

Elementary Student Books



Amplify.



THE LAWRENCE
HALL OF SCIENCE
UNIVERSITY OF CALIFORNIA, BERKELEY

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We have a blanket. Will it block the sunlight? Let's **test**!

6

The blanket blocks too much light. It does not let any light pass through. We can't see.

7



The weather today is sunny and windy.

There are no clouds, and the sun is high in the sky. **Sunlight** is shining on houses, trees, people, and everything else. The wind is blowing. It blows leaves through the air and makes branches sway. The sunlight is very bright today, so I'm going to wear my sunglasses. I'll keep my hair tied back to keep the wind from blowing it around.

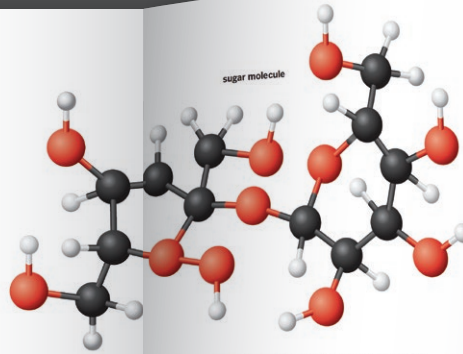
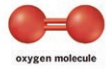
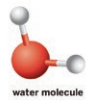
8



Some days I look outside and see ice crystals on my window. Outside, everything looks white and still. White flakes are falling to the ground. I can see the footprints of animals that have passed by in the night.

What is the weather like today?

9



There are many different kinds of molecules. Some kinds of molecules are made of two atoms joined together, while other kinds of molecules are made of hundreds of atoms! Some kinds of molecules are much heavier than other kinds. Different kinds of molecules have different shapes and sizes.

10

Molecules can also be different in other ways. For example, some kinds of molecules are strongly **attracted** to one another, so they hold together. Other kinds of molecules are not strongly attracted to one another, so they don't hold together as well.

11



Traveling Across Town Today

If you live in a city, you may use the streetcar or subway to get across town. Both streetcars and subways use electrical energy. Here's how an electric streetcar works: The train has a part at the top that connects to wires running over the street. These wires transfer electrical energy from a power plant to the train. The train's engine converts electrical energy into motion energy, moving the train's wheels and carrying you across town.

12



Traveling Across Town in Ancient Mexico

The Aztecs built a big capital city about 700 years ago, in the spot where Mexico City is today. This great Aztec city was built on an island in the middle of a lake. Waterways connected the different parts of the city, so people paddled through the city in canoes. Motion energy was transferred from the paddler's arms to the paddle, pushing the canoe through the water.

13

Different Kinds of Plants

There are many different kinds of **plants**. All plants have parts that help them get what they need to live and grow in the **habitats** where they live. The parts might look different, but they all help the plants live and grow.

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page 14



page 16



About the books

Each unit of Amplify Science K–5 includes five student books authored by the curriculum experts at the University of California, Berkeley’s Lawrence Hall of Science. These age-appropriate books were built specifically to enhance students’ experiences in the Amplify Science curriculum. The books engage students with science phenomena that are too big, too small, too far, happen too slowly, or are too dangerous for students to engage with firsthand in the classroom, while reinforcing reading and literacy skills. These content-rich, nonfiction and informational texts provide opportunities for students to search for evidence relevant to their firsthand investigations, see science practices and dispositions modeled, extend their science knowledge, and provide real world connections as they master reading-to-learn, and close reading skills, and construct evidence-based arguments. The five books in each unit include one book for approximately every five days of instruction and one reference book that students draw upon throughout the 20-lesson units.



**THE LAWRENCE
HALL OF SCIENCE**
UNIVERSITY OF CALIFORNIA, BERKELEY

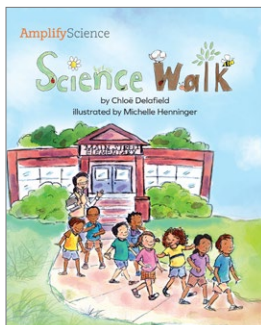
The program is designed to provide strong support in how to read like a scientist and for the development of vocabulary, language, and reading comprehension particularly relevant to reading informational text. It can serve as a complement to an English Language Arts program that addresses other literacy components (e.g., skill-based or fluency-oriented literacy instruction). Big books come with the program for all titles in grades kindergarten and 1.

Lexile Levels

The Lexile¹ measure is provided for all non-reference books.² At this time, our reference books are not given Lexile measures because these books are not designed to be read from cover to cover; rather, students use these books to find targeted information to support their investigations. All books in the Amplify Science program fall within, or in a few cases, just outside, the range of Lexile measures specified for the grade level.

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- 1 Target Lexile measures by grade band are specified by the Common Core in Supplemental Information for Appendix A of the Common Core State Standards for English Language Arts and Literacy: New Research on Text Complexity, available at <http://www.corestandards.org/wp-content/uploads/Appendix-A-New-Research-on-Text-Complexity.pdf>. MetaMetrics further specifies target Lexile measures for each grade, available at <https://lexile.com/about-lexile/grade-equivalent/grade-equivalent-chart/>
 - 2 Lexile measures are available for the Grades 2–5 books; there are no current official Common Core recommendations for Lexile measures for kindergarten and Grade 1.

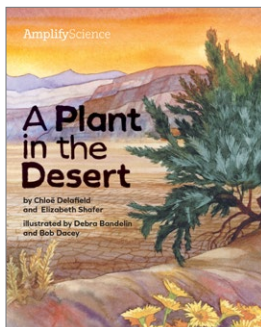
Needs of Plants and Animals: Milkweed and Monarchs



ISBN: 978-1-939787-90-3

Science Walk

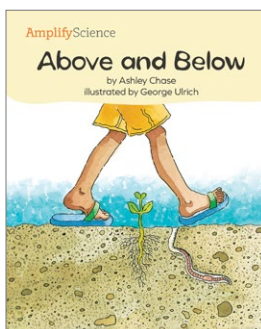
Science Walk introduces students to several scientific practices in the context of a story about a kindergarten class observing living and nonliving things outside. As the fictional class prepares for its science walk, the teacher explains the process of making observations, recording data, classifying information, and asking questions. Students first hear the book as a Read-Aloud and think about what scientists do to answer questions. Later, they explore the book as a Partner Read and look for living things in the images and text. The book helps prepare students to classify living and nonliving things and then make further classifications within the category of living things. After they have read about and explored these scientific practices through the book and related activities, students take a science walk of their own.



ISBN: 978-1-945191-06-0

A Plant in the Desert

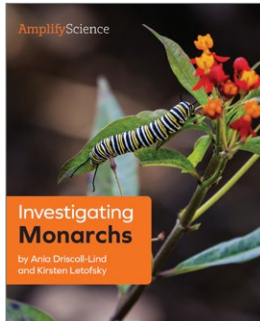
A Plant in the Desert uses the example of a sage bush to help students understand the needs of plants. It may seem like the desert has no water. If that's the case, how can plants grow there? Students learn that there is indeed water in the desert. It rains sometimes, and during those rains, the desert plants—and animals—take in all the water they can. The sage plant has many roots that reach deep into the soil to take in as much water as possible so it can survive until the next rain. Even plants and animals that live in very dry places must get water sometimes. This drives home the idea that all plants and animals need water to survive. Students encounter the book twice as a Shared Reading, each time with a different focus: first, that even plants in the desert need water and second, how plants get that water.



ISBN: 978-1-945191-53-4

Above and Below

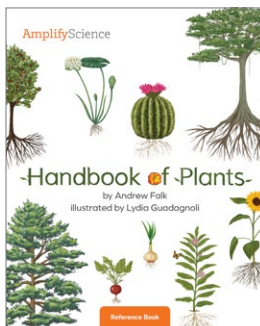
Above and Below uses engaging cutaway illustrations and repeating text to explore how different plants and animals are meeting their needs above and below the soil. Plants get water from below the ground; some animals stay safe and find food below the ground. Plants get sunlight from above the ground; some animals walk around and find food above the ground. Students first explore this book in pairs, searching the illustrations for plants and animals getting what they need. The class then reads the book as a Shared Reading, focusing on how plants and animals meet their needs in their habitats. Students use what they learn from this book to inform their discussions of monarchs and milkweed.



ISBN: 978-1-945191-02-2

Investigating Monarchs

Investigating Monarchs emphasizes the needs of monarch caterpillars and butterflies and shows what happens when these animals are not able to meet their needs. The book first introduces the life cycle of monarchs, explaining that monarch caterpillars must eat milkweed to survive and change into butterflies. Their summer habitat must have milkweed. The butterflies then migrate a long distance, from the United States to a forest in the mountains of Mexico, where they take shelter in the trees. Their winter habitat must have trees. Scientists discovered that the monarch population in Mexico was greatly reduced because people were cutting down the trees. The forest was then protected, but the monarch population did not recover as expected. Scientists in the United States found evidence that this was because fields with milkweed are being replaced by farms and buildings. Students are encouraged to think about what people in the United States can do to help the monarchs get what they need to survive. *Investigating Monarchs* is used as a Shared Reading, first to discover that monarch caterpillars turn into butterflies and then to consider how humans are changing monarch habitats.



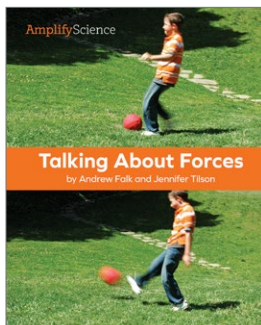
ISBN: 978-1-939787-94-1

Reference Book

Handbook of Plants

Handbook of Plants is the reference book for this unit. It includes information about nine different kinds of plants as well as introductory material about plant growth, seeds, leaves getting light, and roots getting water. Students use the book to look up information throughout the unit. First, they use the book to find out what animals and plants can live where, which helps illustrate the concept of habitat. Organisms can only live in a place that has what they need. Specifically, students learn that monarch butterflies can only live in a place that has milkweed. Students use the reference book again, as they are setting up the seeds to grow in their classroom, to learn more about how plants grow. They also look up radishes and their roots. The reference book is used again to discover that plants need light and which plant parts are important for getting that light. Students then look at diverse leaf types depicted in the book. *Handbook of Plants* is used as a Shared Reading throughout the unit.

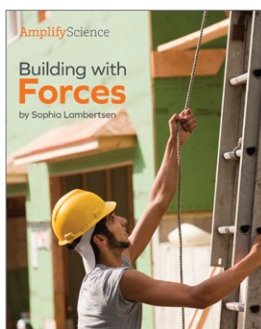
Pushes and Pulls: Designing a Pinball Machine



ISBN: 978-1-939787-92-7

Talking About Forces

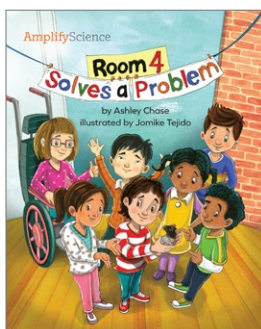
Talking About Forces introduces students to several foundational concepts for the unit, including the idea that forces make things move. The book also introduces key scientific language for explaining what is happening when a force makes something move. Students learn that scientists and engineers say that when one thing is making another thing move, it is exerting a force on it. Relatable examples and photographs help students connect the concepts they are learning in the unit with what they see in the world around them. The book helps students view the world through a scientific lens and see how forces are being exerted all the time. *Talking About Forces* is used as a Read-Aloud book at the beginning of the unit to introduce the content and help students connect movement with the forces that cause it to happen.



ISBN: 978-1-943228-68-3

Building with Forces

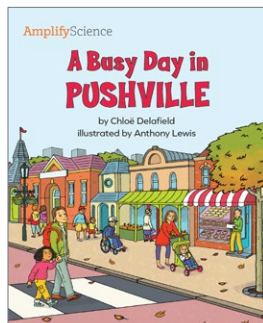
Building with Forces features construction workers who are building houses and stores. The book highlights forces being exerted in different directions: up, down, to the left, to the right, toward, and away. Students learn that construction workers must exert forces in the correct directions so everything ends up where it belongs. *Building with Forces* is used as a Shared Reading midway through the unit to help students visualize how forces exerted in different directions make things move in those directions. Construction photographs and simple text engage students in learning this foundational concept.



