

SAMPLER

Changes in the Sky

INVESTIGATIONS GUIDE



FOSS PATHWAYS™

Developed at

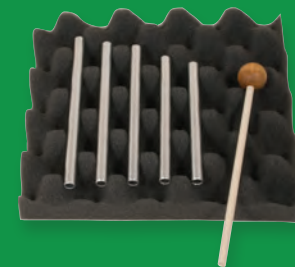
The Lawrence Hall of Science

PreK–5 science that meets the challenge of our time

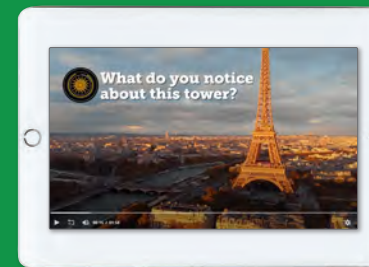
Welcome to new FOSS® Pathways™. Now as never before, the world needs scientific thinkers—to view the world thoughtfully, approach challenges analytically, and embrace opportunities enthusiastically. For educators to help unlock this potential in their students, they need powerful tools that work for 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



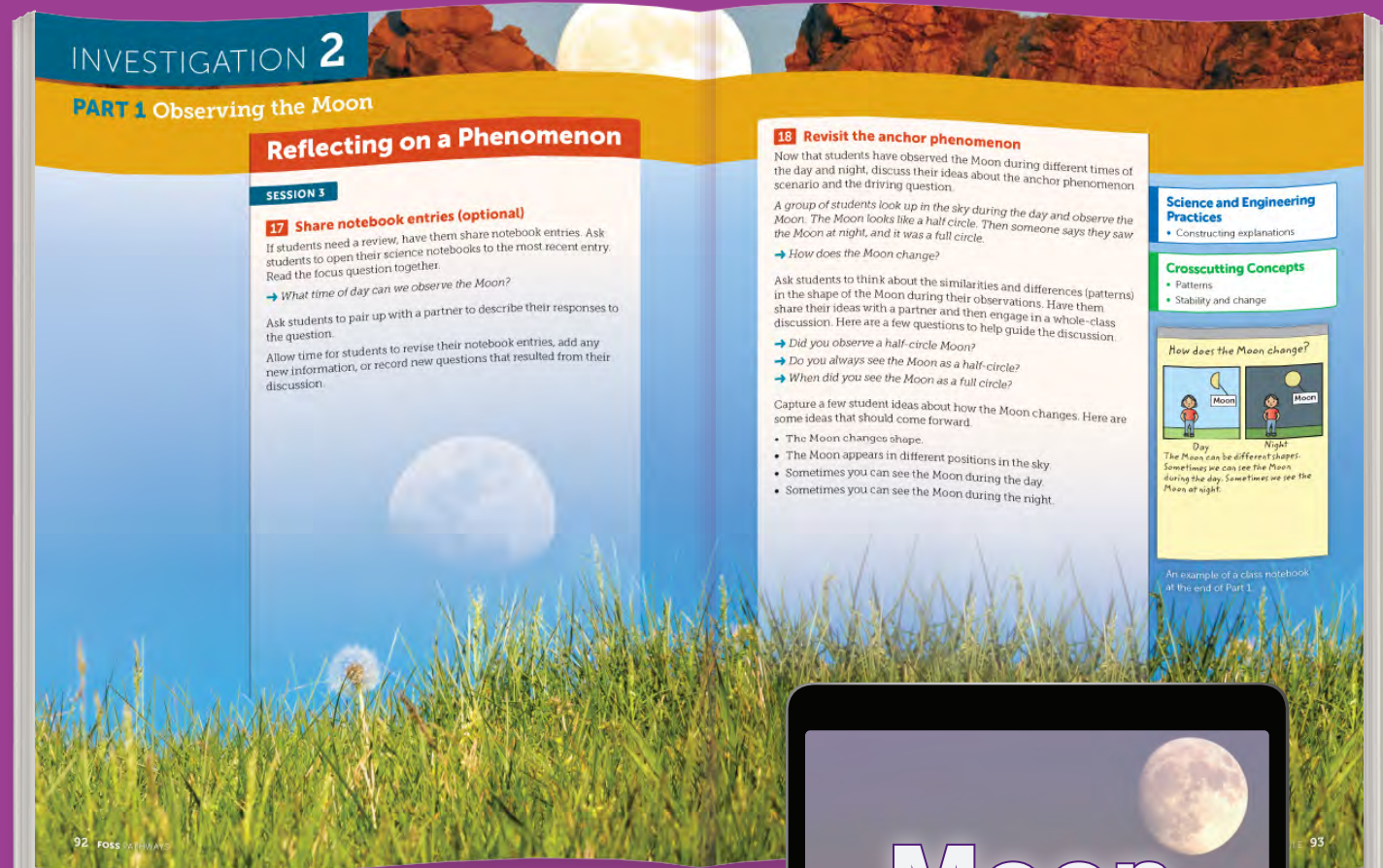
Immerses students in figuring out local and relevant phenomena and engineering problems



