Smithsonian | SCIENCE *for the classroom*

PROGRAM OVERVIEW

GRADES K–5

SETTING THE STANDARD IN
3D LEARNING AND 3D ASSESSMENT

ENGAGE. INSPIRE. CONNECT.

CAROLINA®
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Table of Contents

3D learning and 3D assessment—all in one package

Setting the Standard in 3D Learning and 3D Assessment

Setting the standard in 3D learning and 3D assessment starts with three things:

- **Coherent Storylines**
- **Proven Results**
- **Teacher Support**

Smithsonian Science for the Classroom™ offers educators all three. Twenty-four phenomena- and problem-based modules for grades K–5 offer a depth of learning and an integrated approach to teaching science and engineering that only the expertise of the Smithsonian can provide.

A hands-on, integrated approach to teaching science and engineering

Curriculum Framework

	Life Science	Earth and Space Science	Physical Science	Engineering Design
Kindergarten	How Do Living Things Get What They Need From the Environment?*	How Can We Prepare for the Weather?*	How Can We Change an Object's Motion?*	How Can We Stay Cool in the Sun?*
Grade 1	How Do Living Things Stay Safe and Grow?	How Can We Predict When the Sky Will Be Dark?	How Can We Light Our Way in the Dark?	How Can We Send a Message Using Sound?
Grade 2	How Can We Find the Best Place for a Plant to Grow?	What Can Maps Tell Us About Land and Water on Earth?	How Can We Change Solids and Liquids?	How Can We Stop Soil From Washing Away?
Grade 3	What Explains Similarities and Differences Between Organisms?	How Do Weather and Climate Affect Our Lives?	How Can We Predict Patterns of Motion?	How Can We Protect Animals When Their Habitat Changes?
Grade 4	How Can Animals Use Their Senses to Communicate?	What Is Our Evidence That We Live on a Changing Earth?	How Does Motion Energy Change in a Collision?	How Can We Provide Energy to People's Homes?
Grade 5	How Can We Predict Change in Ecosystems?	How Can We Use the Sky to Navigate?	How Can We Identify Materials Based on Their Properties?	How Can We Provide Freshwater to Those in Need?

*Working titles. Final modules available 2021.

Coherent Storylines

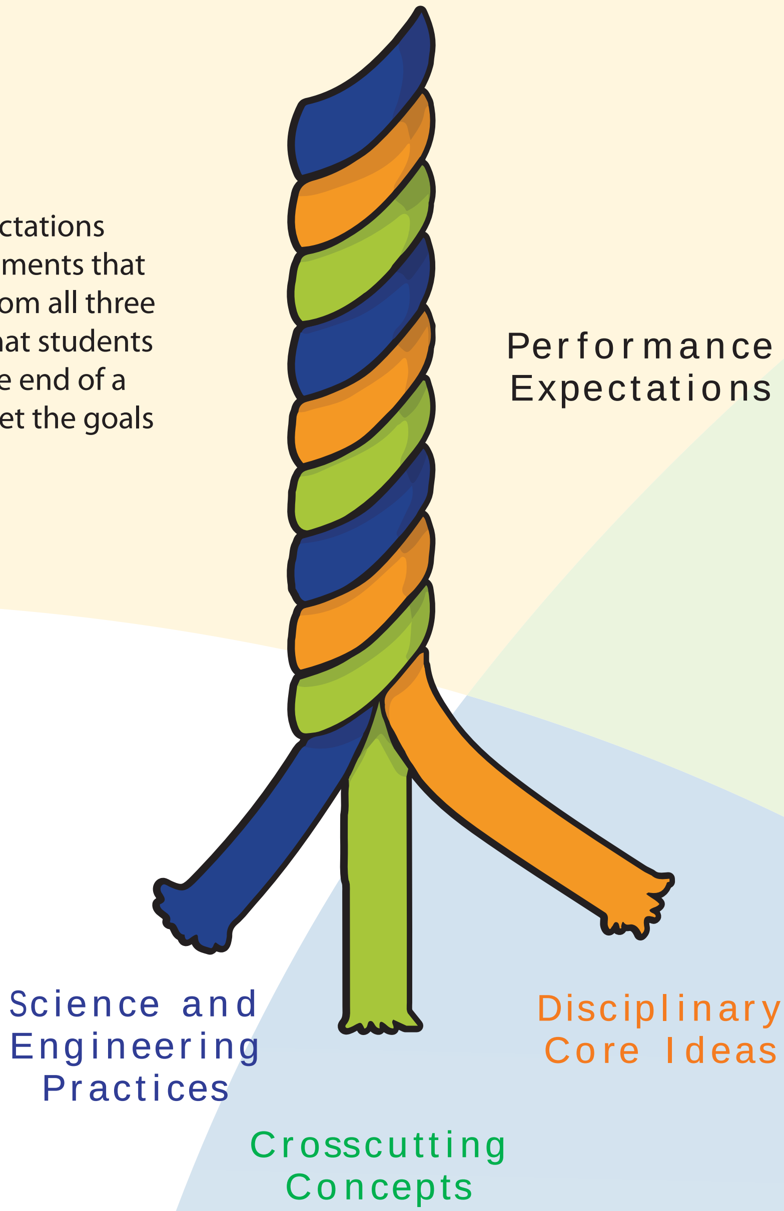
The Difference Is in the Development

Smithsonian Science for the Classroom's coherent storylines illustrate how a series of lessons progressively moves students toward a 3D performance assessment in which they answer a question or solve a problem.

Ensuring coherence through backward design—a three-part process

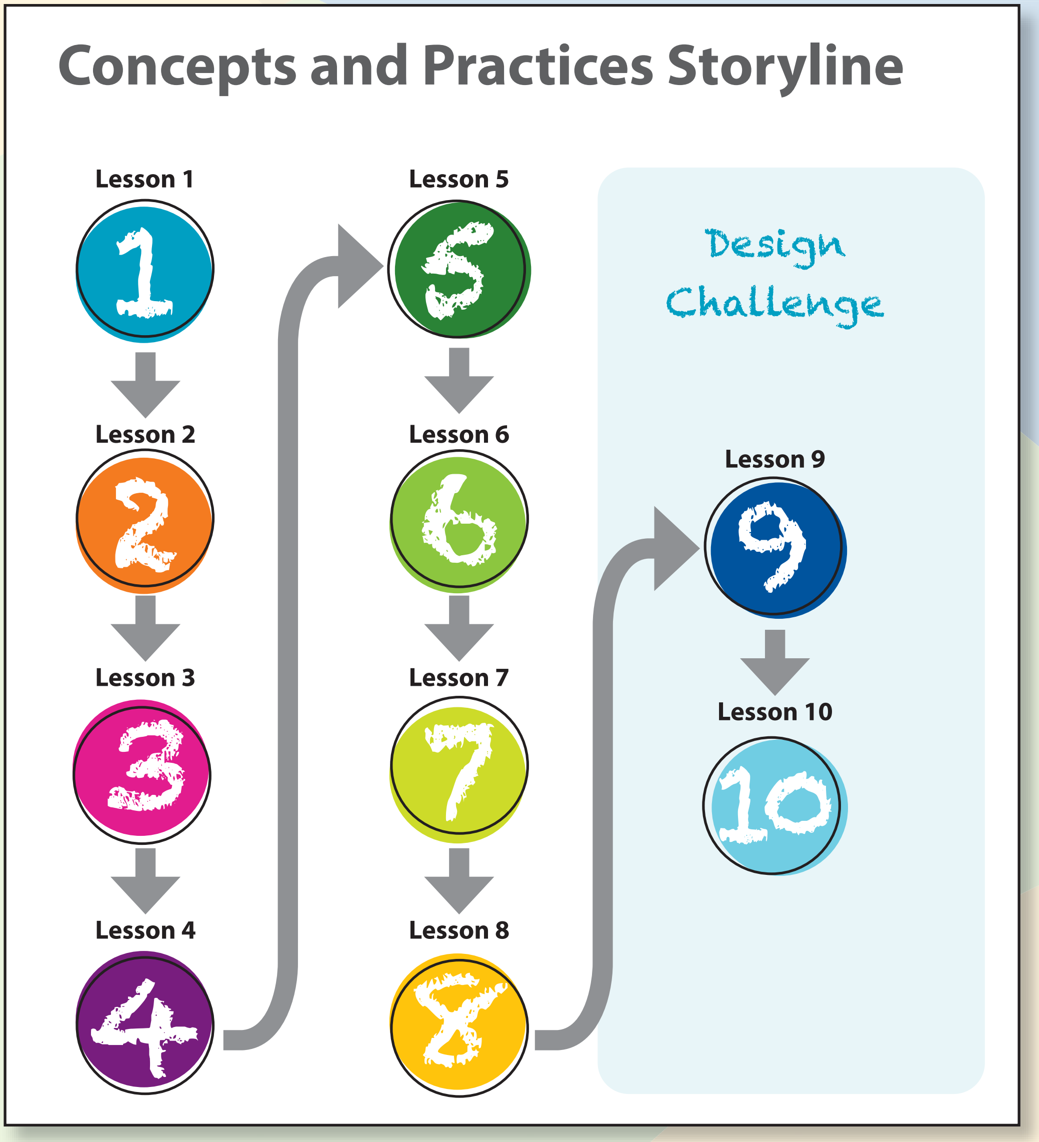
1. Identify what students need to know by the end of a module—the Performance Expectations set the goals.

1 Performance Expectations (PEs) provide statements that blend elements from all three dimensions to describe what students should be able to do by the end of a grade or grade band. PEs set the goals for the modules.



2. Identify 3D performance assessments that will provide evidence that students have achieved the goals set by the PEs.

3. Plan 3D learning rooted in phenomenon- or problem-based experiences that will prepare students to be successful in the performance assessment.



2 Science Challenges and Design Challenges are 3D performance assessments that provide evidence that students have achieved the goals set by the PEs.

3 Lessons are designed to flow logically toward a culminating science or design challenge.

Coherent Storylines and the 5E Instructional Model

The highly structured storyline within each module is designed with multiple story arcs that focus on explaining phenomena and solving problems. Each storyline integrates the 5E Instructional Model (Engage, Explore, Explain, Elaborate, Evaluate), providing a familiar instructional model that is a natural fit with NGSS-aligned instruction.

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Coherent Storylines

The Concepts and Practices Storyline below illustrates the coherent learning progression that prepares students for the module's final performance task and written summative assessment and clearly defines objectives and 3D learning in each lesson—**Disciplinary Core Ideas**, **Science and Engineering Practices**, and **Crosscutting Concepts**.

Module titles ask students to explain a phenomenon or solve a problem

Summary

In this module, students will investigate how animals, including humans, use their internal and external structures to sense the world around them, process information, communicate information to others, and react accordingly. In the first focus question, students explore the senses, including how light travels when we see an object. They compare animal eyes and analyze how their structures support different survival needs. In the second focus question, students explore how the brain processes information through experiencing optical illusions and analyzing data from research into how birds can learn to avoid distasteful insects. In the third focus question, students will put what they have learned together to investigate how animals can communicate with each other using a variety of signals. They will compare how often live fiddler crabs communicate using claw-waving in social and nonsocial contexts. In the fourth focus question, students consider problems in communication. They discover that nightingales sing louder in noisy urban environments, and explore how humans can communicate over great distances in very little time using digital signals. In a written assessment, students model the interactions when a cat sees a mouse. For the Science Challenge, students analyze data based on testing with models to construct an argument about which firefly flash patterns would be most effective for finding a mate.

Concepts and Practices Storyline

Students work toward answering a big question or solving a problem in the summative performance task assessment by answering a Focus Question at the end of each group of lessons.

Focus Question 1: How can animals sense the world around them?

1 Lesson 1: Now You See It

We see objects because light reflected from their surface reaches our eyes.

Students carry out an investigation by manipulating components in a system to determine what allows us to see objects.

2 Lesson 2: The Eyes Have It

Internal and external eye structures support different functions for survival.

Students analyze animal eye structures for patterns in structures that support similar functions.

3 Lesson 3: Survival Sense

Animals have a variety of sense receptors specialized for different kinds of information.

Students obtain, evaluate, and communicate information about animal senses and structures and collaboratively construct an argument for which sense an animal relies on most for survival.

Focus Question 2: How can animals process and respond to information?

4 Lesson 4: Can You Believe Your Eyes?

Information from the senses is processed in the brain.

Students analyze optical illusions using tools and develop a model to show how body structures work as a system to form the images we see.

5 Lesson 5: Live and Learn

Animals can use their memories to learn and guide their actions.

Students analyze data from an investigation to develop a model that explains how songbirds can use their structures to learn to avoid distasteful insects.

6 Lesson 6: Quick Study

Information from multiple senses, as well as memories, can be integrated when animals decide how to react.

Students engage in argument from evidence to support a prediction about the type and timing of sensory information that would cause birds to learn the fastest.