ISBN: 978-1-943228-62-1

Room 4 Solves a Problem

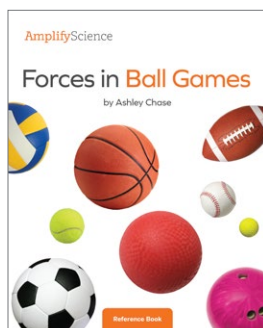
In *Room 4 Solves a Problem*, a group of kindergartners encounter a problem: Their class pet, Ratty, needs to get more exercise. Students jump into action, designing solutions that use pushes and pulls to alleviate Ratty's problem. They test out several solutions and then refine and improve their solutions until they have designed the perfect push-and-pull exercises for Ratty. *Room 4 Solves a Problem* is a Read-Aloud book that models the design process that students are using to create their pinball machines in the unit.



ISBN: 978-1-943228-60-7

A Busy Day in Pushville

A Busy Day in Pushville is written from the perspective of a young girl who sees people using pushes and pulls in their jobs and activities all around town as she goes to the library with her dad. After she and her dad come home, she also notices pushes and pulls as they paint and draw, make dinner, and more. Students are encouraged to look for evidence of forces throughout the book. *A Busy Day in Pushville* is used as a Shared Reading at the end of the unit to help students synthesize information and explain all the different kinds of forces they have learned about in the unit. The book provides a bridge to an activity in which students search for evidence of forces in and around the school.



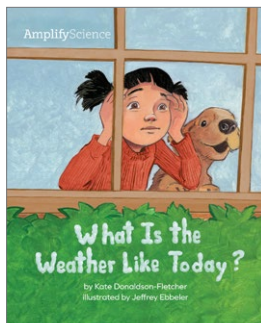
ISBN: 978-1-943228-66-9

Forces in Ball Games

Forces in Ball Games is the reference book for this unit. It explores the types of forces in many different ball games, both familiar and new. Showing how forces are exerted in the context of games helps solidify the connection between the physics content that students are learning and the pinball machines they are creating. The reference book is used during a Partner Read and in Read-Alouds throughout the unit and offers an opportunity to look for changes of direction, stopping and starting motion, and strong and gentle forces.

Reference Book

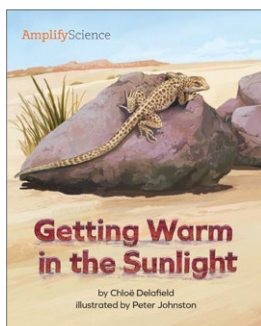
Sunlight and Weather: Solving Playground Problems



ISBN: 978-1-945192-39-5

What is the Weather Like Today?

What Is the Weather Like Today? provides a lively introduction to some of the unit's content: various weather conditions and temperatures. The narrator of the book wakes up each morning and asks what the weather is like and what the temperature is. She looks out her window or steps out onto her porch to answer these questions. Having the answers helps her prepare for going outside and lets her know what kinds of activities she might be able to enjoy that day. This engaging Read-Aloud helps students become familiar with many of the words that will be used to describe weather and temperature in the unit. *What Is the Weather Like Today?* sets the context for this unit by introducing students to the idea that weather can change from day to day and throughout the year and that there are ways people can prepare for the weather to help them stay comfortable and safe.



ISBN: 978-1-945192-42-5

Getting Warm in the Sunlight

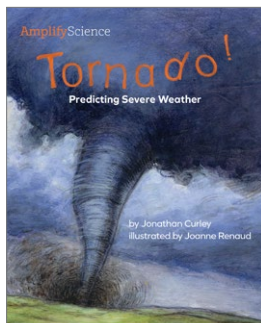
Getting Warm in the Sunlight explores the warming effects of sunlight through the story of a lizard's day. In the morning, it's too cold for the lizard to come out of its burrow. As the sun shines on Earth's surface, it starts to warm up enough for the lizard to come out and hunt for insects. Various surfaces—the dark rocks and pale sand—warm at different rates, and the lizard chooses on which surface to hunt based on when it reaches optimal temperature. As the day gets hotter, the lizard has to first seek out the pale sand and then the shade of a shrub. When the sun sets, the surfaces quickly cool down, and the lizard has to seek shelter again. *Getting Warm in the Sunlight* is a Shared Reading that provides a clear introduction to the idea that pale-colored surfaces and dark-colored surfaces warm up at different rates, which helps set the stage for students' firsthand investigations and for understanding what's going on with the two schools in the unit that are experiencing varying temperatures.



ISBN: 978-1-945192-33-3

Cool People in Hot Places

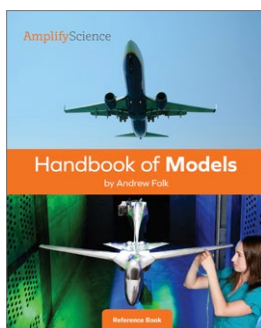
Cool People in Hot Places takes students to seven locations around the world where people use different techniques to deal with a particular type of severe weather—very high temperatures. The book is a Shared Reading that uses a repetitive structure to introduce students to various methods of blocking sunlight, increasing airflow, and using pale colors to prevent surface temperatures from getting too high. These examples help reinforce several essential unit concepts: sunlight warms surfaces, different surfaces warm at different rates, weather can become severe, and people can take measures to protect themselves from severe weather. This book helps support students' firsthand investigations by showing them real-world examples that relate to the problem they are trying to solve.



ISBN: 978-1-945192-36-4

Tornado! Predicting Severe Weather

Tornado! Predicting Severe Weather tells the story of real-life weather scientist Lynn Burse and how she studies and predicts severe weather. In this Read-Aloud, students hear about how Burse and her fellow scientists use their observations and measurements of the weather—including wind, rain, temperature, and changes in weather—to make predictions. Many people use these predictions in their daily lives to prepare for severe weather. On one particular occasion, Lynn and her team used their observations of temperature and thunderstorms to predict that a tornado was coming to their area. They warned the people in time for everyone to get to safety, and no one was hurt even though the tornado caused a lot of damage. This book supports students in making connections between what they are learning in the classroom about predicting and preparing for different weather conditions and what scientists in the field do to help keep people safe.



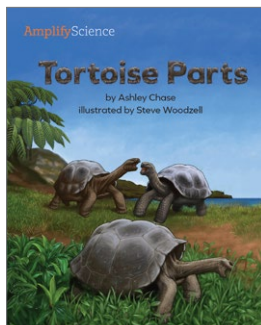
ISBN: 978-1-945192-30-2

Handbook of Models

Handbook of Models is the reference book for this unit, giving students a place to see examples of many different kinds of scientific models and how people use them to understand the world. Models can help us investigate things that are too big or too small to study otherwise and can help us investigate things that happen too quickly or too slowly to observe directly. Models also help us study one part of a complex system at a time and allow us to test our predictions. As students build and manipulate their own scientific models, they can use this reference book to make connections between what they are doing and the larger idea that models help facilitate learning in a variety of ways. *Handbook of Models* is used as a Shared Reading throughout the unit and helps build a foundation for understanding scientific models that will support students throughout the unit and throughout their entire science education.

Reference Book

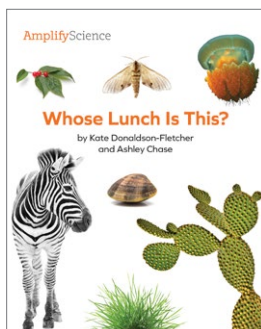
Animal and Plant Defenses: Spikes, Shells, and Camouflage



ISBN: 978-1-945192-62-3

Tortoise Parts

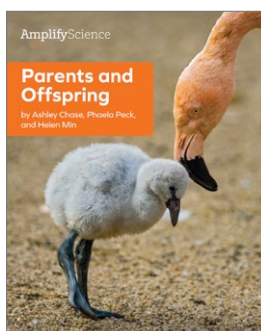
Tortoise Parts introduces the concept of structure and function with the example of the giant Galápagos tortoise. Each external structure on a tortoise's body has a special shape, and each structure is good for doing specific things. For example, a tortoise has a beaky mouth that is good for biting leaves, and it has long, strong toenails that are good for digging. The repetitive structure of the book, with the same section headings on each spread, helps reinforce students' understanding of the content. Beautifully clear illustrations with labeled parts offer additional help with the concepts and provide a bridge to understanding scientific diagrams. *Tortoise Parts* is used as a Shared Reading and supports students' secondhand investigations as they explore the structure and function of animal parts in the unit.



ISBN: 978-1-945192-59-3

Whose Lunch Is This?

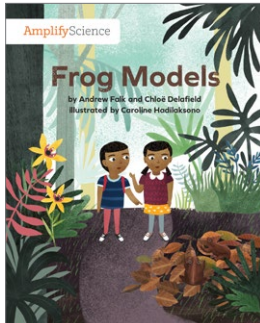
Whose Lunch Is This? is filled with engaging photos of animals catching and eating their lunch. The introductory pages explain that all animals need to eat to survive, just like humans do. Seven different food-web relationships are explored with a two-page spread dedicated to each. The first page shows a photo of the animal or plant with the query *Whose lunch is this?* The facing page includes information about the structures of the animal that eats it. *Whose Lunch Is This?* is a rich Read-Aloud that sets the context for the unit. It reinforces vocabulary and essential concepts that will be used throughout the unit, including structure and function, survival needs, and predator–prey relationships.



ISBN: 978-1-945192-65-4

Parents and Offspring

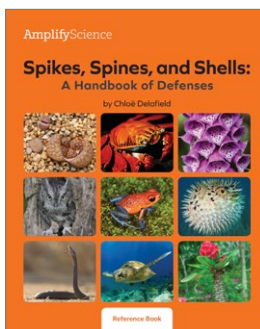
Parents and Offspring introduces students to the idea that all animals and plants have offspring. The book explains that some offspring need parental care, while others do not. Some parents feed, carry, defend, shelter, bathe, teach, and play with their offspring. When the offspring grow up, they can do those things on their own. This Partner Read uses simple language and repeated unit vocabulary to convey a few basic but essential ideas: some animal babies need care, while some can survive on their own; offspring look somewhat like, but not identical to, their parents; and baby animals grow up to have the same structures that their parents have, which help them survive in the same ways. Students read this book twice in the unit, first with the teacher in a Shared Reading and then with a partner. *Parents and Offspring* supports students' firsthand investigations by showing them how offspring can survive.



ISBN: 978-1-945192-68-5

Frog Models

Frog Models is a story about a pair of siblings who use models to explain their ideas about frog camouflage. Luz and Juan are walking in a forest when they see a snake hunting. There are some frogs nearby, but the snake does not see them. Each child has an idea about why the snake did not see the frogs, and they make paper models to show their ideas. Using their models, the siblings are able to explain that the frogs' color and shape make them hard to see against the leaves. *Frog Models* is a Shared Reading that uses simple language to support students' firsthand investigations by demonstrating the process that scientists go through when constructing models for reasoning and explanation. The book shows the process that students will engage in as they create their own models in the unit.



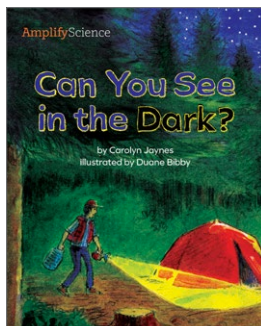
ISBN: 978-1-945192-72-2

Spikes, Spines, and Shells: A Handbook of Defenses

Spikes, Spines, and Shells: A Handbook of Defenses is the reference book for this unit. It's full of striking photos of various animals and plants whose defenses fall into four categories: camouflage, armor, spikes and spines, and poison and venom. The book provides a place for students to find more information about defensive structures and food-web relationships for many different organisms. The entries provide information about the organisms' habitats, defensive structures and their functions, defensive behaviors, and animals that eat them. *Spikes, Spines, and Shells* is used as a Shared Reading throughout the unit, supporting students' investigations by providing secondhand, visual data in the form of photographs. The book also gives students experience with many features of informational texts.

Reference Book

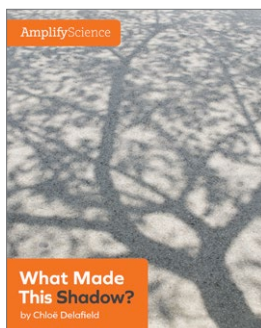
Light and Sound: Puppet-Theater Engineers



ISBN: 978-1-943228-46-1

Can You See in the Dark?

