between energy and forces ESS2.E: Biogeology ESS3.C: Human impacts on Earth systems ETS1.A: Defining and delimiting engineering problems ETS1.B: Developing possible solutions ETS1.C: Optimizing the design solutions</p>	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> Patterns Cause and effect Systems and system models Scale, proportion, and quantity
 <p>Animals Two by Two INVESTIGATIONS GUIDE</p> <p>Life Science * Still in development</p>	<p>The Animals Two by Two Module provides young students with opportunities to observe differences in structure and behavior and to learn about basic needs of animals.</p> <p>NGSS PEs: Life Science: K-LS1-1 Earth Sciences: K-ESS2-2 K-ESS3-1</p>	<p>LS1.C: Organization for matter and energy flow in organisms ESS3.A: Natural resources ESS2.E: Biogeology</p>	<ul style="list-style-type: none"> Asking questions Developing and using models Planning and carrying out investigations Analyzing and interpreting data Constructing explanations Engaging in argument from evidence Obtaining, evaluating, and communicating information 	<ul style="list-style-type: none"> Patterns Cause and effect Systems and system models

FOSS® Pathways™ is an engaging PreK–5 science program developed at the Lawrence Hall of Science for the Next Generation Science Standards (NGSS). This sampler will introduce you to the major components of the program and show examples from FOSS Pathways Trees and Weather Investigations Guide.

Recommended Scope and Sequence FOSS Pathways

GRADE	PHYSICAL SCIENCE	EARTH SCIENCE	LIFE SCIENCE
PK	Observing Nature		
K	Materials and Forces	Trees and Weather	Animals Two by Two
1	Sound and Light	Changes in the Sky	Plants and Animals
2	Solids and Liquids	Water and Landforms	Insects and Plants
3	Motion	Water and Climate	Structures of Life
4	Energy	Soils, Rocks, and Landforms	Senses and Survival
5	Mixtures and Solutions	Earth and Sun	Living Systems

Learn more at FOSSPathways.com

Scan the QR code and explore additional
FOSS Pathways Samplers today.



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