Focus Questions are unique to Grades 3–5. In Grades K–2, students answer a Lesson Question at the end of each lesson.

20 How Can Animals Use Their Senses to Communicate?

Each module scaffolds relevant Science and Engineering Practices and Crosscutting Concepts throughout the lessons.

Focus Question 3: How can animals send and receive information to communicate?

7 **Lesson 7: Sending and Receiving**

Communication requires a sender, signal, and receiver.

Students obtain and evaluate information from a text about the components of an animal communication system.

8 **Lesson 8: Do the Wave**

When receivers are not present, communication is not possible.

Students plan and carry out an investigation into the components of the fiddler crab communication system.

9 **Lesson 9: Conferring with the Flowers**

Plants have structures that support survival and that can sometimes be used to communicate information to animals.

Students engage in argument from evidence about what counts as a plant-animal communication system.

Focus Question 4: What are some challenges in communication?

10 **Lesson 10: I Can't Hear You!**

Animals can solve communication problems.

Students analyze and interpret data to make an argument about how urban noise causes nightingales to sing louder.

11 **Lesson 11: What's the Code?**

Computers send messages as digital signals of 1s and 0s.

Students design and test a solution to represent a picture with patterns of 1s and 0s and short and long flashes of light.

12 **Lesson 12: Messaging Faster**

Solutions to human communication problems vary based on criteria and constraints, but digital signals solve many problems and allow messages to be sent quickly and accurately.

Students obtain information from text to define human communication problems and their solutions including the relative speed of those solutions. They argue from evidence to compare different designed solutions based on the criteria and constraints of the solution.

Science Challenge

Focus Question 5: How can fireflies communicate to attract a mate?

13 **Lesson 13: Firefly Flashes Part 1**

Fireflies identify mates using species-specific flash patterns.

Students obtain information about how fireflies use flash patterns to communicate and plan for a model by identifying key components and interactions.

14 **Lesson 14: Firefly Flashes Part 2**

Flash patterns can be modeled to test how likely they are to be confused for similar patterns.

Students use an electric firefly model to test how differences in flash patterns affect their ease of identification.

15 **Lesson 15: Firefly Flashes Part 3**

Scientific arguments are based on evidence.

Students use data from testing with a model to develop an argument about whether fireflies with more distinct flash patterns are better at communicating.

Module Overview 21

Focus Questions and their supporting lessons build student knowledge over the course of a module to prepare them for the final science or design challenge.

In a culminating science or design challenge, students apply acquired skills and knowledge related to the module's focal **Science and Engineering Practices** and **Crosscutting Concepts** to a 3D performance task.

Pique students' curiosity with Focus Questions that motivate student learning.

Proven Results

Built on a Foundation of Research

Hands down, research concludes that inquiry-based instruction is best for your students. Smithsonian Science for the Classroom is built on a foundation of research that is proven to raise test scores in science, reading, and math.

Smithsonian Science for the Classroom's proven, research-based instructional methods allow you to:

- Teach dynamic lessons that integrate science and engineering content at every grade level.
- Integrate science content and literacy while drawing upon the Smithsonian's research, scientists, and world-class collections, featured in the Smithsonian Science Stories Literacy Series.
- Offer literacy that meets the needs of ***all*** students: available on grade level, below grade level, and in Spanish.

Our approach is grounded in published research and informed by practitioner feedback." – Smithsonian Science Education Center

The development process for Smithsonian Science for the Classroom modules follows a process grounded in a research-based approach that incorporates rigorous field testing and revision based on feedback from diverse teachers and students from around the United States.

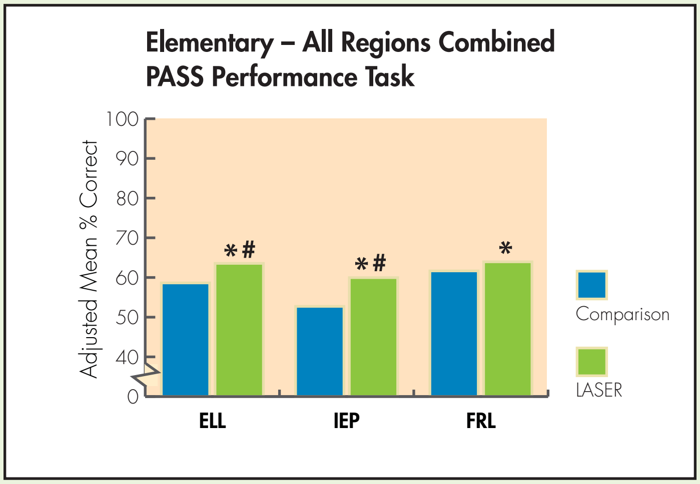
The LASER Model: A Systemic and Sustainable Approach for Achieving High Standards in Science Education

In a 5-year randomized control trial with 60,000 students, reading, math, and science test scores increased for ALL students.

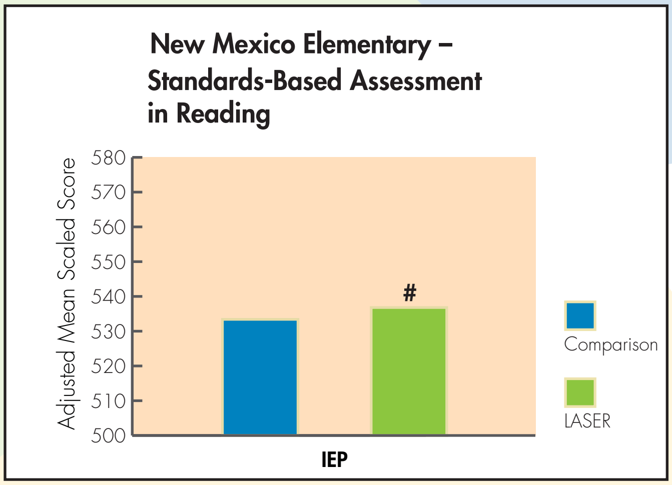
The U.S. Department of Education funded a research study, The LASER Model: A Systemic and Sustainable Approach for Achieving High Standards in Science Education. This study, which used the Smithsonian's inquiry-based STC Program, unequivocally demonstrated that inquiry-based science improves student achievement not only in science, but also in reading and math.

The study showed statistically significant and educationally meaningful test results, including improved achievement in all three areas: English language arts (ELA), math, and science. Gaps in assessment scores between English language learners (ELL), students with individualized education programs (IEPs) and free and reduced lunch (FRL) students relative to the comparison group were reduced as well.

The strongest gains in the PASS assessments by LASER students in all regions relative to the comparison group were seen in the hands-on performance tasks.



In New Mexico LASER schools, elementary IEP students demonstrated educationally meaningful gains in their scores in the standards-based assessment (SBA) in reading relative to comparison schools.



* indicates statistically meaningful results; # indicates educationally meaningful results

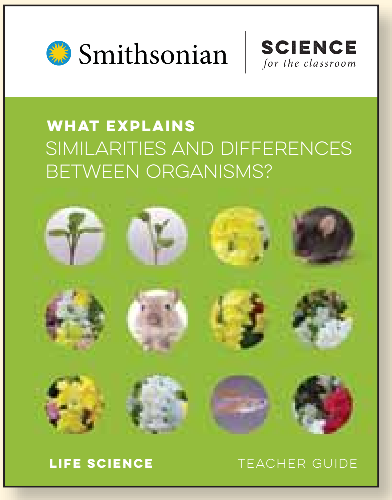
To view or download the executive study from the LASER i3 study visit: ssec.si.edu/our-results

Proven Results

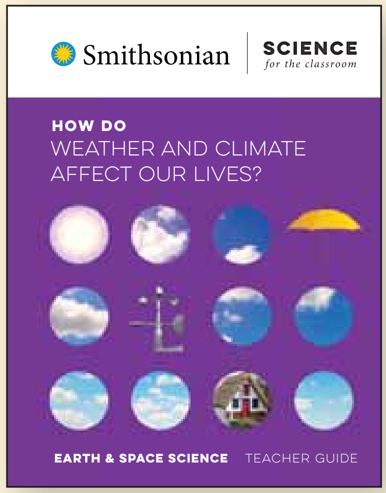
Integrated Science and Engineering

Smithsonian Science allows you to teach dynamic lessons that integrate science (phenomena) and engineering design problems into every classroom from kindergarten to grade 5.

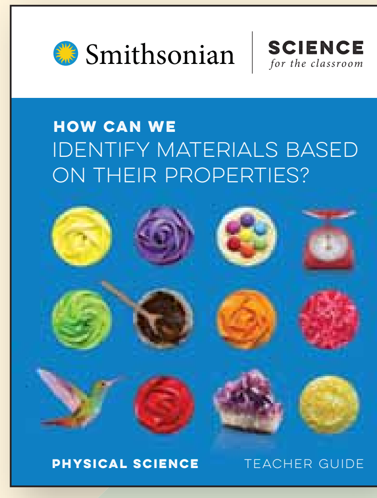
Students question, explore, and explain science phenomena. Module titles introduce the phenomena:



Grade 3 Life Science
Supported by Earth and Space Science

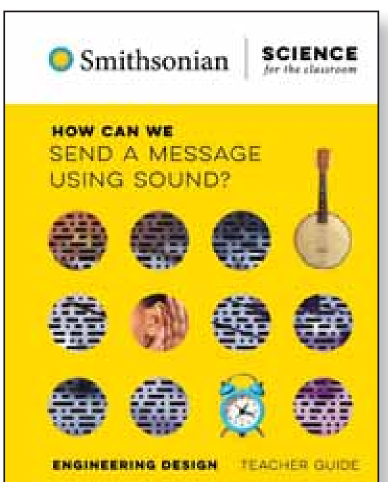


Grade 3 Earth and Space Science
Supported by Engineering Design



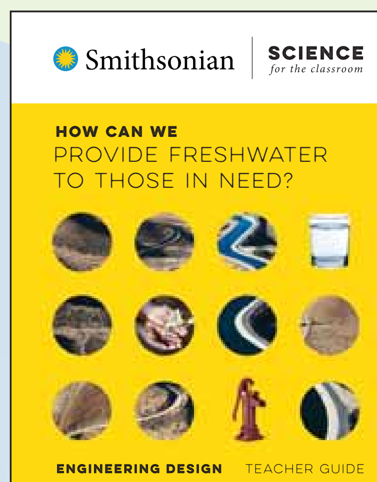
Grade 5 Physical Science
Supported by Life Science

Students define problems and design solutions. Module titles introduce the problem to be solved:



Grade 1 Engineering Design
Supported by Physical Science

Grade 3 Engineering Design
Supported by Life Science



Grade 5 Engineering Design
Supported by Earth and Space Science

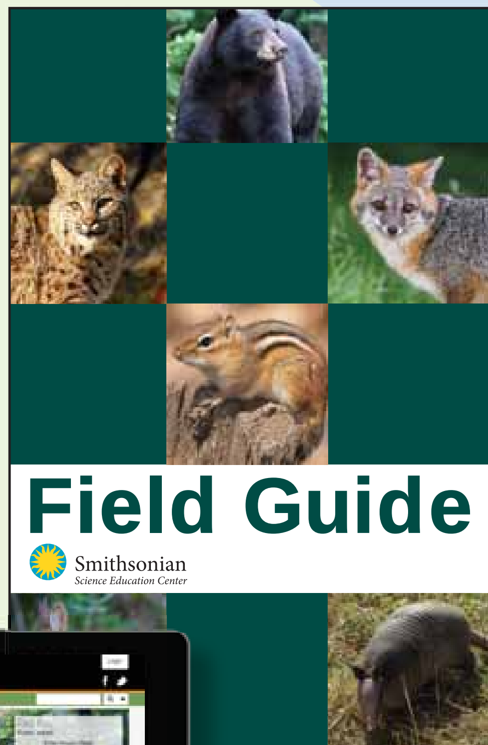
Integrated Science Content, Literacy, and Smithsonian Research

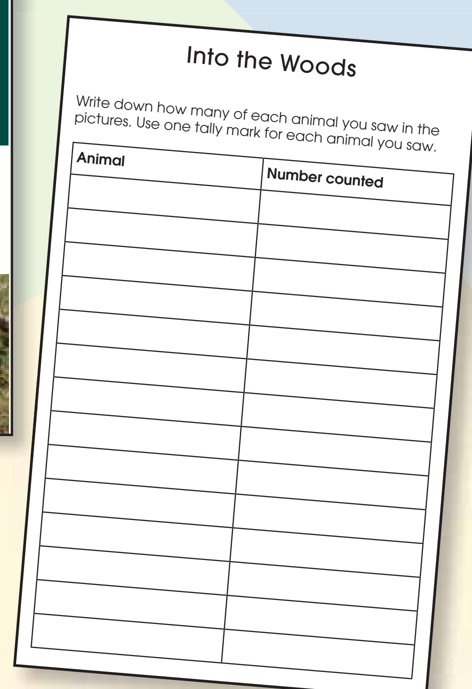
The integration of science content with literacy develops a deeper understanding by creating connections between science and the real world. This integration helps teachers ***efficiently*** prepare students to meet both science and ELA standards.