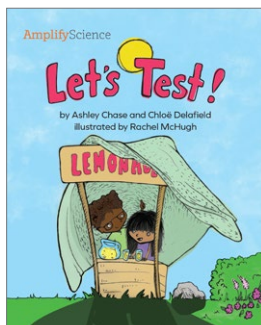
Can You See in the Dark? invites students to wonder about whether or not they need light to see. The main character searches for a completely dark place, testing a movie theater, a dark bedroom, a closet, a starlit campsite, and finally a deep cave where there truly is no light at all. In each new place the narrator asks, “Is it completely dark? Can you find any light?” Although each place seems dark at first, a little searching always reveals light sources, until the main character reaches the cave, where there is no light whatsoever—and he cannot see! This finally answers the question posed in the book’s title, reinforcing the idea that you need light to see. *Can You See in the Dark?* is a Read-Aloud book that provides an intriguing invitation to the unit, setting the context for students’ understanding that all light comes from a source and that light sources can be dim or bright.



ISBN: 978-1-943228-49-2

What Made This Shadow?

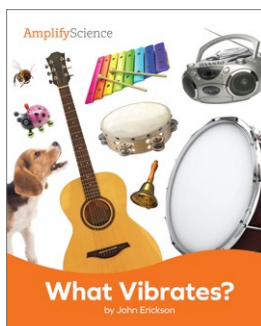
What Made This Shadow? presents a series of photos for children to wonder about as they explore the ideas that light can be blocked—certain objects block all light, while others let some light pass through—and this creates different kinds of shadows on surfaces. The right-hand page of each spread shows an isolated shadow; a turn of the page reveals the object casting the shadow as well as the light source. In each instance, the text calls out the surface where the shadow appears, helping students to grasp the concept of surfaces through a variety of examples. This book is set up to be used as a Shared Reading, with repetitive structure and captivating photos providing supports. The mysterious right-hand photos and the questioning refrain urge students to make predictions before the page is turned. A final spread encourages students to go out and collect their own evidence of light blocking. *What Made This Shadow?* supports students’ firsthand investigations as they discover the relationships between light sources, objects, surfaces, and shadows in the world around them.



ISBN: 978-1-943228-42-3

Let's Test!

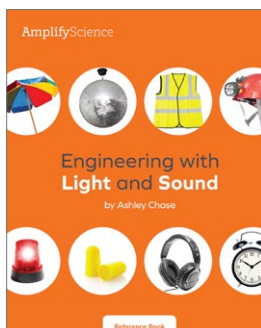
Let's Test! follows two young children who test several different shade devices for their lemonade stand before finding the perfect one. It's a hot day, and the kids want to sell lemonade, but the sun is too bright and hurts their eyes. They try out three different versions of a light-blocking design: the first one makes it too dark, the second one doesn't block enough light, and the third one is just right. Within a relatable story and structure, this book provides a very clear model of the design process that students will be using in this unit. The characters experience a problem and design a solution to the problem, revising their design as they go along. *Let's Test!* is a Partner Read, so the book uses very simple language and supportive illustrations to make the content accessible to early readers.



ISBN: 978-1-943228-47-8

What Vibrates?

What Vibrates? conveys the essential concept that every sound comes from something that vibrates. The book looks at several familiar sources of sound, including a guitar, a radio, and an alarm clock, and shows students what part of the object vibrates to make sound. *What Vibrates?* supports the content of the unit's fourth chapter, using recognizable examples to help students understand the concepts that vibration causes sound, and every sound comes from a source. The book is used first as a Shared Reading, and then students are encouraged to read the book with partners once they have been exposed to the concepts and vocabulary. Clear, labeled photographs help provide support through both readings.



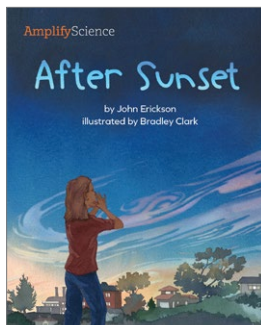
ISBN: 978-1-943228-44-7

Engineering with Light and Sound

Engineering with Light and Sound is this unit's reference book. The introduction explains what an engineer is and describes the process engineers go through to design a solution to a problem. The book is divided into sections about designing light sources, things that block light or let light through, things that reflect light, sound sources, things that block sound, and things that use both light and sound. Each section includes an introductory paragraph, and each entry presents the problem and the solution to repeatedly highlight the basics of the design process. This reference book is intended to be used predominantly as a Shared Reading throughout the unit, offering secondhand investigation opportunities and inspiring students as they design their own light and sound solutions in the unit.

Reference Book

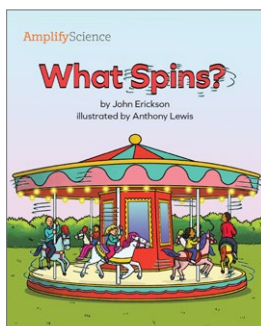
Spinning Earth: Investigating Patterns in the Sky



ISBN: 978-1-939787-91-0

After Sunset

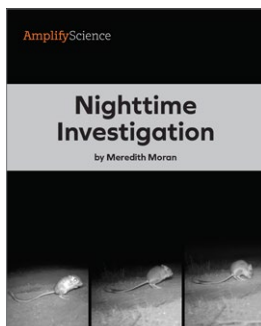
After Sunset is a rich Read-Aloud that provides an engaging entry point into the unit's content and vocabulary, encouraging students to recognize familiar and new objects as they make their own sky observations. Two sisters stay outside past sunset watching the sky as the sunlight fades, and the stars slowly appear. They see many interesting things in the sky: birds heading to their nests for the night, an airplane, stars, planets, a meteor, and even a space station. As they wonder about what the people on the space station see, the perspective shifts, and readers are brought into space to look down on Earth as astronauts see it. The new perspective helps students understand that Earth is a planet in space, just like the other planets they may have heard of. *After Sunset* provides secondhand data about what can be seen in the night sky through two sisters' observations of the sky after the sun goes down.



ISBN: 978-1-943228-04-1

What Spins?

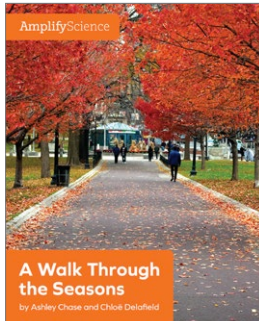
What Spins? is an illustrated book that introduces students to the idea that Earth spins, just as merry-go-rounds, fans, and other familiar things do. There are some differences in how Earth spins. For example, the merry-go-round starts and stops, but Earth never stops spinning. The book then explores the idea of seeing a pattern because you are spinning. As he spins, a child on a tire swing sees a bench, a slide, some trees, some friends, and then the bench again. Similarly, a child looking out the window each day sees sunrise, a bright daytime sky, stars, and then sunrise again as she spins on planet Earth. *What Spins?* is a Partner Read that presents a fundamental concept, using simple language, familiar examples, supportive photos, and a repetitive structure that mirrors the patterns caused by Earth's spin.



ISBN: 978-1-939787-99-6

Nighttime Investigation

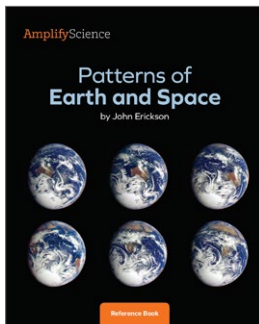
Nighttime Investigation introduces Laura Prugh, a scientist who studies animals, through a Shared Reading. Laura investigates nocturnal animals, including kangaroo rats. During one investigation, she discovered something interesting by chance: Contrary to her expectations, more kangaroo rats seemed to come out during brighter Moon phases. By gathering data and organizing it, Laura confirmed the pattern she had observed. *Nighttime Investigation* provides a fascinating model of a real-life scientist who organized data to find a pattern, just as students will be doing in the unit. The book clearly lays out the steps of the scientific investigation process—with a particular emphasis on collecting, recording, and organizing data—in an exciting and comprehensible context.



ISBN: 978-1-939787-40-8

A Walk Through the Seasons

A Walk Through the Seasons is a Partner Read that introduces students to seasonal patterns of sunlight, connecting those patterns to everyday experience through the story of a girl whose family walks their dog twice a day, morning and evening. In spring and fall, these walks happen around sunrise and sunset. However, in summer, both walks are in broad daylight, while in winter both walks happen in the dark. The girl's observations provide students with secondhand data about light conditions in different seasons, supporting them in discovering the pattern for themselves.



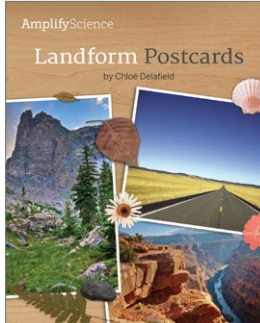
ISBN: 978-1-943228-13-3

Patterns of Earth and Space

Patterns of Earth and Space is the reference book for this unit, giving students a place to explore many different kinds of patterns that can be observed on Earth and in the sky. The book introduces the concept of a pattern through two very simple examples and then moves on to present patterns over time, patterns of Earth's movement, patterns of the seasons, patterns of the Moon and stars, and much more. Carefully arranged photographs provide students with rich visuals on each page to explore and use as evidence to support their ideas. *Patterns of Earth and Space* is used as a Shared Reading throughout the unit.

Reference Book

Changing Landforms: The Disappearing Cliff



ISBN: 978-1-945191-59-6
Lexile Measure: 550L

Landform Postcards

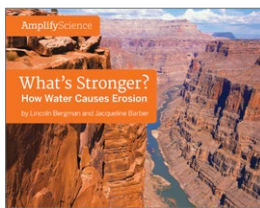
Landform Postcards is written from the perspective of a girl who is taking a road trip with her family. Her grandfather is a geologist, and she writes him postcards about the interesting landforms she sees around the United States. The book includes reproductions of the postcards she writes, along with beautiful photos of peninsulas, mountains, canyons, and more. The postcards and photo captions provide some basic information about various kinds of landforms and model the process of asking questions about natural phenomena. The final four pages of the book include more photos for students to explore, providing evidence that landforms are made of rock. This book sets the context for the unit by offering a friendly introduction to landforms and encouraging students to notice and ask questions about landforms in the world around them.



ISBN: 978-1-945191-84-8
Lexile Measure: 610L

Gary's Sand Journal

Gary's Sand Journal is a first-person account of how Gary Griggs, a geologist and oceanographer, investigates sand. In this book, Gary describes how he observes sand and uses his observations as evidence to support his ideas about the sand and its environment. The size, shape, and color of sand give him evidence about how old the sand is, what it's made of, and how it got to where it is. The book includes entries from a "sand journal" in which Gary records his observations of three different sand samples that he collected from various locations. In each entry, he asks: "How did this sand get to be the way it is?" The final pages introduce a mystery sand, encouraging students to observe its color, shape, and size and think about what that tells them about the sand's history. *Gary's Sand Journal* provides an inspiring real-world example of a geologist at work and models how to make observations and use these as evidence to support answers to questions.



ISBN: 978-1-945191-87-9
Lexile Measure: 470L

What's Stronger? How Water Causes Erosion

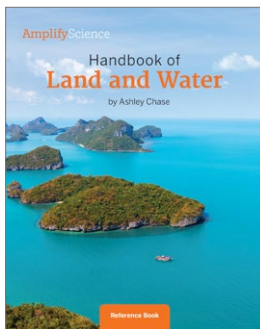
What's Stronger? How Water Causes Erosion explores the ways that water—in both liquid and solid forms—can erode landforms. It may not seem like one small raindrop can cause a mountain to change, but it can! Through a series of engaging questions, students are asked to think about streams and boulders, waves and beaches, glaciers and valleys, and other interesting pairings of water and landforms. Students learn that even seemingly stable landforms change over time—usually very slowly. Stunning full-page photos of water and landforms help students visualize erosion processes. This book delivers key content about erosion and helps students solidify their understanding of this process.



ISBN: 978-1-945191-90-9
Lexile Measure: 650L

Making Models of Streams

In *Making Models of Streams*, students meet a water scientist named Chris Cianfrani. Chris uses a scientific model called a stream table to help answer questions about how streams work. In this book, she and a group of young scientists use a stream table to investigate questions about how floods erode streambeds. The text describes how and why scientists build models, and how models are similar to and different from the real thing in important ways. The book explains how the stream table is similar to and different from a real stream, and how Chris made decisions about how to build it. Chris and the young scientists investigated their question about floods by pouring lots of water into the stream table and observing what happened. Using their model, they discovered that a flood will erode a streambed in some places and cause sand to build up in other places. Their model allowed them to investigate something that is difficult to observe in the real world. *Making Models of Streams* helps students understand how scientists use models to learn about the world.