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

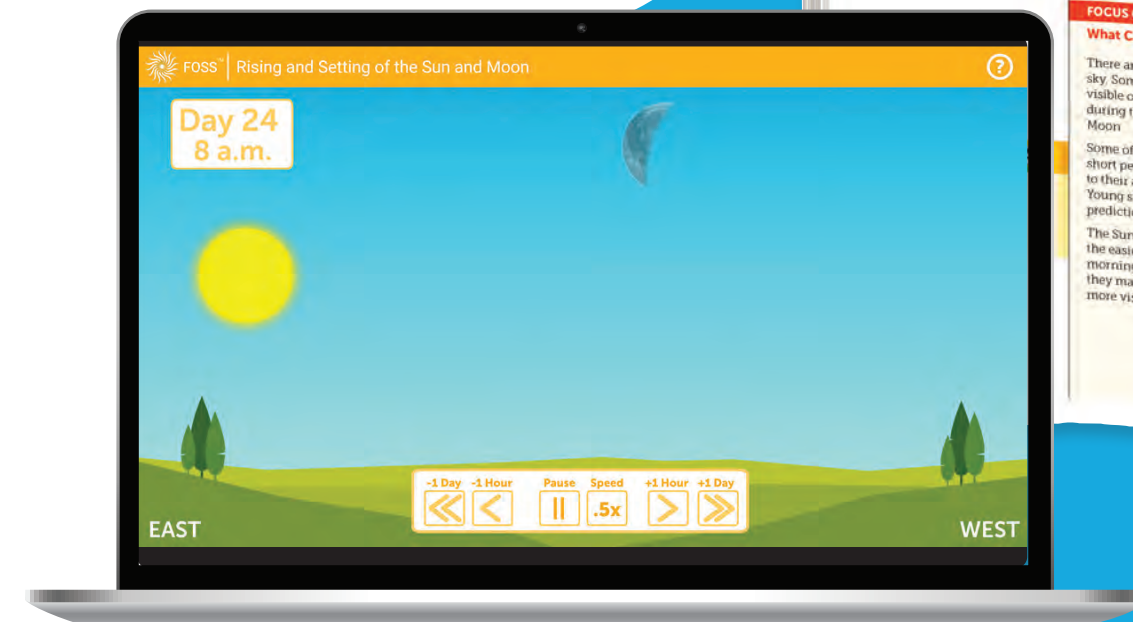
Research-based and field-tested assessments accurately measure student learning and progress. A variety of formative assessment tools provide evidence of students' use of the three dimensions and their knowledge of phenomena.

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 9-17 and 19-39 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



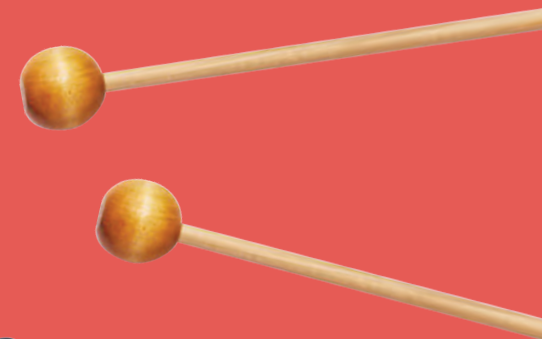
Cross-curricular activities that give students a choice and voice to differentiate instruction