Connecting Smithsonian Research to Science Content

Smithsonian Science for the Classroom brings the Smithsonian's world-class collections, experts, and science research into classrooms at every grade level.

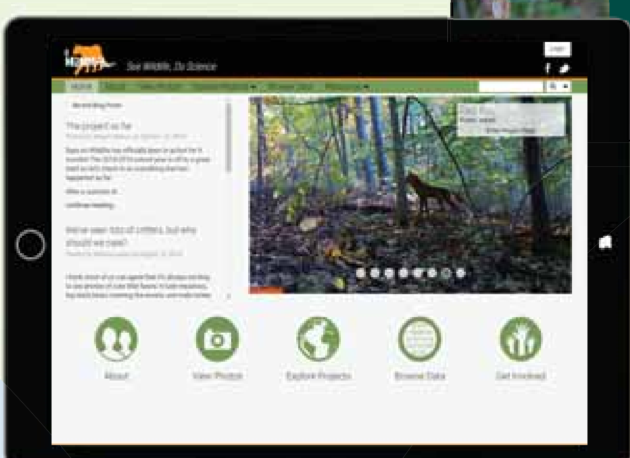
In *How Can We Protect Animals When Their Habitat Changes?* Lesson 5, students acting as citizen scientists, use a Field Guide to identify animals in camera trap images from eMammal, a Smithsonian citizen science project. In Lesson 6, students use eMammal data to construct an explanation for why different animals are seen in different habitats.




Into the Woods

Write down how many of each animal you saw in the pictures. Use one tally mark for each animal you saw.

Animal	Number counted



emammal.si.edu

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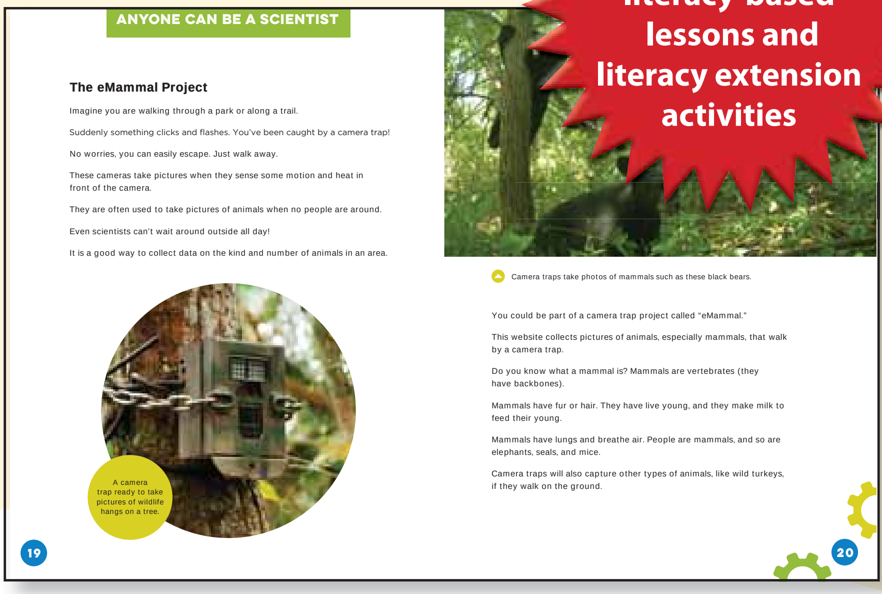
Proven Results

Connecting Smithsonian Science Stories to Science Content

Smithsonian Science Stories Literacy Series

Students use these high-interest readers to obtain and evaluate information, identify key details and main ideas, and gather evidence from text to support claims and the ideas of the lesson objectives.

Each module features literacy-based lessons and literacy extension activities


ANYONE CAN BE A SCIENTIST

The eMammal Project

Imagine you are walking through a park or along a trail.

Suddenly something clicks and flashes. You've been caught by a camera trap!

No worries, you can easily escape. Just walk away.

These cameras take pictures when they sense some motion and heat in front of the camera.

They are often used to take pictures of animals when no people are around.

Even scientists can't wait around outside all day!

It is a good way to collect data on the kind and number of animals in an area.

A camera trap ready to take pictures of wildlife hangs on a tree.

Camera traps take photos of mammals such as these black bears.

You could be part of a camera trap project called "eMammal."

This website collects pictures of animals, especially mammals, that walk by a camera trap.

Do you know what a mammal is? Mammals are vertebrates (they have backbones).

Mammals have fur or hair. They have live young, and they make milk to feed their young.

Mammals have lungs and breathe air. People are mammals, and so are elephants, seals, and mice.

Camera traps will also capture other types of animals, like wild turkeys, if they walk on the ground.

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To prepare for analyzing their own collected data in *How Can We Protect Animals When Their Habitat Changes?* Lesson 5, students read "Anyone Can Be a Scientist" from *Changing Habitats*. The informational text introduces the eMammal project and what it means to be a citizen scientist. Students also learn how scientists use camera traps to collect data.

Connecting science content to STEM notebooking—learning to think, act, reflect, and communicate like scientists and engineers

Research shows that writing about science helps students' ideas become more structured and coherent. The use of science notebooks supports ELA writing standards while students engage with the writing process and write for a variety of purposes.

In *How Can We Protect Animals When Their Habitat Changes?* students use their STEM notebooks to record and organize their design and testing plans, their collected data, their ideas and explanations of phenomena, their evaluation of design solutions, and more.

Solution Evidence Table

Write your claim and three pieces of evidence that support it in the table.

Question: What solved the problem of wildlife being killed on the Trans-Canada highway?
Claim: Wildlife corridors solved the problem of animals being killed on the Trans-Canada highway.
Evidence: 1. Fewer animals died on the road. 2. Camera traps showed many animals used the corridors. 3. Camera traps showed all sizes of animals used the corridors.

Materials for Our Habitats

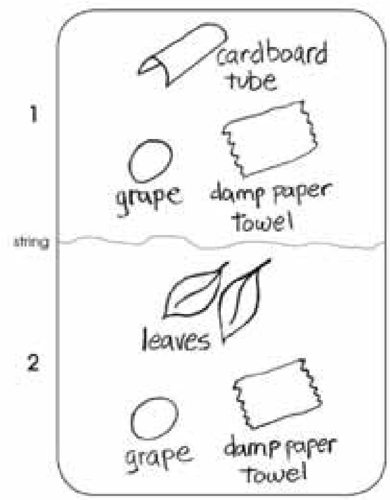
Write the materials you are using for each habitat in the table.

Need	Habitat 1 Material	Habitat 2 Material
Food	Grape	Grape
Water	Damp paper towel	Damp paper towel
Shelter	Cardboard tube	Leaves

Our Roly Poly Habitats

We are testing shelter

Draw your two habitats in the tank.



A Note about science vocabulary acquisition and speaking and listening

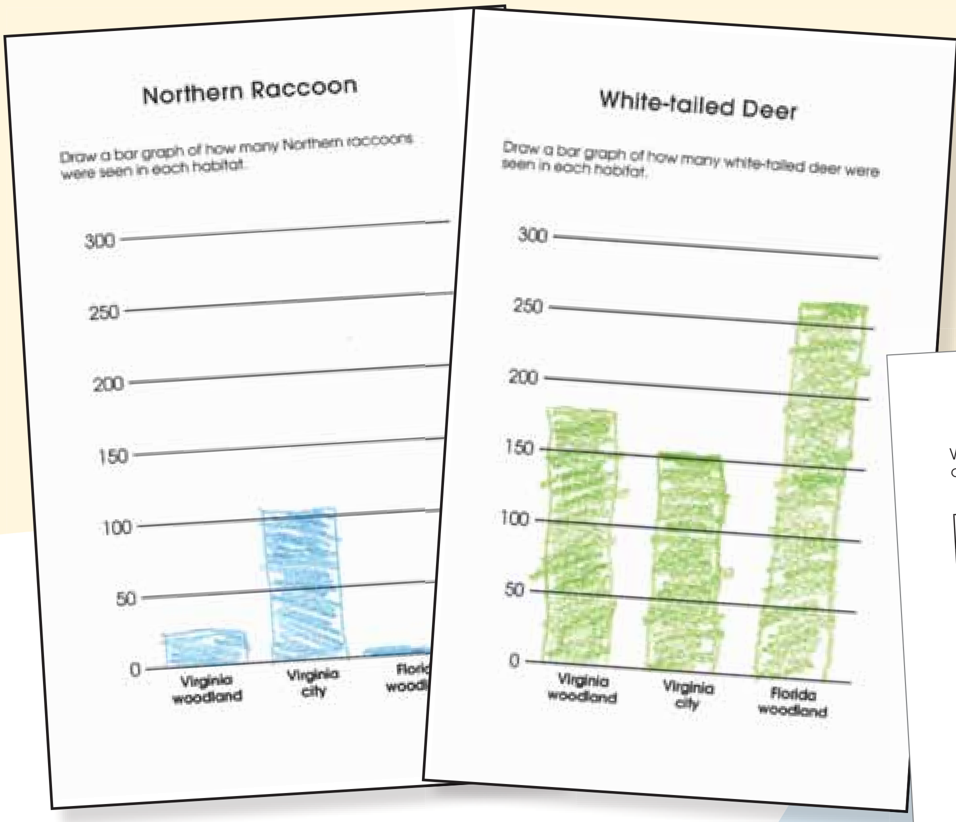
Teacher Guides identify key terms for each lesson, but students acquire vocabulary within the context of hands-on investigations and literacy. Vocabulary is reinforced by multiple, repeated exposures to these terms through first-hand experiences, reading, and writing. Additionally, students are presented with multiple opportunities to develop ELA Speaking and Listening skills through exercises in argumentation and asking and answering questions through collaboration or texts being read aloud.

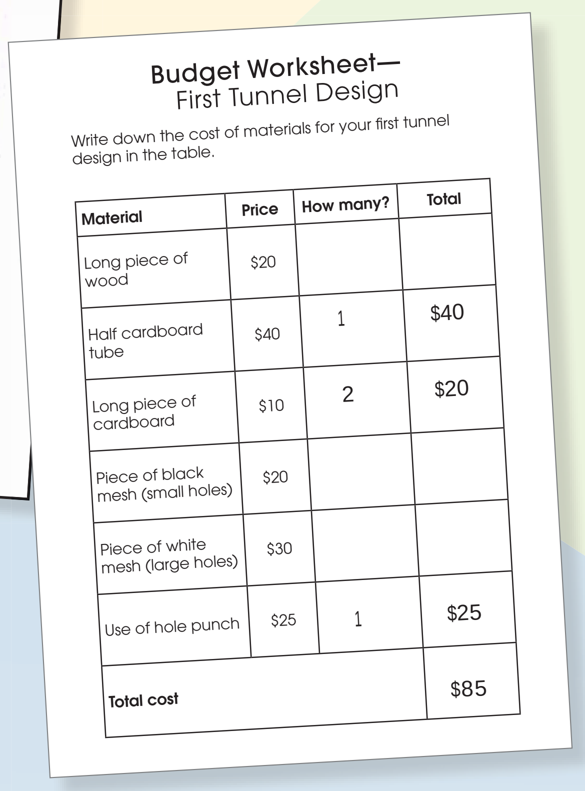
Proven Results

Connecting Science Content to Math

As students engage with the Science and Engineering Practices, there often is overlap with math. Students use math to represent and interpret data and to quantitatively describe and measure objects, events, and processes.

In How Can We Protect Animals When Their Habitat Changes? multiple investigations ask students to use geometry to plan and build design solutions, create graphs and charts to represent data, and solve math problems that involve place value and multi-digit arithmetic.





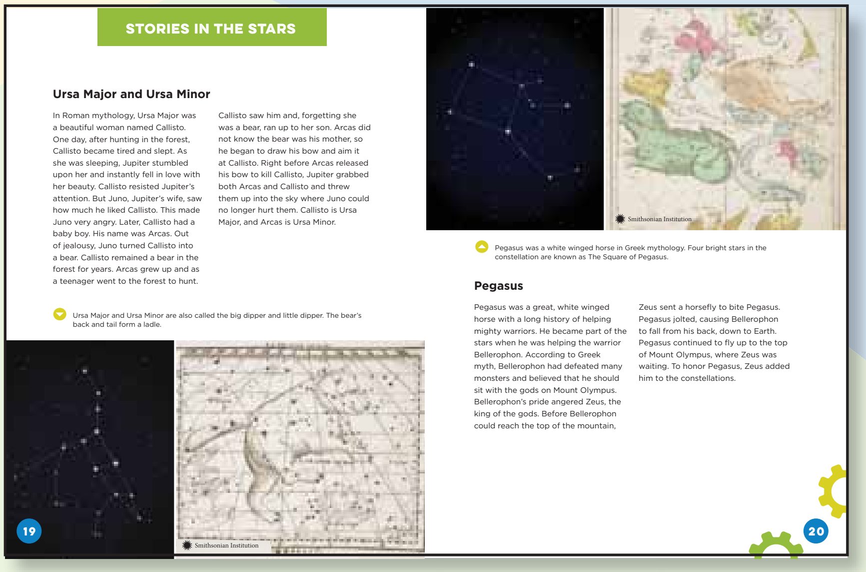
Budget Worksheet—
First Tunnel Design

Write down the cost of materials for your first tunnel design in the table.