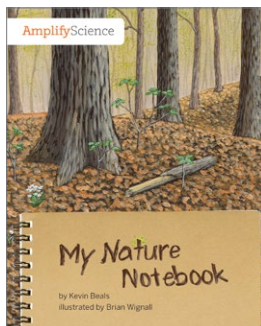
ISBN: 978-1-945191-62-6
Lexile Measure: N/A

Reference Book

Handbook of Land and Water

Handbook of Land and Water is the reference book for this unit, providing students with a place to look for information about all kinds of landforms and bodies of water. It includes entries on beaches, caves, the ocean, rivers, islands, mountains, and more. Each entry includes an introduction to the landform or body of water, several photos showing how it can vary, a photo paired with a map of a real location, a three-part diagram showing how that kind of landform or body of water can change slowly, and a photo or series of photos showing how it can change fast. In addition, the book's introduction gives detailed directions for how to read a map and how to relate it to a real location on Earth. Students read the reference book to find evidence to support concepts about erosion that they learn throughout the unit, including the idea that landforms are made of rock and that lots of small changes add up to big changes in landforms. *Handbook of Land and Water* is used throughout the unit to provide evidence that supports students' firsthand investigations.

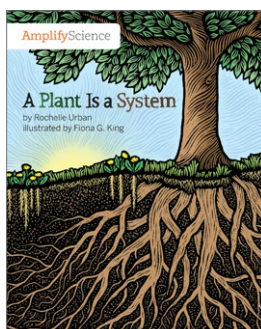
Plant and Animal Relationships: Investigating Systems in a Bengali Forest



ISBN: 978-1-945192-14-2
Lexile Measure: 510L

My Nature Notebook

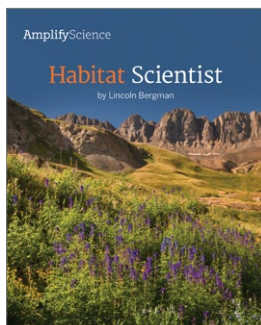
My Nature Notebook is written from the perspective of a young girl who studies the forest behind her home. The girl sets up a sample study site in the forest and returns each month to record observations of the plants and animals in this habitat. Over the course of five months, she observes a young oak tree growing taller and developing new leaves, small grass plants sprouting and producing seeds, a dead bird decomposing to feathers and bones, ants carrying seeds to new places, and much more. By recording her observations as drawings as well as measurements in a data table in her notebook, the narrator notices how the habitat changes through time and wonders about additional changes that might happen in the future. *My Nature Notebook* introduces students to different ways to study a habitat and supports the firsthand observations they make of the habitat around their school.



ISBN: 978-1-945192-17-3
Lexile Measure: 470L

A Plant Is a System

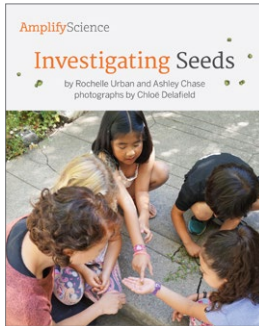
A Plant Is a System presents the concept of a system as a group of parts that work together. Plants function as a particular type of system whose parts work together to help them get what they need to live and grow. Each part of the system plays a role in helping the plant get what it needs. A plant's leaves catch light from the sun. A plant's roots take in water. A plant's stem connects its roots and leaves. A plant's flowers make seeds that grow into new plants. The parts of the system depend on one another to support the plant's growth. This book delivers content about plants and exposes students to the essential science concept of systems. Through reading *A Plant Is a System*, students come to understand a system as a group of networked parts and are then prepared to apply this understanding to other systems in the natural world.



ISBN: 978-1-945192-20-3
Lexile Measure: 530L

Habitat Scientist

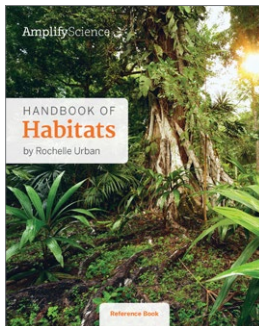
Habitat Scientist introduces students to John Harte, a scientist who investigates plants and animals in the places where they live. John studies how the parts of a habitat work together as a system. In this book, John investigates the interdependent relationships in a mountain habitat in Colorado. Plants in this habitat depend on animals to move their pollen so they can make new plants. Animals in this habitat depend on plants and other animals for food. Each part of the habitat depends on the other parts of the habitat for survival. John works with other scientists to investigate what happens to living things when part of their habitat changes. John and his team discovered that when the Colorado mountain habitat got too hot, the plants and animals there could no longer depend on one another to get what they needed. *Habitat Scientist* models the investigation practices of measuring and counting, while supporting students' understanding of the interdependent relationships among the living things within a habitat.



ISBN: 978-1-945192-23-4
Lexile Measure: 570L

Investigating Seeds

Investigating Seeds follows a group of friends as they investigate how a small burclover plant came to grow in a sidewalk crack. The friends build on their understanding that new plants sprout from seeds, and they launch an investigation of how the burclover seed that made this plant could have been moved to a place away from other plants. They use a pair of models to measure two different forms of seed dispersal: blowing in the wind and getting carried by animal fur. By carefully recording and comparing data from a series of trials, the friends find evidence that burclover seeds get dispersed when they are caught in animal fur and carried to a new place. *Investigating Seeds* models the investigation practice that students use throughout the unit while simultaneously building their understanding of how models can be used to support the investigation process.



ISBN: 978-1-945192-26-5
Lexile Measure: N/A

Handbook of Habitats

Handbook of Habitats is the reference book for this unit and provides information about a series of diverse habitats on Earth. After an introduction to habitats as places where living things depend on one another and get what they need, the book outlines the fundamentals of plant growth that take place within any habitat. The remainder of the book is devoted to a detailed look at six habitats around the world: the Amazon rain forest, a broadleaf forest, the Everglades wetlands, the Serengeti plains, the Sonoran Desert, and a city park. The plants and animals that live in each habitat are described in detail, and the interdependent relationships between these organisms are highlighted. The reference book supports students' understanding of the unique plants and animals that live in each habitat and how relationships among these living things support the process of dispersing seeds to places where they can grow into new plants. It also gives students a sense of the diversity of habitats on Earth.

Reference Book

Properties of Materials: Designing Glue



ISBN: 978-1-943228-14-0
Lexile Measure: 480L

What If Rain Boots Were Made of Paper?

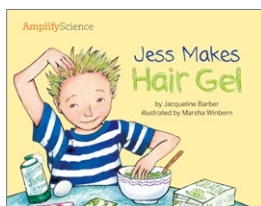
What If Rain Boots Were Made of Paper? is designed as an introduction to the unit and the properties of materials. In the book, students are asked to imagine a series of absurd objects, such as rain boots made of paper and frying pans made of rubber. This inspires them to think about the relationship between objects, the materials used to make them, and the properties of those materials. The book provides students with a real-life context for this physical science unit and prepares them for the design work they will do.



ISBN: 978-1-943228-21-8
Lexile Measure: 570L

Can You Change It Back?

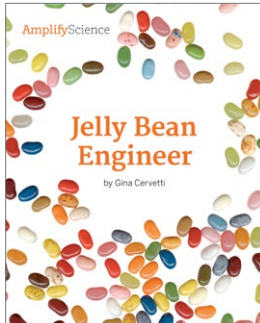
Can You Change It Back? introduces students to the idea that heating and cooling can cause changes to materials. Some of these changes are reversible, meaning the material's properties have not changed, and some are irreversible, meaning the properties have changed. Students are presented with a variety of materials and asked to predict whether a certain change caused by heating or cooling is reversible or irreversible. The book also touches on the changes caused by rearranging pieces. *Can You Change It Back?* helps reinforce students' understanding of properties and gives them a chance to build prediction skills.



ISBN: 978-1-943228-20-1
Lexile Measure: 500L

Jess Makes Hair Gel

Jess Makes Hair Gel tells the story of a boy who sets out to make his own hair gel. He first identifies the properties of good hair gel and then tests various ingredients to see which ones have these properties. While conducting tests on each ingredient, Jess realizes that he needs to expand the list of properties of good hair gel. This allows him to solve his problem and make great hair gel. This book uses an engaging context to model the steps of the design process that students use in the unit.



ISBN: 978-1-943228-12-6
Lexile Measure: 760L

Jelly Bean Engineer

Jelly Bean Engineer shows how food engineers use design practices to create new kinds of food. In the book, readers meet Ambrose Lee, a food engineer who invents new jelly bean flavors. Students see Ambrose and his colleagues using their senses, designing mixtures to have certain properties, and working as a team. They learn about how ingredients create the texture of jelly beans and get a glimpse at the hard work and serendipity that are part of the design process. This book provides a real-world parallel to the work students are doing as they design mixtures in the classroom.



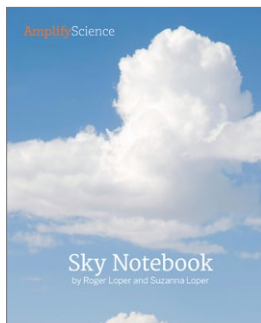
ISBN: 978-1-943228-19-5
Lexile Measure: N/A

The Handbook of Interesting Ingredients

The Handbook of Interesting Ingredients is a reference book that provides information about many common kitchen ingredients, such as cinnamon, egg white, gelatin, flour, and sugar. For each ingredient there is a two-page spread with photos and information, some of which is directly observable and some of which is not. Sections on each spread include “How it looks,” “Where it comes from,” “Important properties,” “What it’s used for,” and “Cause and effect.” The ingredients students will be testing as they design their glue mixtures are sprinkled throughout the book. Students use the information they find to support their firsthand investigations in the unit.

Reference Book

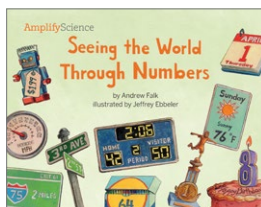
Weather and Climate: Establishing an Orangutan Reserve



ISBN: 978-1-943228-18-8
Lexile Measure: 610L

Sky Notebook

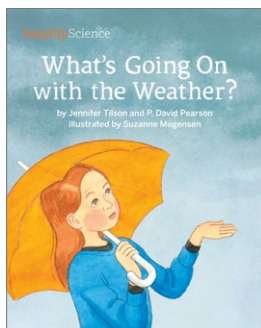
Sky Notebook is set in the mountains of Colorado where storms move through on a regular basis during the winter. The narrator is an amateur meteorologist who takes measurements and makes notes about the weather each day in his sky notebook. Beautiful photographs illustrate what the narrator sees each day (a daily photograph is part of the measuring and observing regimen), so the reader experiences the weather visually as well as through data. The book models the scientific practice of recording data, demonstrating how students could conduct their own firsthand daily weather investigation. It also offers a secondhand investigation experience by giving students a chance to make predictions from the data included in the book.



ISBN: 978-1-939787-17-0
Lexile Measure: 540L

Seeing the World Through Numbers

Seeing the World Through Numbers invites students to think differently about numbers and what they mean. Numbers are not just marks on a page. In fact, they can tell us a lot about the world. The book shows students how numbers—and various ways of organizing them—reveal information about weather. Numbers can give us a sense of how a day will feel, and also allow us to predict what a future day will be like. *Seeing the World Through Numbers* shows how line plots allow us to analyze data and how totals are a useful tool for analyzing a month's worth of precipitation data. The book's beautiful illustrations help students make sense of a variety of data and support students in visualizing numbers. *Seeing the World Through Numbers* delivers essential unit content in an engaging, relatable context and models the scientific practice of analyzing data.



ISBN: 978-1-943228-24-9
Lexile Measure: 700L

What's Going On with the Weather?

What's Going On with the Weather? is a fictional story describing weather observations and investigations that a girl named Toby makes after she moves from Boston to San Francisco. As she begins her new life in San Francisco, Toby notices that the weather is quite different from the weather she left behind in Boston. She questions why this is so and ends up learning a great deal about seasonal patterns in both San Francisco and Boston. She and her brother search for data online and find graphs for temperature and precipitation in both cities. They analyze and compare the graphs to understand how San Francisco's weather differences will impact their lives. Toby's investigations in *What's Going On with the Weather?* model the kind of analysis that students do in the unit.