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



How FOSS aligns to NGSS Performance Expectations

Grade 1 NGSS Performance Expectations	FOSS Changes in the Sky Module	
	Investigation(s)	Benchmark Assessment
1-ESS1-1. Use observations of the Sun, Moon, and stars to describe patterns that can be predicted.	Investigation 1 Investigation 2	<ul style="list-style-type: none"> Investigation 1 I-Check Investigations 2–3 I-Check
1-ESS1-2. Make observations at different times of year to relate the amount of daylight to the time of year.	Investigation 3	<ul style="list-style-type: none"> Investigations 2–3 I-Check



Changes in the Sky Investigations

Changes in the Sky

► [Start here to begin your review of the Grade 1 Changes in the Sky Investigations Guide.](#)

Investigation 1: Sunrise and Sunset

- Part 1: Observing the Daytime Sky
- Part 2: Sun and Shadows
- Part 3: Measuring Temperature and Daylight

Investigation 2: Moonrise and Moonset

- Part 1: Observing the Moon
- Part 2: Moon Patterns

Investigation 3: Patterns Through the Year

- Part 1: Daylight Through the Seasons

Introduction

In this module, young students turn their focus upward. Students explore the phenomenon 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. Students 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 the seasons and connect them to changing weather conditions. They observe the Moon in the day and night sky and monitor its movement over the month.

- Anchor phenomenon 1—the Sun changes position in the sky
- Anchor phenomenon 2—the changing appearance of the Moon
- Anchor phenomenon 3—the changing amount of daylight

Throughout the **Changes in the Sky Module**, students engage in science and engineering practices by planning and carrying out observational investigations and collecting and interpreting data to answer questions. Students gain experiences that will contribute to their understanding of the crosscutting concepts of patterns; cause and effect; and stability and change.

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:

- Earth and Space Sciences**
- 1-ESS1-1
- 1-ESS1-2

NOTE

The three modules for grade 1 in FOSS Pathways are:

- Changes in the Sky
- Sound and Light
- Plants and Animals

Module Matrix

At a Glance

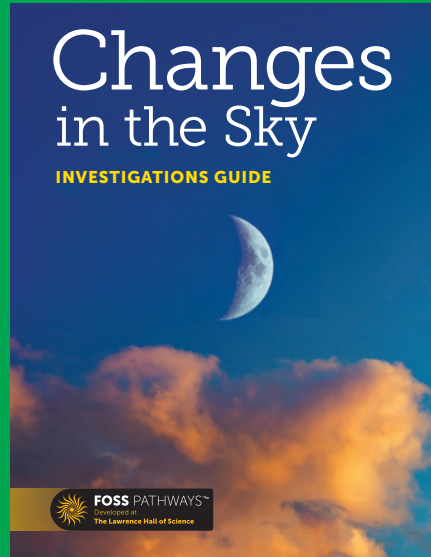
Phenomenon and Storyline	Driving Question and Focus Questions	Content and Disciplinary Core Ideas	Practices and Crosscutting Concepts	NGSS PEs
<p>INV. 1 Sunrise and Sunset</p> <p>Phenomenon 1—The Sun changes position in the sky: A class of students goes on a field trip. The bus waits for them in front of the school early in the morning. As students get on the bus, they observe the Sun behind a big tree. When they return from the trip in the afternoon, they get off the bus in front of the school. The Sun is now behind the school building.</p> <p>Storyline: Students observe objects at different times during daylight and analyze their observations to determine how the position of the Sun changed. Students create shadows outdoors and determine the relationship between the Sun, an object, and the object’s shadow. Students connect observations of a tree shadow at different times of the day to the Sun’s changing position in the sky. Students monitor sunrise and sunset and record the total number of daylight hours each day in the community. They collect data on temperature changes during a single day.</p>	<p><i>How does the Sun’s position in the sky change during the day?</i></p> <p>FOCUS QUESTIONS:</p> <p>What can we see in the sky during the day?</p> <p>How can we use the Sun to create shadows?</p> <p>What time of day is the air the warmest?</p>	<p>ESS1.A: The universe and its stars</p> <ul style="list-style-type: none"> • Objects appear to move across the sky during the day. • The Sun can be seen only during the day. • Shadows are the dark areas that occur when light is blocked. • Shadows change during the day because the position of the Sun changes in the sky. • Temperature describes how hot or cold the air is. Temperature is measured with a thermometer. • The Sun rises in the east, moves across the sky, and sets in the west each day at predictable times. • The Sun warms Earth. 	<p>Science and Engineering Practices</p> <p>Asking questions Planning and carrying out investigations Analyzing and interpreting data Constructing explanations Obtaining, evaluating, and communicating information</p> <p>Crosscutting Concepts</p> <p>Patterns Cause and effect</p>	<p>1-ESS1-1: Use observations of the Sun, Moon, and stars to describe patterns that can be predicted.</p>
<p>INV. 2 Moonrise and Moonset</p> <p>Phenomenon 2—The changing appearance of the Moon: A group of students look up in the sky during the day and observe the Moon. The Moon looks like a half circle. Then someone says they saw the Moon at night, and it was a full circle.</p> <p>Storyline: Students make systematic observations of the Moon during the day and night for four weeks. They analyze their observations of the day and night sky over four weeks and find a pattern in the shape and position of the Moon. They construct an explanation about the anchor phenomenon and make predictions using these observations.</p>	<p><i>How does the Moon change?</i></p> <p>FOCUS QUESTIONS:</p> <p>What time of day can we observe the Moon?</p> <p>What does the Moon look like at different times of the month?</p>	<p>ESS1.A: The universe and its stars</p> <ul style="list-style-type: none"> • The Moon can be observed moving across the sky; we see it at different locations in the sky, depending on the time of day or night. • Sometimes the Moon can be seen at night and sometimes during the day. It looks different throughout the month, but looks the same again about every four weeks. • Stars other than the Sun can be seen only at night. 	<p>Science and Engineering Practices</p> <p>Asking questions Developing and using models Planning and carrying out investigations Analyzing and interpreting data Constructing explanations Obtaining, evaluating, and communicating information</p> <p>Crosscutting Concepts</p> <p>Patterns Stability and change</p>	<p>1-ESS1-1: Use observations of the Sun, Moon, and stars to describe patterns that can be predicted.</p>
<p>INV. 3 Patterns Through the Year</p> <p>Phenomenon 3—The changing amount of daylight: A brother and sister like to practice soccer after dinner. In June, they play for a long time before it gets dark. Four months later in October, it is already dark before they have dinner.</p> <p>Storyline: Students use a bar graph to analyze the monthly daylight data for their area to determine a pattern. They make predictions about the amount of daylight on their birthday. Students read about weather changes throughout the seasons. Students construct explanations by using firsthand observations and obtaining information from text to explain the anchor phenomenon.</p>	<p><i>How does the amount of daylight change between June and October?</i></p> <p>FOCUS QUESTION:</p> <p>How does the amount of daylight change over the seasons?</p>	<p>ESS1.B: Earth and the solar system</p> <ul style="list-style-type: none"> • The Sun heats Earth during the day. • The number of daylight hours changes predictably through the year. Winter has the least number of daylight hours; summer has the most daylight hours. • The Sun can be seen only in the day. 	<p>Science and Engineering Practices</p> <p>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</p> <p>Patterns Stability and change</p>	<p>1-ESS1-2: Make observations at different times of the year to relate the amount of daylight to the time of year.</p>