Material	Price	How many?	Total
Long piece of wood	$20		
Half cardboard tube	$40	1	$40
Long piece of cardboard	$10	2	$20
Piece of black mesh (small holes)	$20		
Piece of white mesh (large holes)	$30		
Use of hole punch	$25	1	$25
Total cost			$85

Connecting Science Content across the Elementary Curriculum

Science naturally connects to all other subjects. No other subject presents opportunities to tie in social studies, history, art, music, and math and connect to a student's community and home. Smithsonian Science for the Classroom makes all these connections through investigations, extensions, and literacy at every grade level.



STORIES IN THE STARS

Ursa Major and Ursa Minor

In Roman mythology, Ursa Major was a beautiful woman named Callisto. One day, after hunting in the forest, Callisto became tired and slept. As she was sleeping, Jupiter stumbled upon her and instantly fell in love with her beauty. Callisto resisted Jupiter's attention. But Juno, Jupiter's wife, saw how much he liked Callisto. This made Juno very angry. Later, Callisto had a baby boy. His name was Arcas. Out of jealousy, Juno turned Callisto into a bear. Callisto remained a bear in the forest for years. Arcas grew up and as a teenager went to the forest to hunt. Callisto saw him and, forgetting she was a bear, ran up to her son. Arcas did not know the bear was his mother, so he began to draw his bow and aim it at Callisto. Right before Arcas released his bow to kill Callisto, Jupiter grabbed both Arcas and Callisto and threw them up into the sky where Juno could no longer hurt them. Callisto is Ursa Major, and Arcas is Ursa Minor.

Ursa Major and Ursa Minor are also called the big dipper and little dipper. The bear's back and tail form a ladle.

Smithsonian Institution

Pegasus was a white winged horse in Greek mythology. Four bright stars in the constellation are known as The Square of Pegasus.

Pegasus

Pegasus was a great, white winged horse with a long history of helping mighty warriors. He became part of the stars when he was helping the warrior Bellerophon. According to Greek myth, Bellerophon had defeated many monsters and believed that he should sit with the gods on Mount Olympus. Bellerophon's pride angered Zeus, the king of the gods. Before Bellerophon could reach the top of the mountain, Zeus sent a horsefly to bite Pegasus. Pegasus jolted, causing Bellerophon to fall from his back, down to Earth. Pegasus continued to fly up to the top of Mount Olympus, where Zeus was waiting. To honor Pegasus, Zeus added him to the constellations.

Smithsonian Institution

19 20

Grade 5 Earth and Space Science *Sailing Under the Stars* literacy reader makes connections to social studies

Extensions

Math: Seeing Symmetry

Materials

For each group of four students

- 1 Optical Illusions card set
- 1 Metric ruler*

For each student

- STEM notebook*

*needed but not supplied

Draw and identify lines and angles, and classify shapes by properties of their lines and angles.

Grade 4 Life Science module *How Can Animals Use Their Senses to Communicate?* connects to math

Grade 2 Physical Science module *How Can We Change Solids and Liquids?* Lesson Question: Can we make two sculptures with different properties from the same pieces? makes connections to art

Proven Results

Instructional and Literacy Resources that Meet the Needs of ALL Students

As the diversity of students' academic, cultural, social, and linguistic backgrounds continues to increase in classrooms across the United States, how do you help each of those students reach their potential? Meeting the needs of ALL students was carefully considered in the design of Smithsonian Science, and each module incorporates several elements to meet this goal.

Smithsonian Science Stories

- Intentionally feature women and minority scientists and engineers
- Provide information about possible career paths
- Incorporate topics relevant to a variety of racial and ethnic minority groups

Hands-on Investigations

- Naturally support the diverse learning styles and abilities among students
- Offer students a variety of ways to demonstrate understanding—writing, drawing, discourse, and performance tasks
- Offer teachers a variety of ways to monitor students' progress and understanding

Instructional Resources for Teachers and Students

- Offer relevant, research-based ELL strategies, student misconception support, and remediation and enrichment strategies, all embedded at point-of-use
- Provide lesson notebook sheets digitally in PDF format, allowing teachers the ability to edit these documents to meet the different needs of their students
- Offer a range of formats for Student Activity Guides and literacy readers to meet students where they are, including:
  - Print and digital
  - English and Spanish
  - On-grade and below-grade literacy readers
  - Digital literacy readers that feature text-to-speech capability and allow for close reading strategies

On-level reader

Readers available digitally and in Spanish

Below-level reader

Everything You Need to Teach

Smithsonian Science for the Classroom provides everything you need to implement the new standards.

- Engage your students in 3D lessons and 3D assessments.
- Gauge student understanding using a complete, three-dimensional system for assessment.
- Benefit from point-of-use support for misconceptions, enrichment, remediation, ELL strategies and more as you transition to NGSS and 3D instruction and 3D assessment.

There's no question—3D tasks and 3D assessments mean hands-on materials are a must.

Every module kit includes:

- **Teacher Guide** (print and digital) that offers support for educators transitioning to NGSS
- **Access to Carolina Science Online®**
  - Digital Teacher Guide access
  - Student sheets and lesson masters, in English and Spanish
  - Smithsonian Science Stories eBooks and interactive readers
  - Digital Student Activity Guide access (Grades 3–5)
- **16 Smithsonian Science Stories Student Readers**
- **10 Student Activity Guides (Grades 3–5)**
- **Hands-On Materials Kit of Choice:**
  - **1-Use Kit** (with enough materials to teach a class of 32 students once)
  - **3-Use Kit** (with enough materials to teach a class of 32 students three times)

Engage Your Students in 3D Performance Tasks and 3D Assessments

Learning discrete facts and concepts no longer provides students with the tools they need to succeed in science. Smithsonian Science for the Classroom engages students by immersing them in three-dimensional, hands-on learning experiences through which they practice and apply Science and Engineering Practices and Crosscutting Concepts while following the 5E Instructional Model.

Modules combine 3D performance tasks and 3D assessments through:

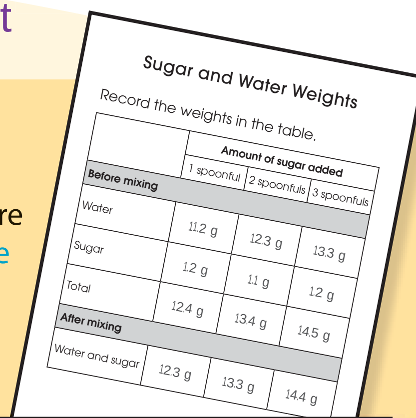
- Hands-on investigations
- Nonfiction literacy
- The right blend of digital integration

The following descriptions exemplify how Smithsonian Science modules integrate 3D performance tasks and 3D assessments into the 5E Instructional Model. In *How Can We Identify Materials Based on Their Properties?* students work though Lessons 4–6 of to answer Focus Question 2: What happens when materials are mixed with water?

Engage students and ignite learning by presenting a phenomenon or a problem to be solved.

To begin answering this Focus Question, students watch a video of hummingbirds feeding to kickstart a discussion about what happens to sugar when it is added to water.

Teacher Support



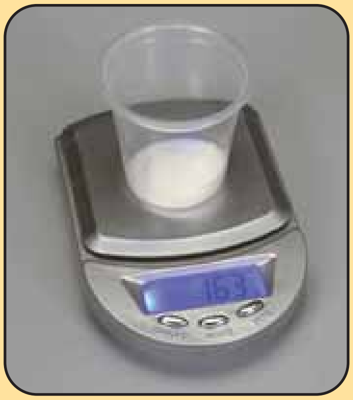
Sugar and Water Weights

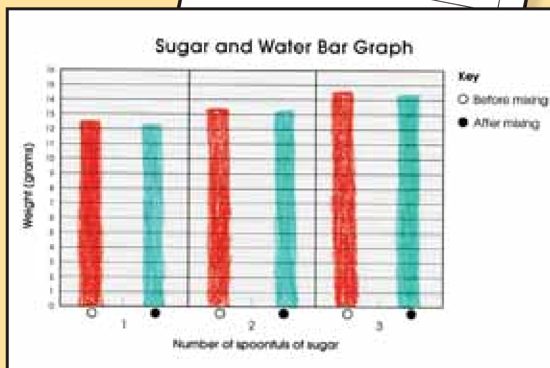
Record the weights in the table.

	Amount of sugar added		
	1 spoonful	2 spoonfuls	3 spoonfuls
Before mixing			
Water	11.2 g	12.3 g	13.3 g
Sugar	1.2 g	1.1 g	1.2 g
Total	12.4 g	13.4 g	14.5 g
After mixing			
Water and sugar	12.3 g	13.3 g	14.4 g

Explore through active, hands-on investigations.

Students then explore what happens when sugar and water are mixed, measuring and representing in a table the weight in grams of each before and after mixing. Students construct bar graphs of their results and write a claim supported by evidence to describe their results.



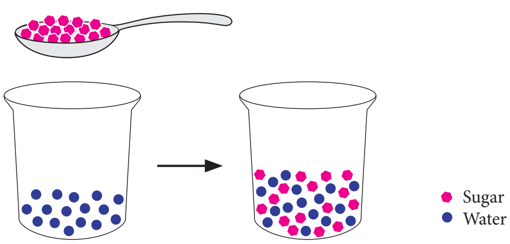


Explain phenomena or design solutions.

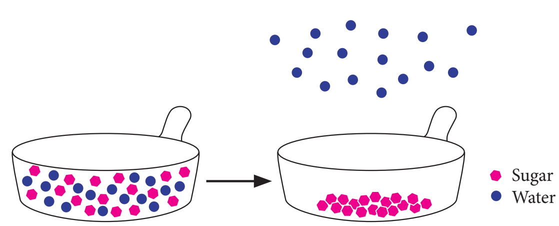
Students develop models to explain what happens when sugar is dissolved in water and what happens when the sugar solution is left to evaporate. Then, with the aid of a simulation, they draw revised models.

Students use their revised models to explain why the weight of sugar and water is the same before and after mixing.

What happened to the sugar when it was added to water?

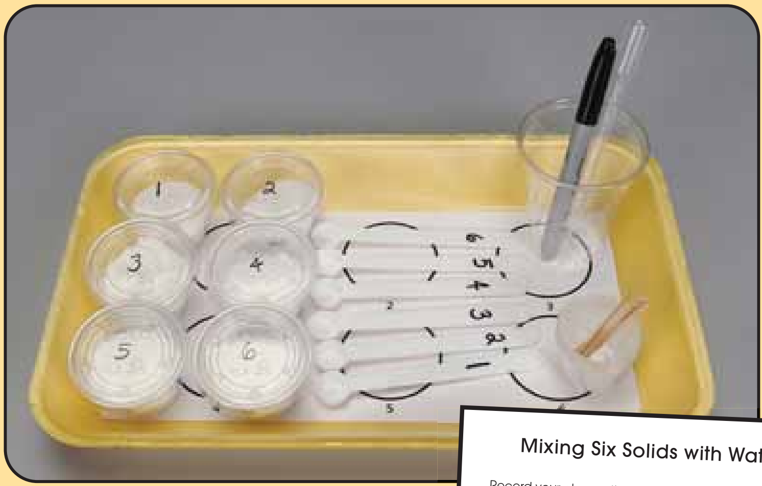


What happened to the water when the dish was left out?



***Elaborate* by using evidence gathered from text, class discussions, and data to apply concepts and practices to new situations, extending conceptual understanding and skills.**

After listening to the reading "What's the Solution?" from the Smithsonian Science Stories *What's Cooking* literacy reader, the class discusses and records other solutions they are familiar with. This prepares students to use the knowledge they have gained from the previous investigations to carry out a new investigation to answer the question, What happens to six solids when they are mixed with water?