ISBN: 978-1-943228-28-7
Lexile Measure: 620L

Dangerous Weather Ahead

Dangerous Weather Ahead is a book about weather-related natural hazards. The book introduces some of the problems that natural hazards can cause, as well as solutions that people have designed to prepare for those problems. The book focuses primarily on three natural hazards—hurricanes, blizzards, and lightning—and provides maps of frequency and illustrative photographs for each. For each hazard, the text details a problem and a solution, providing photos that help students visualize and understand the issues. *Dangerous Weather Ahead* conveys content about natural hazards and provides an opportunity for a secondhand investigation as students examine the maps and think about how the maps can be used to predict and prepare for weather-related natural hazards.



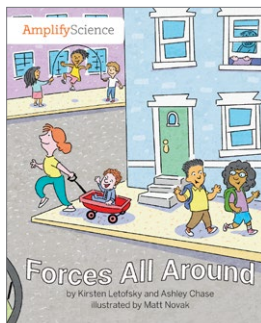
ISBN: 978-1-943228-32-4
Lexile Measure: N/A

World Weather Handbook

World Weather Handbook is the reference book for this unit, providing a place for students to explore weather data and information from locations around the world. Bar graphs, maps, detailed descriptions, and photos combine to help students get a full picture of weather and climate in 19 diverse locations. *World Weather Handbook* allows for a secondhand investigation experience where students can analyze graphs and identify a variety of seasonal patterns. The book also provides background information that helps students begin to recognize broad global climate patterns.

Reference Book

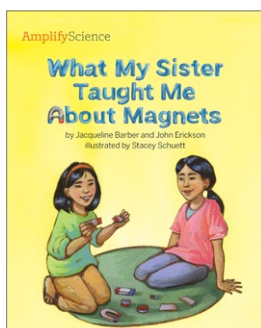
Balancing Forces: Investigating Floating Trains



ISBN: 978-1-943228-00-3
Lexile Measure: 440L

Forces All Around

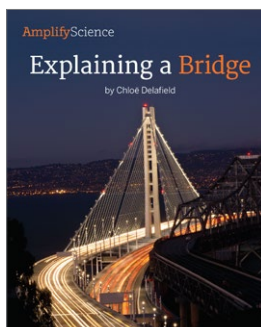
Forces All Around follows the adventures of two kids looking for evidence of forces. The narrator and her friend learn in school that forces are pushes and pulls. On the way home, they decide to play a game: They challenge each other to find evidence of forces in the world around them. As they walk along, they look for things that are starting to move or stopping moving. It turns out there is evidence of forces everywhere—as a kid passes by on a skateboard, as a parent pushes a stroller, as a car gets towed away—and the kids record each example they see. *Forces All Around* sets the context for this unit, connecting what students are learning with their everyday lives. Non-touching forces are introduced in some of the illustrations, offering an opportunity to go back through the book looking for evidence of gravity and magnetic force.



ISBN: 978-1-943228-02-7
Lexile Measure: 580L

What My Sister Taught Me About Magnets

What My Sister Taught Me About Magnets tells the story of a girl who loves to investigate magnets. She investigates the similarities and differences between magnets of different shapes, sizes, and strengths and makes discoveries about magnetic poles and what magnets attract. Through a series of “explanations”—similar to the explanations that students will construct in the unit—she describes how she compares different magnets and tells her older sister what she has learned by investigating. *What My Sister Taught Me About Magnets* models ways of investigating magnetic force, recording data, making explanations, and using comparative language. It also supports students’ investigations by providing them with information about the properties and types of magnets.



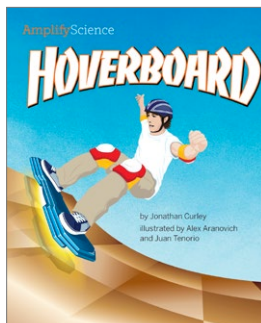
ISBN: 978-1-943228-05-8
Lexile Measure: 770L

Explaining a Bridge

Explaining a Bridge profiles Brian Maroney, one of the lead engineers involved in the design of the new San Francisco Bay Bridge. Since part of the original Bay Bridge fell during an earthquake in 1989, some people might be concerned about the new bridge staying up. Maroney explains to the public why the new bridge is safe—just as students will be explaining that maglev trains are safe.

Maroney knows a lot about balanced forces, and he explains how the forces will stay in balance to keep the bridge up even in an earthquake. The text discusses the materials and models that Maroney uses to help educate the public and includes diagrams of balanced and unbalanced forces acting on bridges.

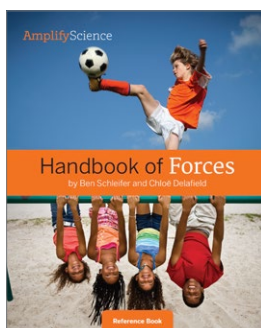
Explaining a Bridge gives students a model of a real-life engineer using the very explanation skills they are learning as an essential part of his job.



ISBN: 978-1-943228-03-4
Lexile Measure: 770L

Hoverboard

Hoverboard introduces students to a real-life futuristic invention: skateboards that float! The text describes how hoverboards work: magnetic force pushes the board up as Earth pulls the board down with the force of gravity. The forces are balanced when the board floats and unbalanced when the board is falling to the ground. The concluding pages offer another example of an invention that uses balanced forces and encourage students to think of more. The exciting analogous example presented in *Hoverboard* helps students understand the maglev train without giving everything away. The diagrams and explanations support students in constructing their own explanations in the unit.



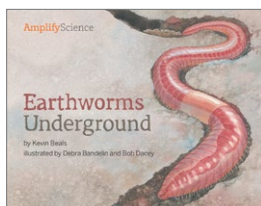
ISBN: 978-1-943228-07-2
Lexile Measure: N/A

Handbook of Forces

Handbook of Forces is the reference book for this unit, giving students a place to look up and discover information about various kinds of forces and scenarios: touching forces, gravity, magnetic force, electromagnetic force, multiple forces, and balanced and unbalanced forces. Each section offers many accessible examples with simple explanations. In addition to reinforcing key unit content, this reference book supports students' firsthand investigations of forces in class and gives them an opportunity to search for secondhand evidence of forces. The book delivers content that builds on students' firsthand observations of magnets and shows how magnets can be used for exciting real-world applications. The diagrams and explanations in the book provide a model for students that will help them as they construct their own explanations in the unit.

Reference Book

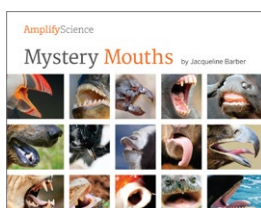
Environments and Survival: Snails, Robots, and Biomimicry



ISBN: 978-1-945191-99-2
Lexile Measure: 670L

Earthworms Underground

Earthworms Underground focuses on how earthworms meet their needs in their underground environment. The book is designed to provide students with a view of the earthworm in its natural habitat. Students learn that earthworms have needs, including the need for water and food, the need to protect themselves, and the need to reproduce. The book describes how earthworms' traits and behaviors allow them to meet each of their needs. Through reading this book, students begin to learn about the connection between an organism's traits and how the organism survives in its environment. *Earthworms Underground* introduces important content and provides context for students' investigations of what organisms need to survive.



ISBN: 978-1-945192-02-9
Lexile Measure: 620L

Mystery Mouths

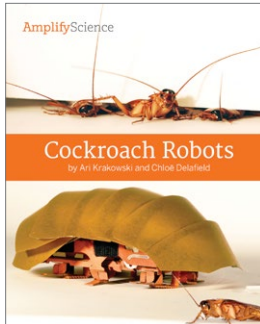
Mystery Mouths introduces students to the concept of structure and function by providing them with the opportunity to observe the traits of various animal mouths. First, students are shown a photograph of a mouth and asked to examine it. Then, they turn the page and learn what kind of animal has such a mouth and what the structures in the mouth allow the animal to do. Students also examine skulls, including fossil skulls, and compare them to the mouths of animals with similar structures. This book conveys essential content about structure and function. In addition, the format of this book makes it ideal for helping students make inferences from the text and the visual representations. This experience with making inferences supports students in their firsthand and secondhand investigations.



ISBN: 978-1-945192-05-0
Lexile Measure: 610L

Environment News

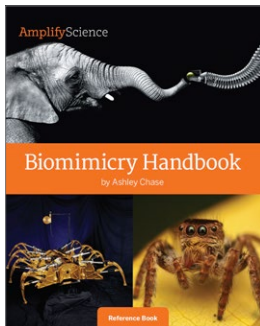
Environment News showcases three examples of how a change in environment can cause traits that were once adaptive to become non-adaptive, or vice versa. These three examples, featuring cliff swallows, armadillo lizards, and gloxinia plants, are presented as a series of news articles based on real-life problems caused by drought and human activity. Readers are taken back in time as they read the news articles. As each situation unfolds, they learn why and how changes in a particular environment happened and how these changes affected the survival of organisms in that environment. This book provides students with several examples of how a trait that helps an organism survive in one environment may no longer help it survive if that environment changes. In addition to providing context for students' investigations by presenting illustrative examples of adaptive and non-adaptive traits, this book reinforces the important, but often misunderstood, concept that an organism can't just change its traits to be adaptive in a new environment.



ISBN: 978-1-945192-08-1
Lexile Measure: 660L

Cockroach Robots

Cockroach Robots is about the work of Bob Full and his team of biomimicry engineers who build robots inspired by the traits of organisms. This book follows the process of designing a many-legged robot that can run fast through tiny spaces, just like a cockroach can. Full and his team carefully observe the cockroach and its traits, and then they design a robot that can also move quickly over and around obstacles. They test the robot, which is intended to enter buildings in the case of a disaster such as an earthquake, to see if it is safe for people to enter the buildings. After testing the robot, Full and his team revise the robot to better meet their design criteria. This book models the practices of observation, investigation, design, testing, and more that engineers engage in when they work.



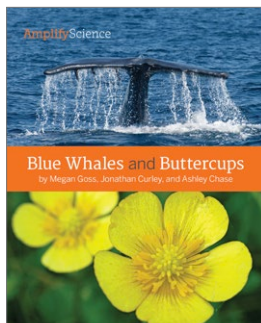
ISBN: 978-1-945192-11-1
Lexile Measure: N/A

Biomimicry Handbook

Biomimicry Handbook is the reference book for this unit and provides students with many examples of real scientists and engineers working on all kinds of biomimicry projects where they get inspiration for designs from the traits of organisms in the natural world. The introduction to the handbook provides a clear, illustrated example of adaptive and non-adaptive traits, an explanation of what biomimicry is, and discusses how designed objects are different from organisms. Students learn about self-healing plastic based on human skin, chainsaws based on beetle jaws, computer screens based on butterfly wings, and more fascinating examples of biomimicry. This book introduces the field of biomimicry, which students will explore throughout the unit in their role as biomimicry engineers. The book also serves to model how scientists and engineers use their knowledge of traits to design new things that solve problems.

Reference Book

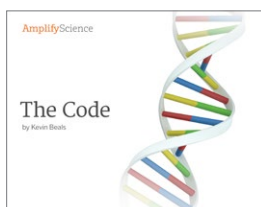
Inheritance and Traits: Variation in Wolves



ISBN: 978-1-945191-85-5
Lexile Measure: 710L

Blue Whales and Buttercups

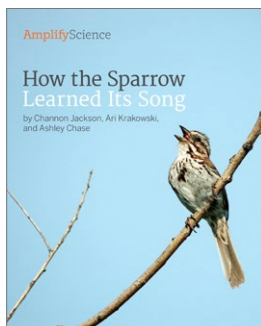
Blue Whales and Buttercups introduces the idea that all organisms on Earth are related, but there is a lot of variation among them. It offers examples of the amazing variety of living things, from redwood trees to nine-armed sea stars. The book explains that there is variation in traits among very different organisms, among different species within a group (such as bats), and among the members of a single species. There is variation in size, ways of moving, and defenses. Organisms are grouped into categories from large (animals with four limbs) to small (blue jays). The end of the book brings students back to the idea that all organisms are related, because they're all made of cells. This book sets the context for the unit and sparks students' interest in traits with many engaging examples of a wide variety of organisms.



ISBN: 978-1-945191-96-1
Lexile Measure: 720L

The Code

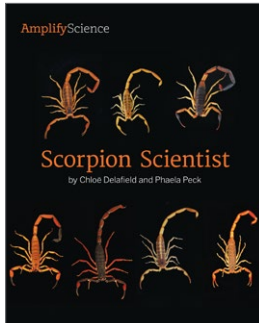
The Code explores the idea that while we are all different, we all share traits that are inherited. Photographs of children show the traits that all people share as well as the variation within those traits. The text explains that we inherit many traits from our birth parents because of a code contained in the genes that our ancestors pass down to us. We are all similar in many ways, but no two people are exactly the same. The text and images help students make the connection between the traits that we can see and the tiny genes inside our bodies. The book concludes with a discussion of the fact that all organisms have genes and that we have genes in common with every organism on Earth. *The Code* provides an accessible way for students to understand a key idea from the unit that is difficult to observe in a firsthand way: Genes provide the instructions for our traits.