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

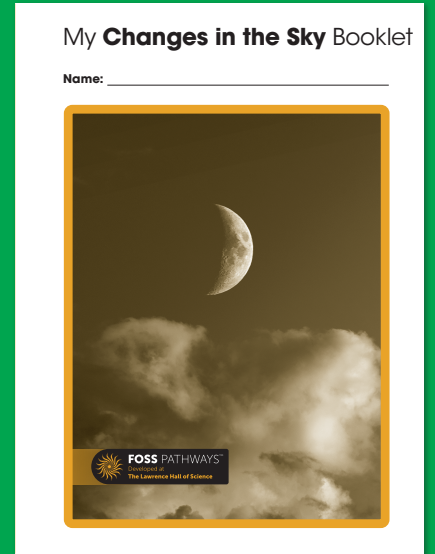
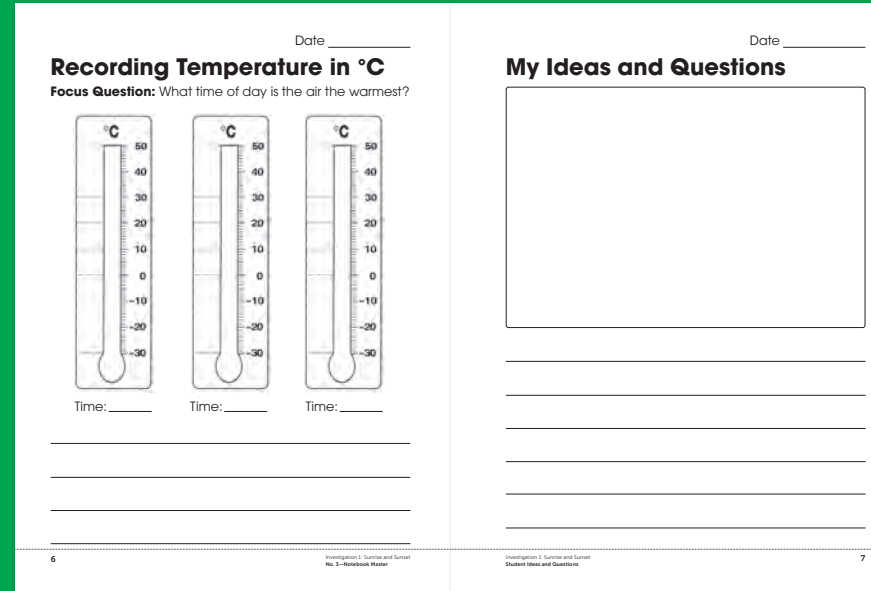
Available in print and as an interactive eBook in English and Spanish.



► 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.



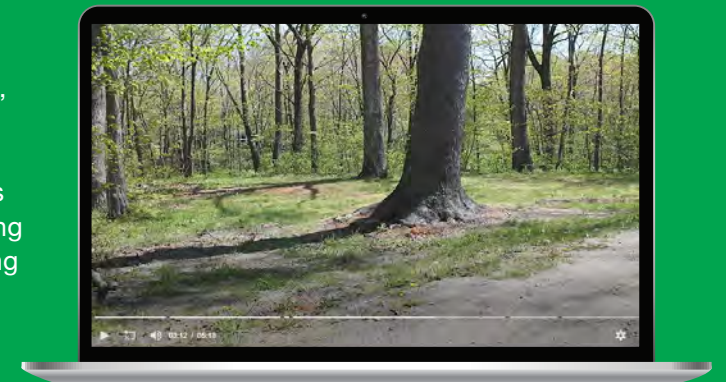
Equipment Kit

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, eInvestigations 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!**

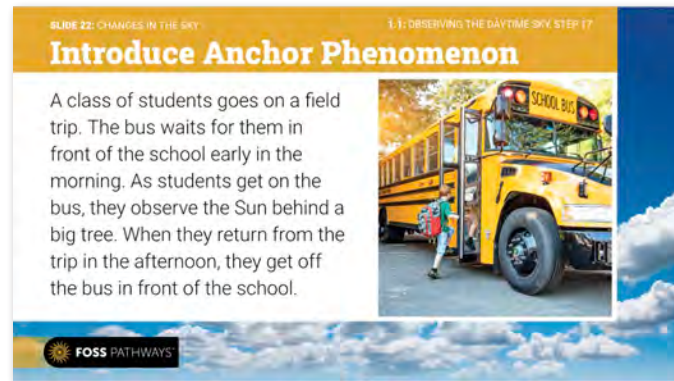
FOSSweb

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.