READING 5

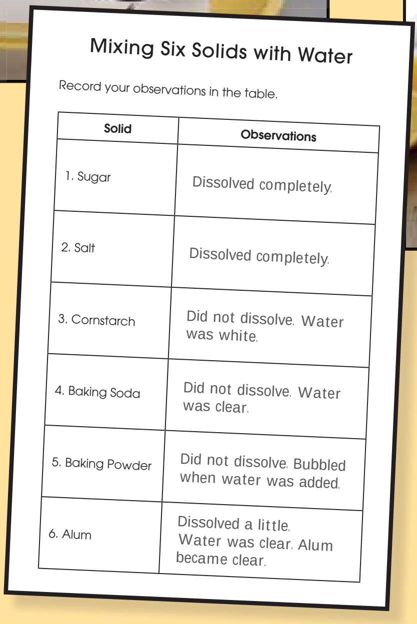
WHAT'S THE SOLUTION?

You arrive home from school thirsty, and you really want some refreshing lemonade. You fill up a pitcher with water and pour in some lemonade powder. Mixing it all together, it becomes a uniform, pale yellow liquid. When you drink it, you can tell that the water and powder are both still there. It tastes sweet and lemony, but when you look at it, you can't see the water or the powder. That's because you've just made a **solution**.

A solution is created when materials are mixed together and unable to be distinguished from one another. When you think about lemonade, does it appear the same throughout? If you look at a solution, it should all look the same. Compare the lemonade to a bowl of cereal with milk. The bowl contains a liquid and a solid, but the cereal is very easily distinguished from the milk. This part of your breakfast is not a solution because you can see the individual materials. What about chocolate milk? Is that a solution? If you said yes because the ingredients blend completely, you are correct.

Ingredients in lemonade mix together to become a solution.

25



Mixing Six Solids with Water

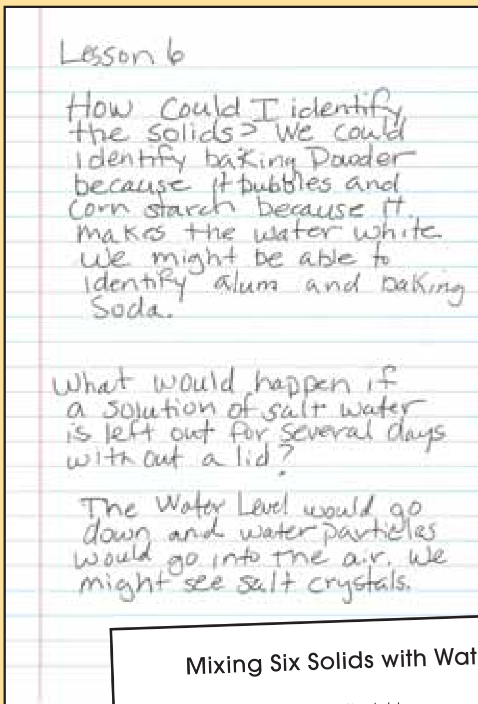
Record your observations in the table.

Solid	Observations
1. Sugar	Dissolved completely.
2. Salt	Dissolved completely.
3. Cornstarch	Did not dissolve. Water was white.
4. Baking Soda	Did not dissolve. Water was clear.
5. Baking Powder	Did not dissolve. Bubbled when water was added.
6. Alum	Dissolved a little. Water was clear. Alum became clear.

Teacher Support

Evaluate understanding of science phenomena or engineering design through 3D-assessed tasks.

To evaluate their understanding of Focus Question 2, students are challenged to use the data they gathered on the similarities and differences in how the substances mix with water to argue from evidence that the six solids can be identified by how they mix with water. They also use their evidence to explain what would happen if a mixture of water and salt was left out for a few days without a lid.


Lesson 6

How could I identify the solids? We could identify baking powder because it bubbles and corn starch because it makes the water white. We might be able to identify alum and baking soda.

What would happen if a solution of salt water is left out for several days without a lid?

The water level would go down and water particles would go into the air. We might see salt crystals.

Mixing Six Solids with Water

Record your observations in the table.

Solid	Observations
1. Sugar	Dissolved completely.
2. Salt	Dissolved completely.
3. Cornstarch	Did not dissolve. Water was white.
4. Baking Soda	Did not dissolve. Water was clear.
5. Baking Powder	Did not dissolve. Bubbled when water was added.
6. Alum	Dissolved a little. Water was clear. Alum became clear.

Assessed Task
Activity: Step 14 (STEM notebook)

Concepts and Practices	*Indicators of Success*	*Indicators of Difficulty*
Measurements of a variety of properties can be used to identify materials.	☐ Students say that they could identify solids that have different properties from all other solids (e.g., they say they could identify cornstarch and baking powder).	☐ Students say that they could identity solids that have similar properties (e.g., they say they could identify salt or sugar).
Matter of any type can be subdivided into particles that are too small to see, but even then the matter still exists and can be detected by other means. A model that shows gases that are made from matter particles that are too small to see and that are moving freely around in space can explain many observations, including the inflation and shape of a balloon and the effects of air on larger particles or objects.	☐ Students say that water particles go into the air and mix with air particles.	☐ Students say that the water evaporates.
Carrying out investigations	☐ Students carry out the investigation using a fair test (e.g., they fill each cup to the 10 mL mark and add one spoonful of each solid).	☐ Students do not carry out the investigation using a fair test (e.g., they use different amounts of water and solid).
tterns	☐ Students identify similarities and differences between how solids mix with water (e.g., they say that sugar and salt both dissolve and the other solids don't).	☐ Students do not distinguish between whether solids dissolve or do not dissolve.

A 3D Assessment System That Informs Your Instruction

Monitor student progress and performance in every lesson.

A comprehensive assessment system should provide a variety of meaningful assessment opportunities that are closely aligned to the target learning goals. Smithsonian Science for the Classroom provides the tools teachers need to assess student progress and performance in every lesson.

The Smithsonian Science for the Classroom assessment system includes:

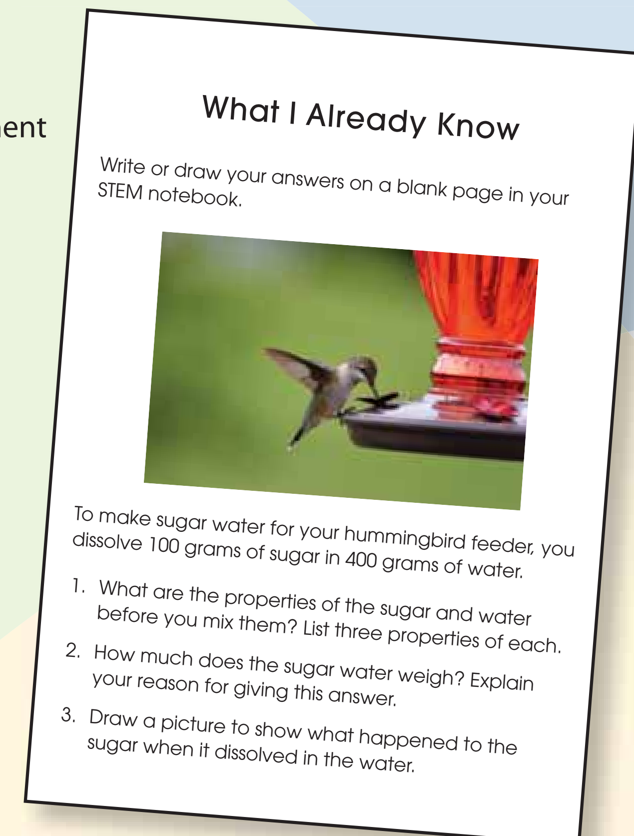
- Pre-assessment
- Formative assessment
- Self-assessment for students
- Summative assessment—written and performance assessments targeting the full range of the module's concepts and practices
  - Science Challenges for Life, Earth and Space, and Physical Sciences
  - Design Challenges for Engineering Design

Pre-Assessment

What do they already know?

The first lesson of every module includes a pre-assessment intended to:

- Serve as a **gauge of students' prior knowledge** of the targeted concepts and practices
- Bring light to the **strengths and weaknesses** and common **misconceptions** of the whole class
- **Guide lesson planning** for the module



What I Already Know

Write or draw your answers on a blank page in your STEM notebook.

To make sugar water for your hummingbird feeder, you dissolve 100 grams of sugar in 400 grams of water.

1. What are the properties of the sugar and water before you mix them? List three properties of each.
2. How much does the sugar water weigh? Explain your reason for giving this answer.
3. Draw a picture to show what happened to the sugar when it dissolved in the water.

Teacher Support

3D Formative Assessment

What did they learn today?

Every lesson includes an **assessable task** designed as a 3D formative assessment. Each of these tasks:

- Requires students to show their skills and knowledge across all three dimensions of the NGSS
- Is assessed using a table of **Indicators of Success and Difficulty** that:
  - Articulates what a successful, lesson-level performance looks like
  - Informs future lesson planning
  - Provides specific, actionable feedback for students

Assessment

Formative Assessment Indicators

Use this table to provide timely, actionable feedback for individual students on their successes and areas for improvement, as well as to plan any necessary whole-class remediation. Revisit the Common Misconceptions table in the module overview to familiarize yourself with other possible difficulties.

Assessed Task Activity: Step 9 (STEM notebook)		
Concepts and Practices	***Indicators of Success***	***Indicators of Difficulty***
Fossils provide evidence of the types of organisms that lived long ago and also about the nature of their environments.	☐ Students distinguish between fossils and modern shells by making detailed observations of their differences.	☐ Students struggle to distinguish between fossils and modern shells.
Analyzing and interpreting data	☐ Students use the box and T chart correctly to represent similarities and differences.	☐ Students do not use the box and T chart correctly to represent similarities and differences; for example, they put similarities in the differences part of the chart or vice versa, or they leave part of the chart blank.
Patterns	☐ Students select a shell that is similar to their fossil and list patterns that repeat in both, e.g., they say that the fossil is the same shape as the shell.	☐ Students select a shell that is not similar to their fossil, and cannot find patterns that repeat in both.

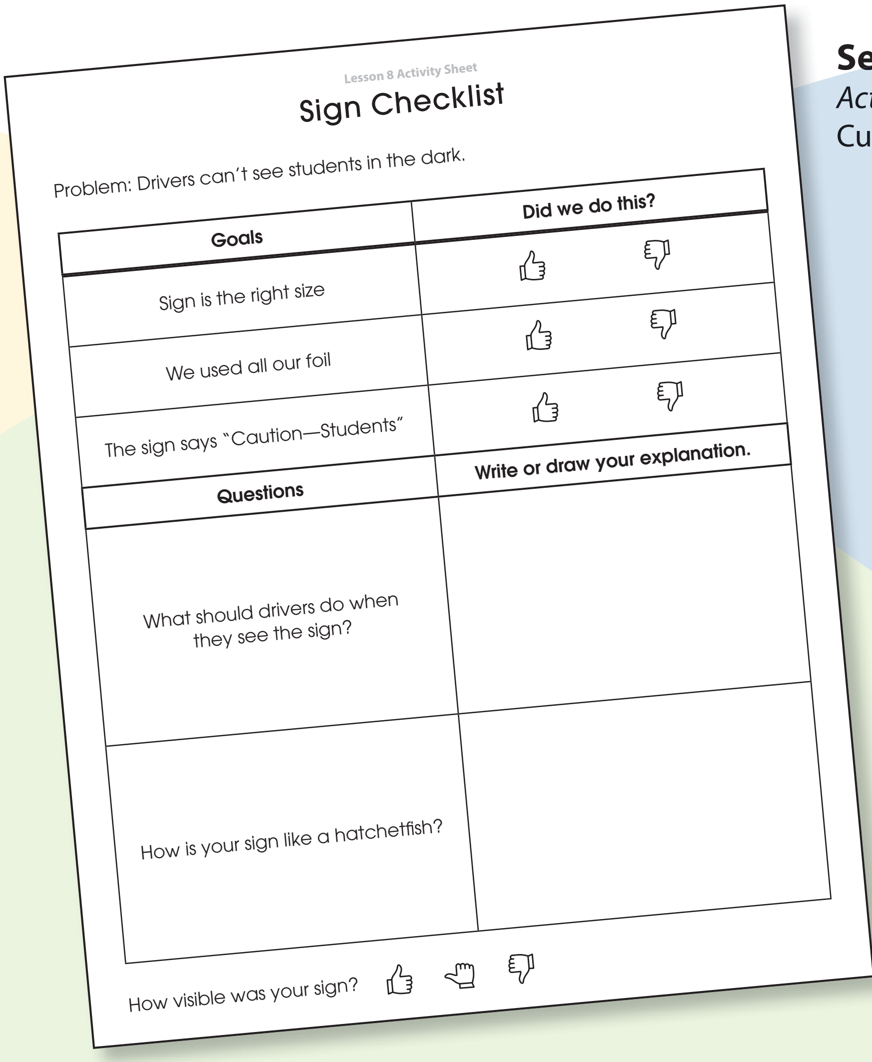
Following each formative assessment are suggestions for **Remediation** or **Enrichment** opportunities that you can conduct depending on your students' needs.

Remediation

Ask students to pick a shell that is similar to the fossil. Give students prompts to help them to compare this with the fossil, e.g., What is it made out of? Is it living or dead? What shape is it? What color is it? Ask students to use these prompts to write one similarity and two differences in the chart.