ISBN: 978-1-945191-68-8
Lexile Measure: 740L

How the Sparrow Learned Its Song

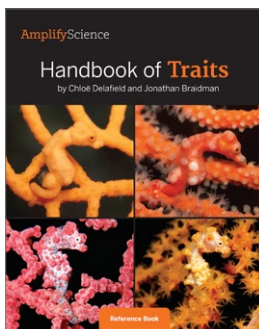
How the Sparrow Learned Its Song complements *The Code* with a discussion of traits that are influenced by the environment. The book gives five examples of organisms that acquire traits from their environments: song sparrows and their individual songs, decorator crabs and their shells, grizzly bears and their hunting styles, vervet monkeys and their alarm calls, and redwood trees and their height. The final example shows how traits can be influenced by inheritance and the environment. The redwood tree is so tall both because it inherited genes that allow it to get that tall, and because it got all the sunlight, water, and space it needed from its environment. A dogwood tree could never get that tall, no matter how many resources there were in its environment. This book supports students' investigations by providing information about traits that can come from an organism's environment and from a combination of genetic and environmental influences.



ISBN: 978-1-945191-65-7
Lexile Measure: 780L

Scorpion Scientist

Scorpion Scientist follows an arachnologist, Lauren Esposito, as she discovers an unknown scorpion and identifies it as a new species. Esposito asks a series of questions and investigates to find the answers. She asks whether the scorpion has different genes from similar scorpions, whether its behavior and other traits are different, and whether it lives in a different environment. The answers to all these questions are evidence that it is a new species of scorpion. This book models the practice of asking investigable questions and gives students a real-life example of a scientist investigating variation to make a claim. It also helps students understand that scientists investigate their questions by looking for patterns.



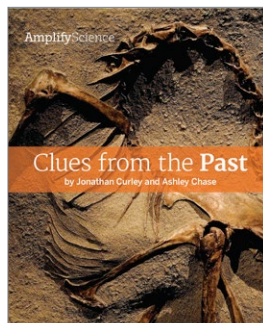
ISBN: 978-1-945191-71-8
Lexile Measure: N/A

Handbook of Traits

Handbook of Traits is the reference book for this unit, providing students with information and examples that build their understanding of traits, variation, inheritance, and environmental influences. The book profiles 20 species of plants and animals, with detailed information on traits and variations within the species, inherited and environmentally influenced traits, and life cycles. Each entry includes many photos that allow students to see traits and variation, plus a diagram that helps students understand the diversity of life cycles. This reference book supports students' firsthand investigations as they find images that show variation within a species, observe the traits of parents and offspring, and discover traits that are influenced by both inheritance and environmental factors.

Reference Book

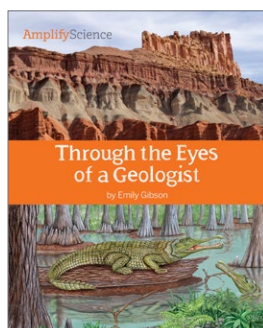
Earth's Features: Mystery in Desert Rocks Canyon



ISBN: 978-1-945192-29-6
Lexile Measure: 670L

Clues from the Past

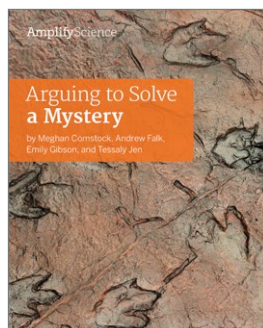
Clues from the Past follows a paleontologist named Rodolfo Coria through his process of making inferences about a dinosaur called *Argentinosaurus* based on his observations of fossils. Of course, Coria can't observe the *Argentinosaurus* directly, so he must combine his observations of fossils with what he knows about existing animals to infer what the dinosaur was like. To support students in understanding how fossils form, *Clues from the Past* explains the process of sedimentary rock formation, and explains how this relates to using fossils as clues from the past. The book models the scientific practice of making inferences by providing an example of a real scientist at work.



ISBN: 978-1-945192-32-6
Lexile Measure: 890L

Through the Eyes of a Geologist

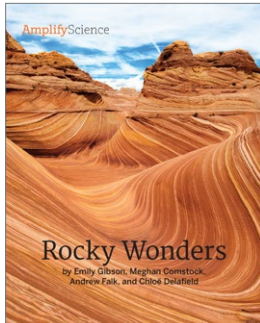
Through the Eyes of a Geologist uses an innovative format to explore how geologists make inferences about the past based on rocks and fossils. The book invites students to view present-day landscapes through the eyes of a geologist by making careful observations. Students learn what geologists can infer from observing rocks and fossils in a mountainous area of Canada that used to be an ocean, a desert area of Utah that used to be a swamp, and more. For each place, students can observe photographs of the present-day landscape and read about what it is like in the present, along with information about rocks and fossils that have been found there. Then, the book presents a detailed illustration of what the place may have looked like millions of years ago, with explanations of how geologists have made inferences about what the place was like in the past. *Through the Eyes of a Geologist* models the practice of making inferences based on observations and scientific principles, and provides context for the ideas that students are learning.



ISBN: 978-1-945192-35-7
Lexile Measure: 870L

Arguing to Solve a Mystery

Arguing to Solve a Mystery explores the fascinating mystery of why the dinosaurs went extinct, and describes how scientists use argumentation to further our understanding of what might have happened. The book follows the work of geologist Walter Alvarez, exploring his claim that a massive asteroid was the catalyst for the dinosaur extinction event. The evidence that Alvarez used to support this claim is described in detail. Another claim, that volcanoes caused the extinction, is proposed by geologist Courtney Sprain, and her work finding evidence to support new and more complete arguments about what happened is explained. Through reading about the mystery of why the dinosaurs went extinct, students learn that argumentation is the way in which science moves forward. *Arguing to Solve a Mystery* models the scientific practice of argumentation, and helps students understand how evidence can be used in support of claims.



ISBN: 978-1-945192-38-8
Lexile Measure: 850L

Rocky Wonders

Rocky Wonders introduces students to many spectacular rock formations around the world and points out that while the rock formations are all very different, erosion caused them all to look the way they do. Beautiful photographs, detailed diagrams, informative descriptions, and a lively “Hazard Warning!” section combine to help students engage with the science behind rock formations. From the mushroom-shaped columns of rock in the White Desert in Egypt to the steep and narrow Black Canyon in Colorado, this book offers students an opportunity to apply ideas about erosion to understanding how many different rock formations came to be. *Rocky Wonders* delivers important content about erosion as well as provides real-world contexts in which students can see the effect of this process.



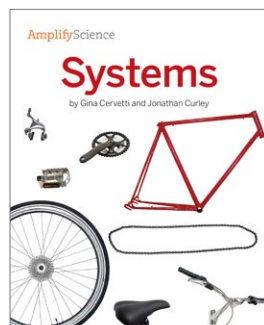
ISBN: 978-1-945192-41-8
Lexile Measure: N/A

Fossil Hunter's Handbook

Fossil Hunter's Handbook is the reference book for this unit. The book provides detailed information about fossils, rocks, the process of sedimentary rock formation, and environments in which fossils are likely to form. The “Fossils” section includes information on fossils from many different plants and animals and explains what these fossils can tell us about the past. The “Rock” section has entries for eight different types of rock, including information about how and where they form. The “Environments” section of the book describes these places and notes the sediments that commonly build up in them. Students use this reference book extensively in the unit to gather evidence, identify rocks and fossils, and learn about the process of sedimentary rock formation. *Fossil Hunter's Handbook* supports students' firsthand investigations by providing information that they can combine with their observations to make inferences about what environments may have been like in the past.

Reference Book

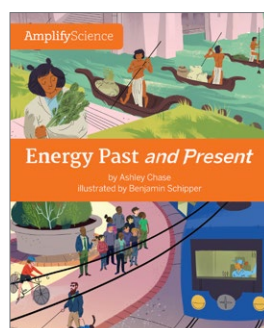
Energy Conversions: Blackout in Ergstown



ISBN: 978-1-943228-41-6
Lexile Measure: 810L

Systems

Systems introduces students to a concept that is essential to the unit: what makes a system. The book's introduction defines structure and function and uses the example of a bicycle to illustrate how parts have a structure that allows them to perform specific functions. Once all the parts are connected, that makes a system. The next example presented is a home, which is a system made of systems—plumbing, heating, electrical, etc. Each system is made up of parts that work together, and all the smaller systems work together to make the whole system of the home. In turn, the home is part of larger municipal systems, such as the public water system and the electrical energy system. The final pages of the book discuss system failure and encourage students to think further about why systems are an important concept and what systems they see in their daily lives. This book sets the context for the unit and introduces vocabulary and concepts that will be used extensively throughout the unit.



ISBN: 978-1-943228-25-6
Lexile Measure: 930L

Energy Past and Present

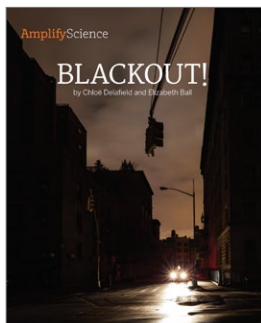
Energy Past and Present looks at how people use electrical devices to do various tasks in their everyday lives and how people accomplished these same tasks before electrical devices were invented. Each spread includes a blurb about the present day and a blurb about the past with information about the transfer and conversion of energy. For example, the section about hot baths explains where hot water comes from in a contemporary home and how ancient Romans heated water for communal bathing pools. The pages are full of intriguing details and fascinating information, and the concluding pages encourage students to learn lessons from the past that may help them use less electrical energy. The book delivers important unit content in the context of an engaging and lively exploration of life with and without electrical devices.



ISBN: 978-1-943228-26-3
Lexile Measure: 900L

Sunlight and Showers

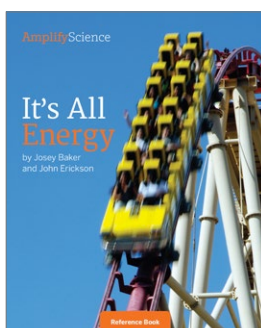
Sunlight and Showers introduces readers to Dr. Ashok Gadgil, an engineer who uses his scientific knowledge to address real-world problems. Dr. Gadgil's students work together as a team to design a solar water heater for use in Guatemala. The book describes various ways the young engineers solve the design problem—working as a team, investigating the issues and gathering data, and designing and testing a solution. The book demonstrates that solar energy is useful as an alternative source of energy and models the practices of engineering by providing a compelling example of engineers solving real problems for real people. The book allows students to reflect on how they have been like engineers and to anticipate more behaviors as they continue being engineers throughout the unit.



ISBN: 978-1-943228-27-0
Lexile Measure: 750L

Blackout!

Blackout! is formatted like a series of news articles about real-life blackouts that have occurred around the world. Each blackout has a different cause, from a runaway truck crashing into utility poles to an overburdened electrical energy system failing in a heat wave. The articles encourage students to think about energy sources, energy conversion and transfer, and what happens when one part of a system fails. The readings reinforce the role of the electrical energy system, including the grid, and plant the idea that blackouts occur for a variety of reasons. Different parts of the system, including sources and converters, are vulnerable to failure. Sometimes getting through blackouts and finding solutions requires trade-offs. These ideas support students' thinking and provide secondhand evidence as they investigate the causes of and remedies for the blackouts occurring in Ergstown.



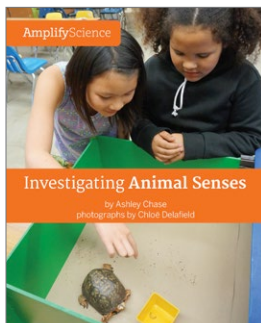
ISBN: 978-1-943228-29-4
Lexile Measure: N/A

It's All Energy

It's All Energy is the reference book for this unit, giving students a place to search for information about forms of energy, energy converters, energy sources, and energy transfer. The book defines energy, introduces and gives examples of energy forms (electrical, motion, sound, thermal, light, and chemical), and discusses how these energy forms are harnessed and converted for human use. Students can also compare the renewability, reliability, cost, and environmental impact of various energy sources. As they delve into the problem context, students can use the reference book to match energy converters with sources and compare renewable and nonrenewable energy sources. This book serves to deliver and reinforce important content throughout the unit, as well as provide students with a rich resource to support their firsthand investigations.