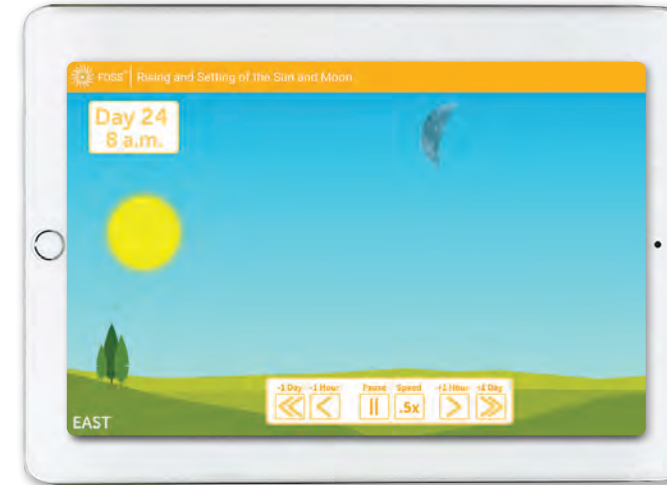
Streaming Videos

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.

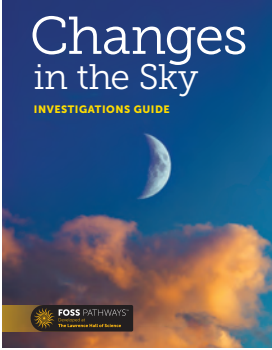
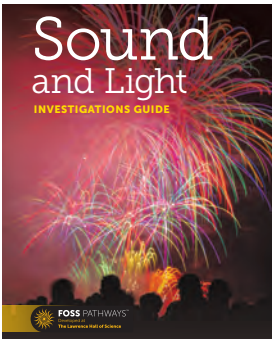
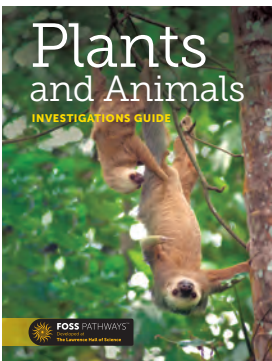


FOSSmap Online Assessment

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 1

FOSS Module	Module Overview/Bundled Performance Expectations	Disciplinary Core Ideas	Science and Engineering Practices	Crosscutting Concepts
 <p>Earth Science</p>	<p>In the Changes in the Sky Module, students turn their focus upward to explore that some objects in the sky change position in predictable ways. They make observations and record data about sunrise and sunset at different times of year to relate the amount of daylight to the seasons. They use observations of the Sun, Moon, and stars to describe patterns that can be predicted and discover that the Moon can be seen in the day and night skies.</p> <p>NGSS PEs: Earth Sciences: 1-ESS1-1 1-ESS1-2</p>	<p>ESS1.A: The universe and its stars ESS1.B: Earth and the solar system</p>	<ul style="list-style-type: none"> Asking questions Planning and carrying out investigations Analyzing and interpreting data Using mathematics and computational thinking Constructing explanations Obtaining, evaluating, and communicating information 	<ul style="list-style-type: none"> Patterns Cause and effect Stability and change
 <p>Physical Science</p>	<p>The Sound and Light Module provides students with experiences to explore how to change sound volume and develop simple models for how a sound travels from a source to a receiver. 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 in which animals use their senses to gather information about their environment.</p> <p>NGSS PEs: 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</p>	<p>PS4.A: Wave properties PS4.B: Electromagnetic radiation PS4.C: Information technologies and instrumentation ETS1.A: Defining and delimiting engineering problems ETS1.B: Developing possible solutions ETS1.C: Optimizing the design solution</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 Obtaining, evaluating, and communicating information 	<ul style="list-style-type: none"> Patterns Cause and effect Systems and system models Structure and function
 <p>Life Science * Still in development</p>	<p>The Plants and Animals Module provides experiences with young plants and animals and the structures and behaviors that help them grow and survive in their habitat. Students explore structure and function relationships in nature and use that knowledge to develop models. They learn about the behaviors of animal parents to support their offspring.</p> <p>NGSS PEs: Life Sciences: 1-LS1-1 1-LS1-2 1-LS3-1 ETAS: K-2-ETS1-2</p>	<p>LS1.A: Structure and function LS1.B: Growth and development of organisms LS3.A: Inheritance of traits LS3.B: Variation of trait ETS1.A: Defining and delimiting engineering problems ETS1.B: Developing possible 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 Obtaining, evaluating, and communicating information 	<ul style="list-style-type: none"> Patterns Cause and effect Systems and system models Structure and function

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 Changes in the Sky 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

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