Enrichment

Ask students to sketch what the fossil of another organism might look like, e.g., coral, fish, roly poly. Students should draw a fossil similar to their shell fossil showing only the hard parts of the new animal, or perhaps an impression of its body.


Lesson 8 Activity Sheet

Sign Checklist

Problem: Drivers can't see students in the dark.

Goals	Did we do this?
Sign is the right size	
We used all our foil	
The sign says "Caution—Students"	
Questions	**Write or draw your explanation.**
What should drivers do when they see the sign?	
How is your sign like a hatchetfish?	

How visible was your sign?

Self-Assessment

Actionable feedback for students.

Cultivate self-regulated learners who:

- Are aware of their strengths and weaknesses
- Reflect on ways to improve as they move forward

Prompts for lower-elementary students are often graphical.

Did we do this?

Student Activity Guides for upper-elementary students include written prompts in **Stop and Check** boxes within the procedure.

Stop & Check

Are you focusing on evidence that answers the question?

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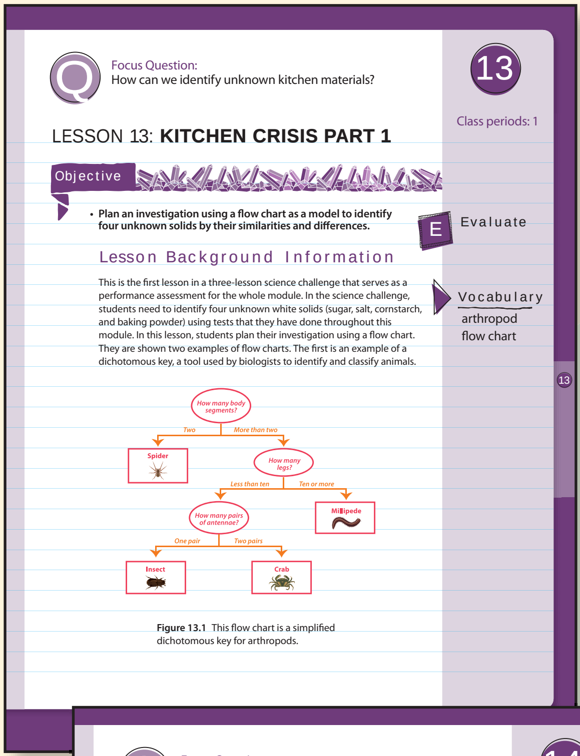
Teacher Support

3D Summative Performance Assessment

What did they learn over the course of the module?

Each module concludes with a multi-day summative assessment that requires students to work collaboratively. These performance assessments target the full range of concepts and practices through:

- **Science Challenges** for Life, Earth and Space, and Physical Sciences
  - Using knowledge gained over the course of the module, students complete lessons that build to an opportunity for them to explain a final science phenomenon.
- **Design Challenges** for Engineering Design
  - Students define a problem and design, test, and optimize a solution to that problem using skills and knowledge gained over the course of the module.


Focus Question:
How can we identify unknown kitchen materials?

13

Class periods: 1

LESSON 13: **KITCHEN CRISIS PART 1**

Objective

- **Plan an investigation using a flow chart as a model to identify four unknown solids by their similarities and differences.**

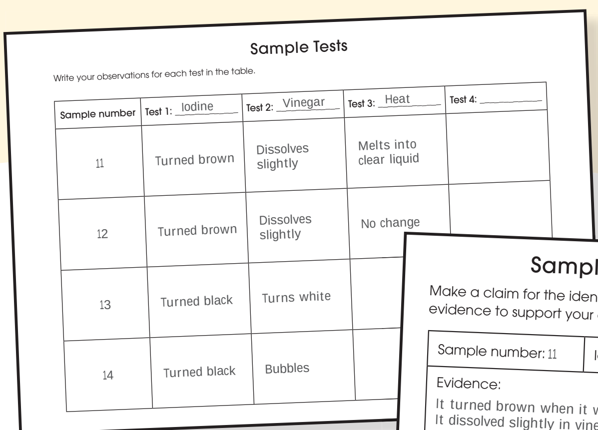
E Evaluate

Lesson Background Information

This is the first lesson in a three-lesson science challenge that serves as a performance assessment for the whole module. In the science challenge, students need to identify four unknown white solids (sugar, salt, cornstarch, and baking powder) using tests that they have done throughout this module. In this lesson, students plan their investigation using a flow chart. They are shown two examples of flow charts. The first is an example of a dichotomous key, a tool used by biologists to identify and classify animals.

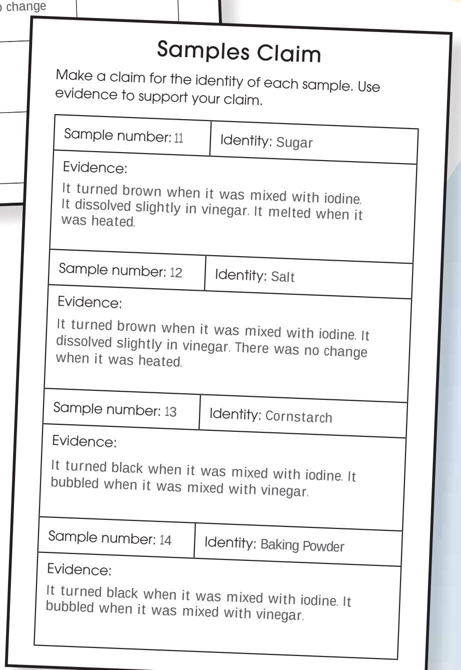
Vocabulary
arthropod
flow chart

Figure 13.1 This flow chart is a simplified dichotomous key for arthropods.


Sample Tests

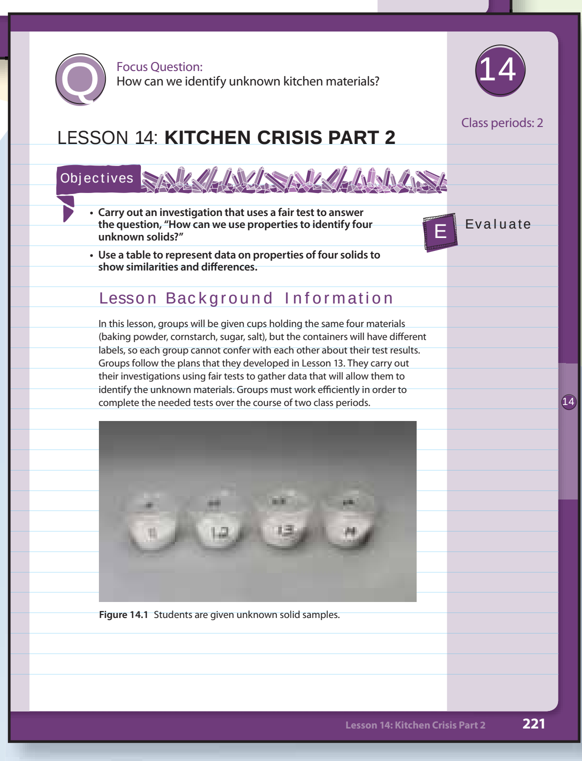
Write your observations for each test in the table.

Sample number	Test 1: Iodine	Test 2: Vinegar	Test 3: Heat	Test 4:
11	Turned brown	Dissolves slightly	Melts into clear liquid	
12	Turned brown	Dissolves slightly	No change	
13	Turned black	Turns white		
14	Turned black	Bubbles		


Samples Claim

Make a claim for the identity of each sample. Use evidence to support your claim.

Sample number: 11	Identity: Sugar
Evidence: It turned brown when it was mixed with iodine. It dissolved slightly in vinegar. It melted when it was heated.	
Sample number: 12	Identity: Salt
Evidence: It turned brown when it was mixed with iodine. It dissolved slightly in vinegar. There was no change when it was heated.	
Sample number: 13	Identity: Cornstarch
Evidence: It turned black when it was mixed with iodine. It bubbled when it was mixed with vinegar.	
Sample number: 14	Identity: Baking Powder
Evidence: It turned black when it was mixed with iodine. It bubbled when it was mixed with vinegar.	


Focus Question:
How can we identify unknown kitchen materials?

14

Class periods: 2

LESSON 14: **KITCHEN CRISIS PART 2**

Objectives

- **Carry out an investigation that uses a fair test to answer the question, "How can we use properties to identify four unknown solids?"**
- **Use a table to represent data on properties of four solids to show similarities and differences.**

E Evaluate

Lesson Background Information

In this lesson, groups will be given cups holding the same four materials (baking powder, cornstarch, sugar, salt), but the containers will have different labels, so each group cannot confer with each other about their test results. Groups follow the plans that they developed in Lesson 13. They carry out their investigations using fair tests to gather data that will allow them to identify the unknown materials. Groups must work efficiently in order to complete the needed tests over the course of two class periods.

Figure 14.1 Students are given unknown solid samples.

Lesson 14: Kitchen Crisis Part 2 221

Focus Question:
How can we identify unknown kitchen materials?

15

Class periods: 2

LESSON 15: **KITCHEN CRISIS PART 3**

Objectives

- **Communicate information about similarities and differences in properties of four unknown solids.**
- **Argue from evidence that four unknown solids can be identified based how they respond to various tests.**

E Evaluate

Lesson Background Information

In this lesson, students present their conclusions about the identities of the unknown materials. Each group should state their claims and share the evidence that supports each claim. Students also complete a written assessment that covers the content and practices addressed in this module.

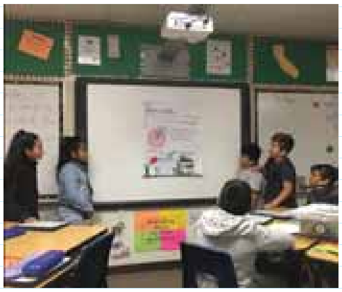


Figure 15.1 Communicating results clearly is an important skill in science.

Lesson 15: Kitchen Crisis Part 3 233

Written Assessments in all modules

- Assessment items cover any concepts and practices that are not fully assessed by the collaborative performance assessment.

What I Have Learned

Write or draw your answers in your STEM notebook.

The diner is planning an event to celebrate a school soccer team becoming league champions.

1. The chef makes homemade lemonade for the event. She starts by dissolving 150 g of sugar in 750 g water.
   a. Write two or three sentences about where the sugar comes from.
   b. Draw a model to explain what happens to the sugar when it is added to the water.
   c. Draw a graph on the notebook sheet showing the weight of water and sugar before and after mixing.
   d. What is the weight of sugar and water after mixing?
2. The chef makes a cake. She weighs out all the ingredients. Two of the ingredients are baking powder and baking soda. The cake bubbles as it bakes.
   a. Write two or three sentences about what causes the bubbles.
   b. Will the weight of the cake be the same, less, or more than the total weight of all the ingredients? Explain your answer.

How are they progressing against the Next Generation Science Standards?

Module-specific rubrics help you assess three-dimensional learning and guide your evaluation of student proficiency with the Science and Engineering Practices, Crosscutting Concepts, and Disciplinary Core Ideas addressed in the module.

Assessed Task
Activity: Step 12 (Chart Paper)

Concepts and Practices	***3***	***2***	***1***
Measurements of a variety of properties can be used to identify materials.	☐ Students' flow charts show the correct identity of all solids based on their properties.	☐ Students' flow charts show one solid that is not correctly identified based on its properties.	☐ Students' flow charts show two or more solids that are not correctly identified based on their properties.
Developing models	Students do both of the following when developing their flow charts: ☐ Use different shapes or colors to show the questions/tests and solids. ☐ Have different possible answers on each arrow from a question/test.	Students do one of the following when developing their flow charts: ☐ Use different shapes or colors to show the questions/tests and solids. ☐ Have different possible answers on each arrow from a question/test.	Students do neither of the following when developing their flow charts: ☐ Use different shapes or colors to show the questions/tests and solids. ☐ Have different possible answers on each arrow from a question/test.
Patterns	Students do both of the following when developing their flow charts: ☐ Use different arrows to show different responses to a test. ☐ Do another test when two or more solids have a similar response to a test.	Students do one of the following when developing their flow charts: ☐ Use different arrows to show different responses to a test. ☐ Do another test when two or more solids have a similar response to a test.	Students do neither of the following when developing their flow charts: ☐ Use different arrows to show different responses to a test. ☐ Do another test when two or more solids have a similar response to a test.

Teacher Support

Support for Teachers During the Transition to NGSS

The goal of Smithsonian Science for the Classroom is not only to provide a new generation of high-quality curriculum materials that ensures true three-dimensional learning, but also to put teachers at ease by providing support within those materials to facilitate their transition to the new standards.

How can you be sure your students are engaging in three-dimensional learning?