Reference Book

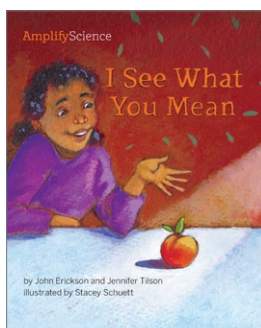
Vision and Light: Investigating Animal Eyes



ISBN: 978-1-945192-44-9
Lexile Measure: 760L

Investigating Animal Senses

Inspired by a real class field trip, *Investigating Animal Senses* follows elementary students engaged in the practices of scientific investigation. The students plan and conduct their own investigations with animals to determine which sense each animal depends on more for finding food: vision or smell. The practices modeled in this story include asking questions, planning and conducting an investigation, and controlling variables. In addition to modeling key practices, *Investigating Animal Senses* helps set the context for the unit. It also reinforces the concepts that light, sound, and scent carry information about the environment and that animals have structures that allow them to sense their environment.



ISBN: 978-1-945192-47-0
Lexile Measure: 640L

I See What You Mean

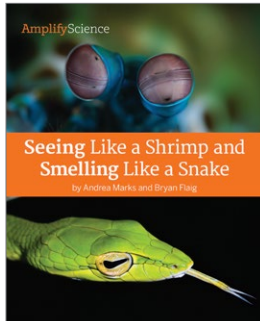
Framed with a narrative about two friends exploring light at home, *I See What You Mean* traces the path of light in vision, from source to object to eye. Through the course of the book, the friends build a detailed explanation of how vision works. Combined with students' experiences working with the Vision and Light Simulation, *I See What You Mean* supports students in understanding a key idea that is difficult to observe firsthand—light needs to reflect off an object and get to the eye for an animal to see the object.



ISBN: 978-1-945192-50-0
Lexile Measure: 820L

Crow Scientist

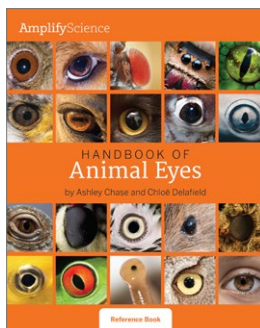
Crow Scientist profiles prominent wildlife biologist John Marzluff. The book focuses on Marzluff's investigation of the American crow's ability to recognize individual human faces. This investigation required careful varying of an interesting variable: the face. Marzluff and his team created masks of different faces. By trapping (and immediately releasing) wild crows while wearing masks of certain faces, the team trained the crows to associate those faces with danger. Masks of other faces were used as "neutral" versions of this variable. The scientists kept all other variables besides the faces constant. Marzluff and his team found that crows consistently scolded (and often attacked) people wearing masks of "dangerous" faces, evidence that the crows recognized and remembered those faces. *Crow Scientist* models controlling variables in a scientific investigation, and also reinforces concepts around sensory processing. Through reading the book, students learn that animal brains process information by forming an image and comparing it to memories; then, animals can make decisions that help them survive.



ISBN: 978-1-945192-53-1
Lexile Measure: 880L

Seeing Like a Shrimp and Smelling Like a Snake

This engaging book explores all five senses, focusing on a different animal for each sense. Students read about a mantis shrimp's vision, a star-nosed mole's sense of touch, a catfish's sense of taste, a fennec fox's sense of hearing, or a snake's sense of smell. These fascinating examples of animal senses help students understand that vision (and other senses) can be different for different animals and that some animals are more sensitive than others. The book also highlights each sense in humans, and includes hints about the ways vision can be different in nocturnal versus diurnal animals. This will help students figure out the mystery they are presented with in the unit—why nighttime highway lights are causing problems for nocturnal Tokay geckos. This book also sets the context for students' final investigations, inviting them to consider how different animals have different sensitivities to information about their environment.



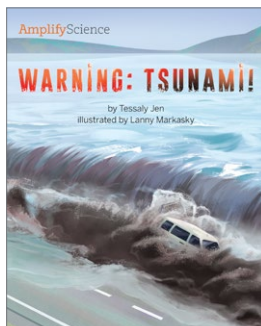
ISBN: 978-1-945192-56-2
Lexile Measure: N/A

Handbook of Animal Eyes

This reference book includes cross-section diagrams of eyes, vivid close-up photos, and accessible text about the eyes of humans and the eyes of a diverse set of 20 other animals. Each entry contains information about the structures of that animal's eyes, such as the sensitivity of the receptors. Also included are descriptions of how vision helps the animal survive. Students return to *Handbook of Animal Eyes* multiple times throughout the course of the unit to support their understanding of vision and eye structures. This book supports students' firsthand investigations as they learn about vision and eye structures and how the brain processes information, and as they discover the role of different types of light receptors in nocturnal and diurnal animals.

Reference Book

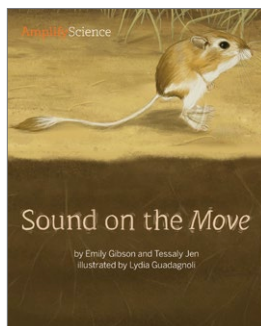
Waves, Energy, and Information: Investigating How Dolphins Communicate



ISBN: 978-1-943228-37-9
Lexile Measure: 930L

Warning: Tsunami!

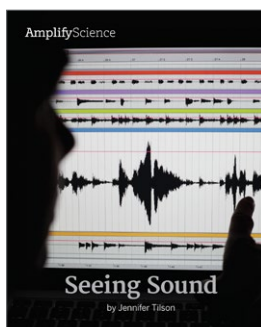
Warning: Tsunami! explores the exciting topic of tsunamis in order to demonstrate how waves travel. Tsunamis provide a memorable depiction of the fact that waves are patterns of motion, not transporters of matter across distances. The book begins with a description of tsunamis and diagrams to show the sequence of events when a tsunami occurs. The book then explores how tsunamis are different from regular ocean waves and from sound waves. The book specifies that what actually travels in a tsunami is the energy of the wave, not the water. The conclusion explains tsunami detection and safety. *Warning: Tsunami!* provides students with a compelling example to help them understand that a wave is a pattern of motion. The book also helps students understand the characteristics shared by all waves.



ISBN: 978-1-943228-31-7
Lexile Measure: 760L

Sound on the Move

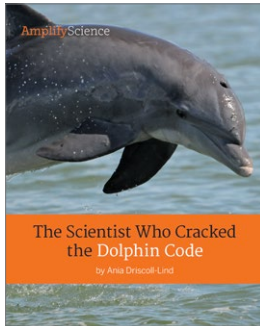
Sound on the Move introduces the idea that sound waves travel as a series of collisions of particles that are too small to see. The engaging context of animal communication through air, water, and ground helps students solidify their understanding of tricky concepts. The book begins with an introduction to animal communication, human communication, and vocal structures. Clear diagrams overlaid on beautiful nature illustrations help students understand the differences in how particles are arranged in air, water, and ground. Diagrams similar to those in the Sound Waves Simulation show how sound waves travel at the particle level. Three organisms—mountain bluebirds, sperm whales, and kangaroo rats—serve as examples of animals using sound to communicate. This book delivers essential unit content about particles, sound waves, patterns, and vibration.



ISBN: 978-1-943228-35-5
Lexile Measure: 760L

Seeing Sound

Seeing Sound introduces students to professionals who use visual representations of sound in their jobs: scientists, audiologists, sound engineers, and doctors. The book provides examples that show the importance of visual representations of sound, such as waveforms, in various kinds of work. Students learn that scientists investigate sound for many reasons, including to study how animals communicate. A section about audiologists explains how these professionals administer hearing tests and make visual representations of the sounds that people can hear. Students find out that sound engineers can change the amplitude and wavelength of recorded sounds to make movies and music sound better to listeners. Finally, students may be surprised to learn that doctors can use sound to diagnose and heal patients. The book reinforces science content about the properties of sound waves, including wavelength, pitch, amplitude, and volume, and how these properties can be visually represented and even manipulated to change a sound. The book shows students that their knowledge about sound applies to the real world and gives them additional context for looking at waveforms.



ISBN: 978-1-943228-33-1
Lexile Measure: 860L

The Scientist Who Cracked the Dolphin Code

The Scientist Who Cracked the Dolphin Code profiles a marine biologist named Laela Sayigh, with a focus on her study of bottlenose dolphin communication. The book follows her years of research and data analysis, culminating in her discovery of how dolphins recognize each other based on the pitch of their signature whistles. Colorful visual representations provide a clear depiction of how changes in pitch can be recognized and sorted by their differences. The final pages of the book discuss how Sayigh's research has raised new questions for further study. *The Scientist Who Cracked the Dolphin Code* depicts a scientist engaging in investigations of sound waves and dolphin communication, offering students a practical model of the kind of investigations they are doing in the unit and of scientific practices in general.



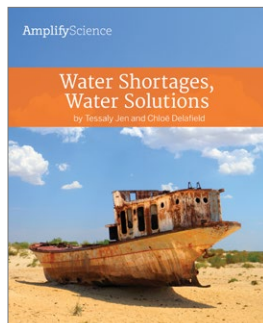
ISBN: 978-1-945191-00-8
Lexile Measure: N/A

Patterns in Communication

Patterns in Communication is the reference book for this unit. It provides students a place to find information about how and why various animals use patterns to communicate. The introduction explains how most of these patterns travel in waves and explains some features that all waves have in common. The book is divided into four sections focusing on different types of organisms: marine mammals, birds, insects, and humans. Each section offers many accessible examples of auditory and visual communication, such as bee dances and dolphin whistles. Each example includes an explanation of the mechanisms involved in the communication, the patterns that the organisms use, and the reasons for the communication. In addition to reinforcing key unit content, this reference book supports students' firsthand investigations of waves and serves as a resource from which students can gather secondhand evidence about features of sound waves.

Reference Book

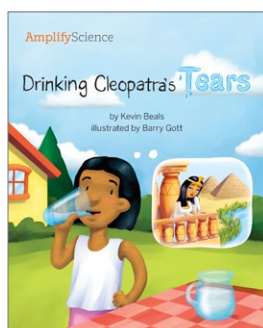
The Earth System: Investigating Water Shortages



ISBN: 978-1-945192-49-4
Lexile Measure: 880L

Water Shortages, Water Solutions

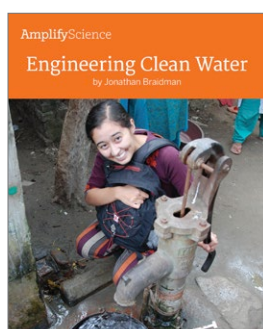
Water Shortages, Water Solutions presents six real-life water shortage situations to get students thinking about humans' relationship with Earth's limited freshwater resources. The examples highlight how drought, overuse, and pollution can cause water shortages, and drive home the idea that a water shortage is an insufficient amount of usable freshwater, not necessarily a lack of water in general. A central theme in the book is that when people use water, it often becomes unavailable for future use. It does not disappear from Earth, but often moves into a place or form that is not usable for people. The book describes examples of water shortages from the U.S. and around the world, as well as some of the ways people are addressing these shortages. This book sets the context for the unit and helps students connect ideas they learn about in the unit to authentic problems people are experiencing around the world.



ISBN: 978-1-945192-52-4
Lexile Measure: 1000L

Drinking Cleopatra's Tears

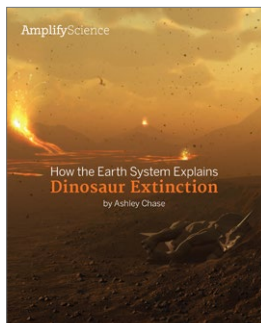
Filled with surprising and humorous examples of how water on Earth is recycled over time, *Drinking Cleopatra's Tears* emphasizes that water is continuously recycled on Earth through the water cycle. Diagrams in the book highlight the different phase changes (evaporation and condensation) that water goes through as it travels around Earth and in the atmosphere. This book helps students review and apply their growing knowledge of the water cycle and also lays the groundwork for understanding conservation of matter. *Drinking Cleopatra's Tears* reinforces concepts such as water vapor, condensation, and evaporation to help students connect ideas that they have learned from previous activities and start understanding how water from a lake can become a raindrop...or how water from Niagara Falls can end up in a squirt gun. The book provides context for students' investigations by helping them see how evaporation and condensation happen continuously all over Earth.