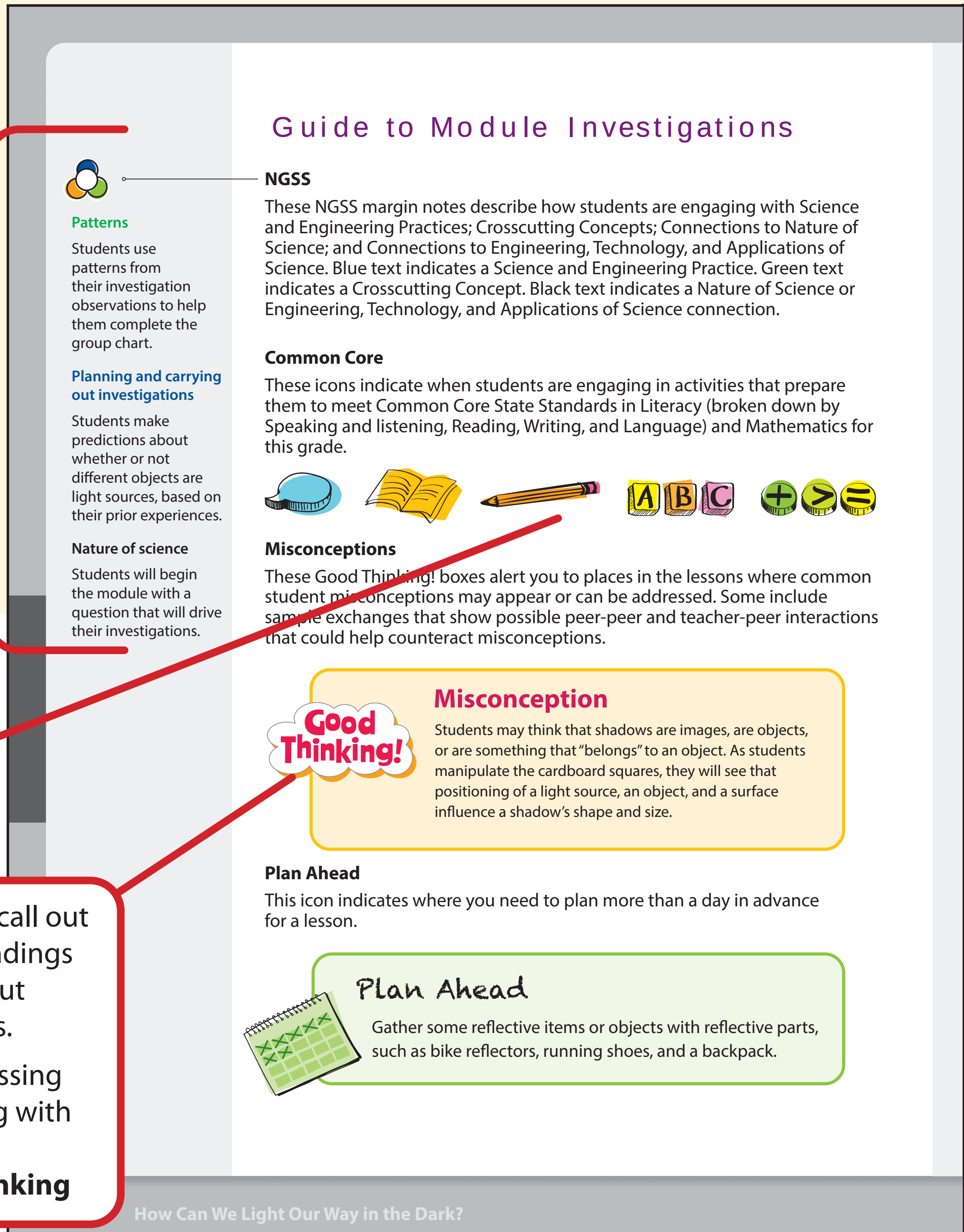
Each lesson has the **point-of-use** guidance you need!

Point-of-use NGSS correlations in the margins of each lesson describe how students are engaging with the SEPs and CCCs.

Common Core icons to indicate engagement with literacy and math

Misconception alerts call out common misunderstandings that students have about lesson-specific content, SEPs, or CCCs.

Find more teacher support for addressing student misconceptions and working with student ideas at: **ScienceEducation.si.edu/GoodThinking**



Guide to Module Investigations

Patterns

Students use patterns from their investigation observations to help them complete the group chart.

Planning and carrying out investigations

Students make predictions about whether or not different objects are light sources, based on their prior experiences.

Nature of science

Students will begin the module with a question that will drive their investigations.

NGSS

These NGSS margin notes describe how students are engaging with Science and Engineering Practices; Crosscutting Concepts; Connections to Nature of Science; and Connections to Engineering, Technology, and Applications of Science. Blue text indicates a Science and Engineering Practice. Green text indicates a Crosscutting Concept. Black text indicates a Nature of Science or Engineering, Technology, and Applications of Science connection.

Common Core

These icons indicate when students are engaging in activities that prepare them to meet Common Core State Standards in Literacy (broken down by Speaking and listening, Reading, Writing, and Language) and Mathematics for this grade.

Misconceptions

These Good Thinking! boxes alert you to places in the lessons where common student misconceptions may appear or can be addressed. Some include sample exchanges that show possible peer-peer and teacher-peer interactions that could help counteract misconceptions.

Good Thinking!

Misconception

Students may think that shadows are images, are objects, or are something that "belongs" to an object. As students manipulate the cardboard squares, they will see that positioning of a light source, an object, and a surface influence a shadow's shape and size.

Plan Ahead

This icon indicates where you need to plan more than a day in advance for a lesson.

Plan Ahead

Gather some reflective items or objects with reflective parts, such as bike reflectors, running shoes, and a backpack.

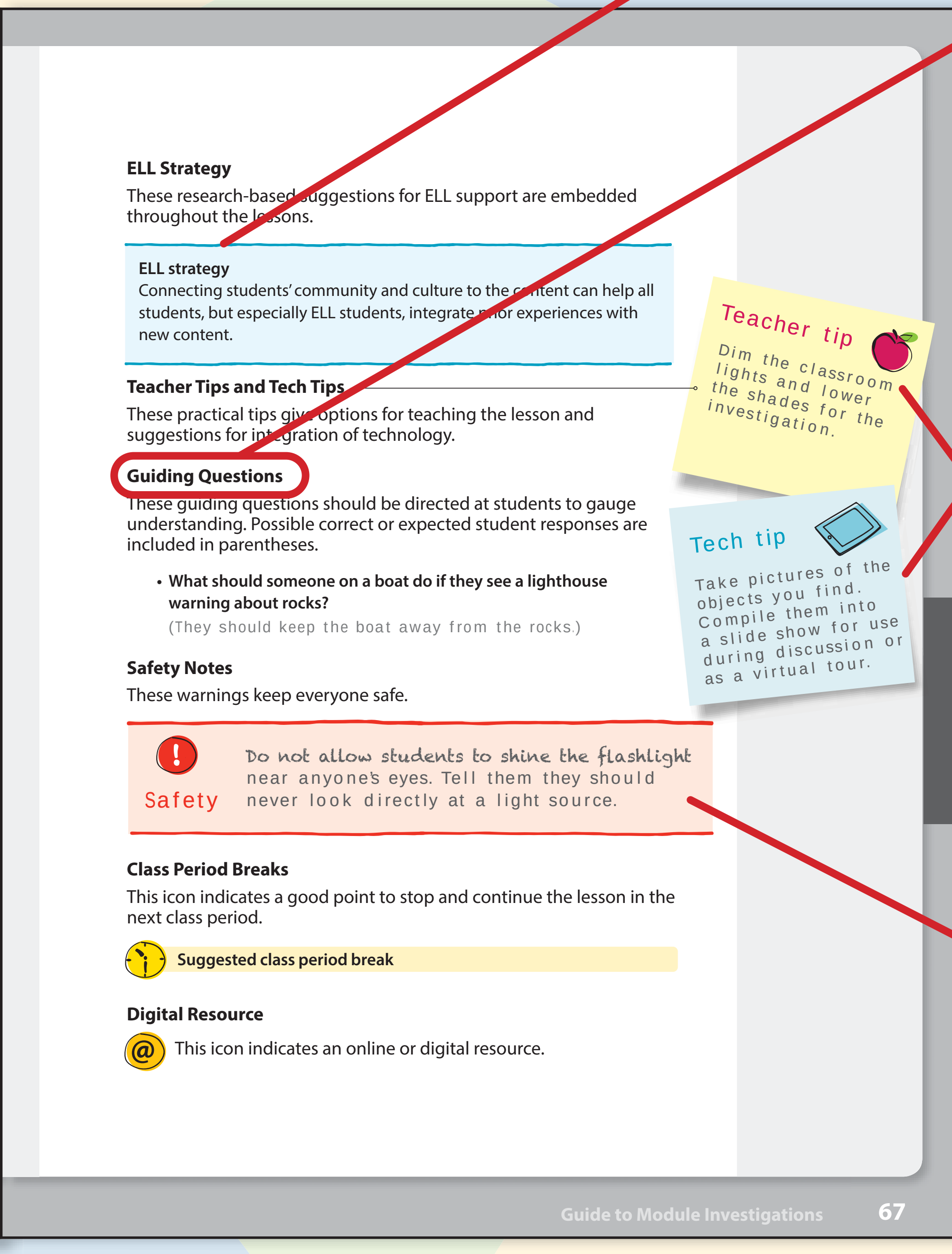
How Can We Light Our Way in the Dark?

Research-based **ELL strategies**

Guiding Questions to gauge understanding and tap into students' prior funds of knowledge

Teacher and Tech Tips

Safety Notes and more



ELL Strategy

These research-based suggestions for ELL support are embedded throughout the lessons.

ELL strategy
Connecting students' community and culture to the content can help all students, but especially ELL students, integrate prior experiences with new content.

Teacher Tips and Tech Tips

These practical tips give options for teaching the lesson and suggestions for integration of technology.

Teacher tip
Dim the classroom lights and lower the shades for the investigation.

Tech tip
Take pictures of the objects you find. Compile them into a slide show for use during discussion or as a virtual tour.

Guiding Questions

These guiding questions should be directed at students to gauge understanding. Possible correct or expected student responses are included in parentheses.

- **What should someone on a boat do if they see a lighthouse warning about rocks?**
  (They should keep the boat away from the rocks.)

Safety Notes

These warnings keep everyone safe.

Safety
Do not allow students to shine the flashlight near anyone's eyes. Tell them they should never look directly at a light source.

Class Period Breaks

This icon indicates a good point to stop and continue the lesson in the next class period.

Suggested class period break

Digital Resource

This icon indicates an online or digital resource.

Guide to Module Investigations 67

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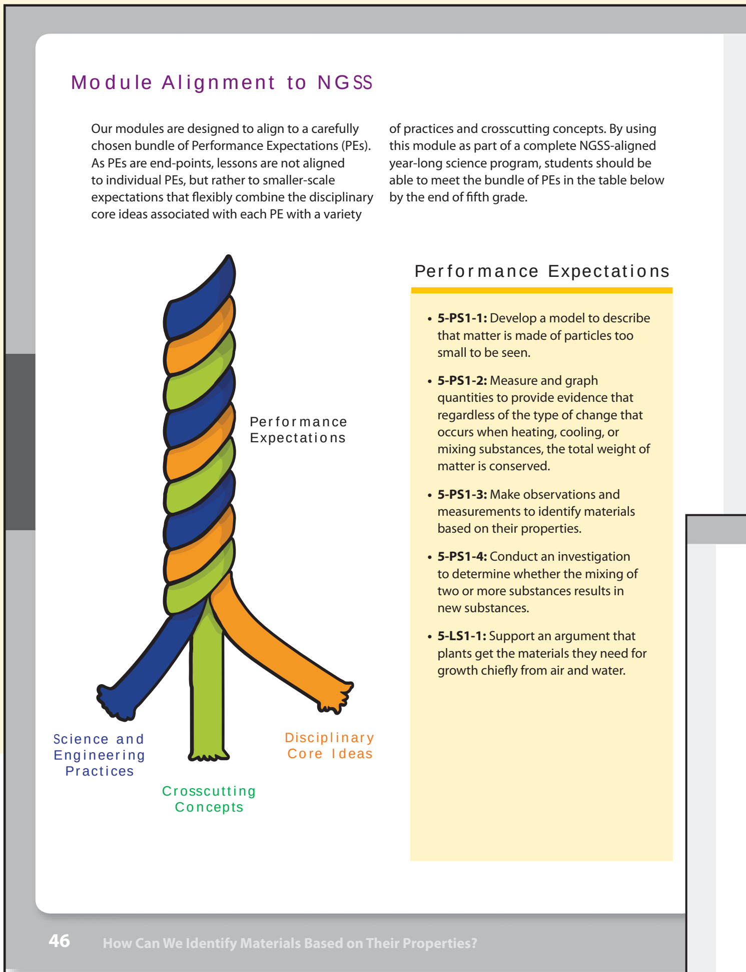
Teacher Support

Planning Made Easy with NGSS Alignment and Lesson Planner

Module alignment to the NGSS is found in the front of each Teacher Guide. It includes the Performance Expectations and their accompanying Disciplinary Core Ideas, Science and Engineering Practices, and Crosscutting Concepts.



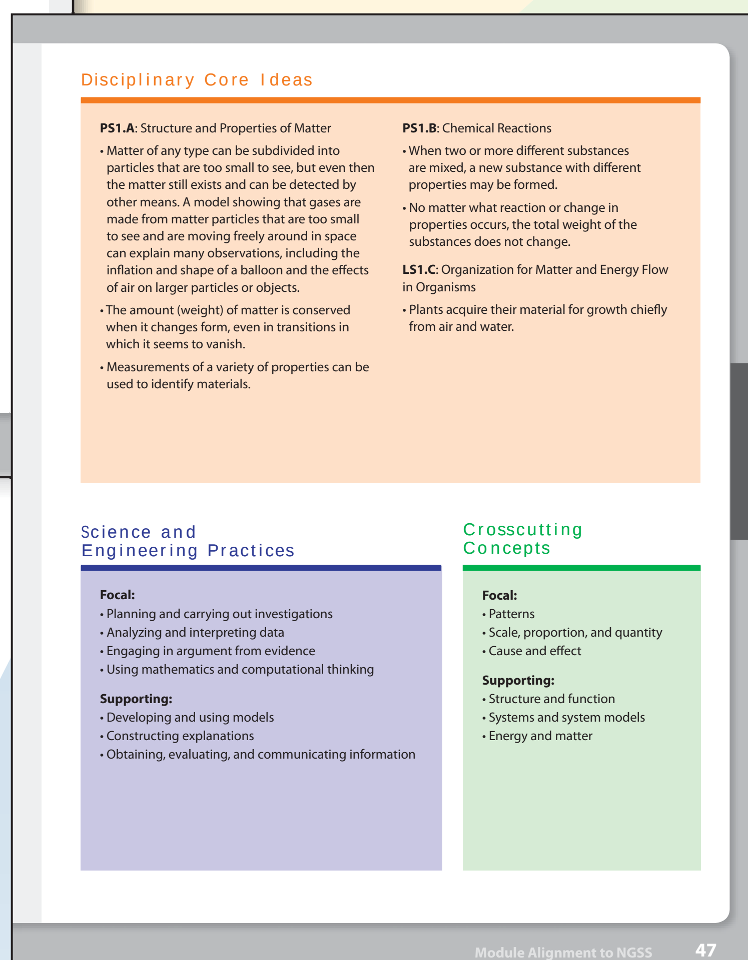
Module Alignment to NGSS

Our modules are designed to align to a carefully chosen bundle of Performance Expectations (PEs). As PEs are end-points, lessons are not aligned to individual PEs, but rather to smaller-scale expectations that flexibly combine the disciplinary core ideas associated with each PE with a variety of practices and crosscutting concepts. By using this module as part of a complete NGSS-aligned year-long science program, students should be able to meet the bundle of PEs in the table below by the end of fifth grade.

Performance Expectations

- **5-PS1-1:** Develop a model to describe that matter is made of particles too small to be seen.
- **5-PS1-2:** Measure and graph quantities to provide evidence that regardless of the type of change that occurs when heating, cooling, or mixing substances, the total weight of matter is conserved.
- **5-PS1-3:** Make observations and measurements to identify materials based on their properties.
- **5-PS1-4:** Conduct an investigation to determine whether the mixing of two or more substances results in new substances.
- **5-LS1-1:** Support an argument that plants get the materials they need for growth chiefly from air and water.

46 How Can We Identify Materials Based on Their Properties?



Disciplinary Core Ideas

PS1.A: Structure and Properties of Matter

- Matter of any type can be subdivided into particles that are too small to see, but even then the matter still exists and can be detected by other means. A model showing that gases are made from matter particles that are too small to see and are moving freely around in space can explain many observations, including the inflation and shape of a balloon and the effects of air on larger particles or objects.
- The amount (weight) of matter is conserved when it changes form, even in transitions in which it seems to vanish.
- Measurements of a variety of properties can be used to identify materials.

PS1.B: Chemical Reactions

- When two or more different substances are mixed, a new substance with different properties may be formed.
- No matter what reaction or change in properties occurs, the total weight of the substances does not change.

LS1.C: Organization for Matter and Energy Flow in Organisms

- Plants acquire their material for growth chiefly from air and water.

Science and Engineering Practices

Focal:
- Planning and carrying out investigations
- Analyzing and interpreting data
- Engaging in argument from evidence
- Using mathematics and computational thinking

Supporting:
- Developing and using models
- Constructing explanations
- Obtaining, evaluating, and communicating information

Crosscutting Concepts

Focal:
- Patterns
- Scale, proportion, and quantity
- Cause and effect

Supporting:
- Structure and function
- Systems and system models
- Energy and matter

Module Alignment to NGSS 47

Lesson Planners provide an at-a-glance overview of each lesson, including class periods, preparation time, misconceptions, and standards.

Daily NGSS support

Lesson Planner

Focus Question 1: How can we use our senses to compare materials?

LESSON 1: **SWEET AND SALTY**

	Student Objectives	Good Thinking! Misconceptions	Disciplinary Core Ideas
E **Engage Explore** **Class periods:** 1 **Preparation time:** 25 minutes **Vocabulary:** crystal material property	Use appropriate methods and tools to answer the question, "Can we tell salt and sugar apart using just our senses?" Use a box and T chart to represent observations of salt and sugar to identify similarities and differences.	A material is a fabric. If two materials have the same property or many of the same properties, they must be the same material. Color and size are not properties. The weight of a solution is different from the weight of the solid and liquid that are used to make it. When matter is changed in any way it disappears. If there is no physical evidence for matter, it doesn't exist. A model has to be a physical object.	**PS1.A:** Measurements of a variety of properties can be used to identify materials. **PS1.A:** Matter of any type can be subdivided into particles that are too small to be seen, but even then the matter still exists and can be detected by other means. A model showing that gases are made from matter particles that are too small to be seen and are moving freely around in space can explain many observations, including the inflation and shape of a balloon and the effects of air on larger particles or objects. **PS1.A:** The amount (weight) of matter is conserved when it changes form, even in transitions in which it seems to vanish.

48 How Can We Identify Materials Based on Their Properties?

Daily ELA and math support

1

Science and Engineering Practices*	Crosscutting Concepts*	ELA and Math Connections	Extensions
Planning and carrying out investigations Analyzing and interpreting data **Developing models**	Patterns Structure and function **Scale, proportion, and quantity**		**Literacy: Close Up** Students read about the shapes of different crystals and how X-ray crystallography has helped people.

* Science and Engineering Practices and Crosscutting Concepts that are assessed in the lesson are in bold.

Lesson Planner 49

Teacher Support

The Right Blend of Digital Integration

Smithsonian Science for the Classroom is designed to flexibly integrate digital resources that meaningfully enhance learning while recognizing that there is tremendous variation in access to technology from classroom to classroom.

Everything you need to teach ALL your students

Digital Teacher Guides

- Step-by-step instruction, including guiding questions and anticipated student responses, remediation, and enrichment
- Good Thinking misconception alerts and ELL strategies at point of use
- 3D assessment by lesson
- Digital resources

Teacher Resource Videos

These 3- to 4-minute videos provide teachers with information about what students will be doing and learning in each lesson, helpful tips for setting up, when to order living materials, and more.

Ada Asks videos present problems to be solved and encourage students to question phenomena.

Tech tip

Ask students to take a video of you pouring the water at an even rate for 10 seconds with their mobile device.

Tech tips suggest additional ways to incorporate technology into lessons or activities.

Everything you need to support ALL your students

Digital components can enhance and extend understanding, support all learners, and provide multiple modalities for learning.

Digital resources embedded within the lesson include:

- Photos, video, and audio clips, including tracks from the Smithsonian Folkways collections
- Informational web links
- Games and simulations

Simulations and Videos

Extend big ideas about science concepts and phenomena that go beyond the scope of hands-on materials or literacy.

Student Activity Guides and Literacy Readers

Provide easy digital access to procedures and informational text. Readers feature embedded definitions for content vocabulary development and a toolbar that includes a highlighter, note-taking capability, and more.

Lesson Notebook Sheets

Students record their observations and data digitally. A toolbar embedded in the Notebook Sheet includes a stopwatch, clock, note-taking capability, and more.

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Smithsonian | SCIENCE for the classroom

Life Science	Earth and Space Science	Physical Science	Engineering Design
Kindergarten			
How Do Living Things Get What They Need From the Environment?* *K-LS1-1 • K-ESS3-1 • K-ESS2-2 • K-ESS3-3*	**How Can We Prepare for the Weather?*** *K-ESS2-1 • K-ESS3-2 • K-PS3-1*	**How Can We Change an Object's Motion?*** *K-PS2-1 • K-PS2-2 • K-2-ETS1-3*	**How Can We Stay Cool in the Sun?*** *K-PS3-1 • K-PS3-2 • K-2-ETS1-1 • K-2-ETS1-2 • K-2-ETS1-3*
Grade 1			
How Do Living Things Stay Safe and Grow? *1-LS1-1 • 1-LS1-2 • 1-LS3-1 • K-2-ETS1-1*	**How Can We Predict When the Sky Will Be Dark?** *1-ESS1-1 • 1-ESS1-2 • 1-PS4-2*	**How Can We Light Our Way in the Dark?** *1-PS4-2 • 1-PS4-3 • 1-LS1-1 • K-2-ETS1-1*	**How Can We Send a Message Using Sound?** *K-2-ETS1-1 • K-2-ETS1-2 • K-2-ETS1-3 • 1-PS4-1 • 1-PS4-4*
Grade 2			
How Can We Find the Best Place for a Plant to Grow? *2-LS2-1 • 2-LS2-2 • 2-LS4-1 • K-2-ETS1-1*	**What Can Maps Tell Us About Land and Water on Earth?** *2-ESS2-2 • 2-ESS2-3 • 2-PS1-1*	**How Can We Change Solids and Liquids?** *2-PS1-1 • 2-PS1-2 • 2-PS1-3 • 2-PS1-4 • K-2-ETS1-1*	**How Can We Stop Soil From Washing Away?** *K-2-ETS1-1 • K-2-ETS1-2 • K-2-ETS1-3 • 2-ESS1-1 • 2-ESS2-1*
Grade 3			
What Explains Similarities and Differences Between Organisms? *3-LS1-1 • 3-LS3-1 • 3-LS3-2 • 3-LS4-2 • 3-ESS2-2*	**How Do Weather and Climate Affect Our Lives?** *3-ESS2-1 • 3-ESS2-2 • 3-ESS3-1 • 3-5-ETS1-1*	**How Can We Predict Patterns of Motion?** *3-PS2-1 • 3-PS2-2 • 3-PS2-3 • 3-PS2-4 • 3-5-ETS1-1*	**How Can We Protect Animals When Their Habitat Changes?** *3-5-ETS1-1 • 3-5-ETS1-2 • 3-5-ETS1-3 • 3-LS2-1 • 3-LS4-1 • 3-LS4-3 • 3-LS4-4*
Grade 4			
How Can Animals Use Their Senses to Communicate? *4-LS1-1 • 4-LS1-2 • 4-PS4-2 • 4-PS4-3 • 3-5-ETS1-1*	**What Is Our Evidence That We Live on a Changing Earth?** *4-ESS1-1 • 4-ESS2-1 • 4-ESS2-2 • 4-ESS3-2 • 4-PS4-1 • 3-5-ETS1-1*	**How Does Motion Energy Change in a Collision?** *4-PS3-1 • 4-PS3-2 • 4-PS3-3 • 4-LS1-1 • 3-5-ETS1-1*	**How Can We Provide Energy to People's Homes?** *3-5-ETS1-1 • 3-5-ETS1-2 • 3-5-ETS1-3 • 4-PS3-2 • 4-PS3-4 • 4-ESS3-1*
Grade 5			
How Can We Predict Change in Ecosystems? *5-LS1-1 • 5-LS2-1 • 5-PS1-1 • 5-PS3-1*	**How Can We Use the Sky to Navigate?** *5-ESS1-1 • 5-ESS1-2 • 5-PS2-1 • 3-5-ETS1-1*	**How Can We Identify Materials Based on Their Properties?** *5-PS1-1 • 5-PS1-2 • 5-PS1-3 • 5-PS1-4 • 5-LS1-1*	**How Can We Provide Freshwater to Those in Need?** *3-5-ETS1-1 • 3-5-ETS1-2 • 3-5-ETS1-3 • 5-ESS2-1 • 5-ESS2-2 • 5-ESS3-1*

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*Working titles. Final modules available 2021.

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