ISBN: 978-1-945192-55-5
Lexile Measure: 940L

Engineering Clean Water

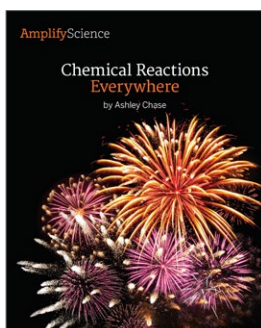
Engineering Clean Water profiles two engineers who worked with a team to improve access to clean water in Dhaka, Bangladesh. One of the engineers was Bangladeshi, and the other was a visitor from the United States. Together, the engineers designed an inexpensive, easy-to-use water pump attachment that cleaned contaminated water at the point of use. Their design improved health outcomes for many residents of crowded areas in Dhaka by affording them access to clean drinking water at their neighborhood pumps. The book addresses each step of the design cycle in detail, with passages describing the engineers learning about the problem and then planning, making, and testing their designs. This book emphasizes that engineers iterate by going through the steps of the design cycle repeatedly to improve their designs. Students will be able to apply this understanding of design iteration to their own work as they improve their freshwater collection system designs.



ISBN: 978-1-945192-70-8
Lexile Measure: 910L

How the Earth System Explains Dinosaur Extinction

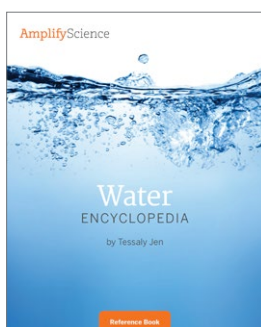
How the Earth System Explains Dinosaur Extinction is a book about how the parts of the Earth system—the hydrosphere, biosphere, geosphere, and atmosphere—interact. The explanation of how the dinosaurs could have gone extinct 65 million years ago provides a fascinating lens through which to view Earth system interactions. The book describes each of the Earth system's parts in detail, followed by the step-by-step explanation of how the interactions between parts could have caused the extinction of the dinosaurs. This explanation is presented as a chain of interactions: Changes in one part caused changes in another part, which caused changes in another part, and so on. The book provides context for students' investigations of the Earth system by helping them make connections between what they have been learning in class and a fascinating event in the history of Earth. It also encourages them to consider the many ways that Earth's parts interact.



ISBN: 978-1-945192-15-9
Lexile Measure: 730L

Chemical Reactions Everywhere

Chemical Reactions Everywhere uses familiar examples to convey that chemical reactions happen everywhere around us. The book explains that everything in the world is made of chemical substances, and that when a chemical reaction happens, at least one new substance with new properties forms. Twelve familiar chemical reactions are featured, and evidence of each chemical reaction—taste change; color change; temperature change; or the production of gas, light, or electricity—is identified. This book puts chemical reactions into the context of students' everyday lives through the engaging text and photographs. It also serves to launch students' investigations of chemical reactions as they consider how chemical reactions could play a role in their designs for wastewater treatment systems.



ISBN: 978-1-945192-74-6
Lexile Measure: N/A

Water Encyclopedia

Students learn about the distribution of water on Earth, the phases of water, water treatment, and much more in *Water Encyclopedia*. As an encyclopedia, the book covers many different aspects of water. Its alphabetized entries provide an easy way for students to search for specific information when they need it. *Water Encyclopedia* is a helpful resource for students to use throughout the unit as they investigate what causes water shortages, why different places get different amounts of rain, and what people can do to solve problems with water availability.

Reference Book

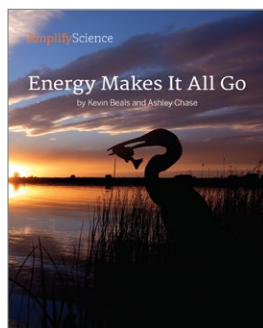
Ecosystem Restoration: Matter and Energy in a Rain Forest



ISBN: 978-1-943228-51-5
Lexile Measure: 900L

Matter Makes It All Up

Matter Makes It All Up explores the fundamental concept that everything in an ecosystem—each living and nonliving part—is made of matter. Through engaging examples, students learn that matter makes up everything and that matter itself is made of atoms and molecules. The book also introduces the idea that matter moves through ecosystems. Using the example of an alligator in the Everglades Swamp ecosystem, the book follows how matter from what the alligator eats becomes part of its body as it grows and thrives in its environment. As matter is traced through the ecosystem, students learn that ecologists use food webs to show the movement of matter in an ecosystem from one organism to another. This book sets the context for the unit and introduces vocabulary and concepts that will be used extensively throughout the unit. It also delivers essential content—the idea that everything is made of matter—that is difficult to observe firsthand.



ISBN: 978-1-943228-54-6
Lexile Measure: 950L

Energy Makes It All Go

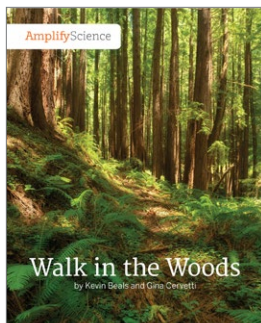
Energy Makes It All Go drives home the idea that nearly all energy on Earth ultimately comes from the sun. This energy moves through ecosystems as plants make their own food and, in turn, as animals eat plants and other animals. Organisms use this energy to grow, move, reproduce, and eat. The book explains how plants make food by using energy from sunlight and how that food may then become part of the bodies of herbivores and omnivores, which may then become part of the bodies of carnivores and omnivores. The book also introduces decomposers and their role in an ecosystem and challenges the reader to use what they have learned to think about the classification of a few organisms that are hard to categorize. Students learn that living things get their energy in different ways, but the source of that energy is almost always the sun. This book delivers content that will enrich students' understanding of ecosystems and support their investigations.



ISBN: 978-1-943228-58-4
Lexile Measure: 960L

Why Do Scientists Argue?

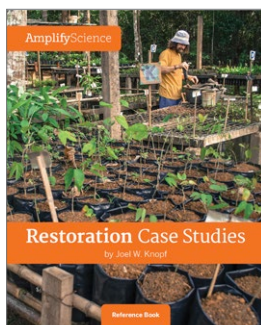
Why Do Scientists Argue? delves into the scientific practice of argumentation and details how and why arguments are so important to scientists. The book's unique format provides both information about the scientific community in general and a specific example of argumentation in action—the work of ecologist Rachel Carson. Left-hand pages tell the story of Carson's work, while right-hand pages place that story in the context of argumentation within the scientific community at large. The book follows Carson as she gathers evidence that supports her claim that pesticides cause damage to entire ecosystems, not just the insects they were designed to stop. Even though her claim was different from what most other scientists thought at the time, Carson convinced others that her claim was correct by supporting it with extensive evidence. This argument helped convince people to stop using some of the most harmful pesticides. Along the way, the text introduces the idea of the scientific community, which includes scientists all over the world who share information and ways of thinking and who argue with one another to move science forward. Students use this book to connect a real-world example of scientific argumentation to their own experiences making arguments about ecosystems. This book provides a rich model of scientific argumentation in action, as well as the communication skills and persistence required to participate in the scientific community.



ISBN: 978-1-943228-53-9
Lexile Measure: 960L

Walk in the Woods

Walk in the Woods follows a soil scientist named Asmeret Asefaw Berhe as she walks through the woods making observations. Berhe finds evidence of soil being formed from different kinds of matter. She knows that soil is a system made of different kinds of matter including 1) nonliving things such as rocks, 2) living things, and 3) the remains of dead organisms. Berhe looks for decomposers on the walk and describes the evidence that she sees of different kinds of common decomposers. *Walk in the Woods* provides students with an example of a real scientist who is looking for firsthand evidence in the natural world and investigating to find the answers to science questions. Students use this book to understand what kinds of matter make up soil as they begin to investigate the relationship between soil and plant growth. It also brings the forest ecosystem into the classroom through vivid photographs and descriptions. This book offers a compelling model of scientific inquiry skills, including careful observation and making inferences.



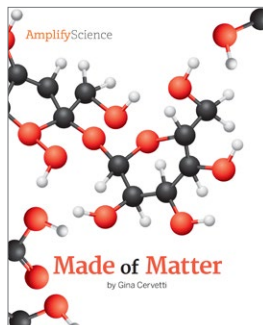
ISBN: 978-1-943228-56-0
Lexile Measure: N/A

Reference Book

Restoration Case Studies

Restoration Case Studies provides students with several examples of ecosystem restoration projects taking place in the real world. Each case study includes a description of the ecosystem along with a diagram of a food web, an introduction to the problems in the ecosystem, and information about the restoration work that is going on. The book helps students understand that ecosystems are complex and that all parts of an ecosystem affect one another. When there is a problem in one part of an ecosystem, it can have repercussions for all the organisms in that ecosystem. Diverse examples of restoration plans expose students to several varied examples of ecosystems and help students understand a range of human-caused environmental problems. The emphasis throughout the book is on the innovative ways that people are trying to remediate these problems. At the end of each section, readers are encouraged to think creatively about how to restore various kinds of ecosystems. At several points throughout the unit, students refer to this book to read about restoration plans that might spark ideas they could apply to their own restoration plans for the Costa Rican rain forest. This book supports students' firsthand investigations by providing information they can use as they create their plans. It also offers an opportunity for secondhand inquiry, as students can analyze the data provided and develop their own claims.

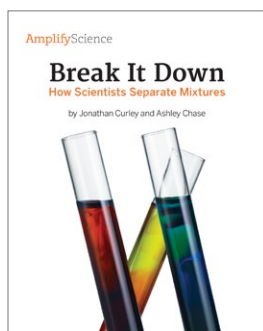
Modeling Matter: The Chemistry of Food



ISBN: 978-1-943228-09-6
Lexile Measure: 800L

Made of Matter

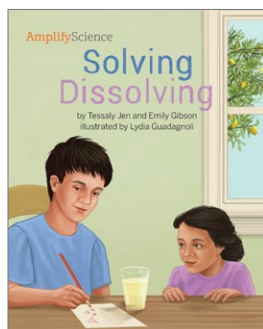
Made of Matter introduces students to several important concepts about matter. Students learn that everything around them is made of tiny particles called atoms and that atoms joined together are called molecules. By comparing different amounts of everyday materials, students get a sense of just how tiny atoms and molecules are. Students are introduced to models as representations of atoms and molecules and learn that all molecules of one kind are exactly the same. Students learn the difference between a substance and a mixture and that most matter is made of many different kinds of substances mixed together. They also learn that molecules can have different properties, which helps build the foundation for understanding why substances have different observable properties.



ISBN: 978-1-943228-10-2
Lexile Measure: 800L

Break It Down: How Scientists Separate Mixtures

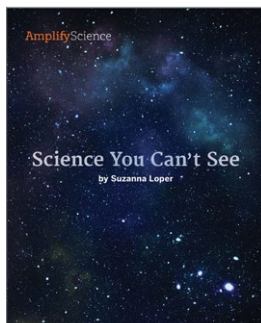
Break It Down: How Scientists Separate Mixtures discusses mixtures and the importance in science of being able to separate them into component substances. The book shows students three contexts in which separating a mixture is important: the separation of pure water from salty ocean water, plasma from blood, and the original ingredients from the remains of a meal found in an ancient tomb. Each example features a different separation technique. The book emphasizes that each technique uses the unique observable and molecular properties of the substances in the mixture in order to separate them. This helps reinforce students' understanding that the properties of a substance are determined by the properties of its molecules.



ISBN: 978-1-943228-15-7
Lexile Measure: 690L

Solving Dissolving

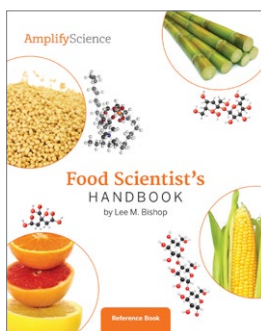
A boy named Diego helps his little sister, Maya, solve the mystery of the disappearing sugar in *Solving Dissolving*. As the siblings make lemonade, Maya notices that the sugar is no longer visible in the water when it's stirred. Using both observable evidence and nanoscale models, Diego proves that the sugar is dissolving, not disappearing. He helps Maya understand that the sugar is breaking apart into pieces that are too small to see: molecules. This exploration of dissolving helps students understand what is happening with their mixtures on a molecular level. In addition, it provides a clear example of using evidence and models to answer questions and explain phenomena that are not directly observable.



ISBN: 978-1-943228-11-9
Lexile Measure: 900L

Science You Can't See

Science You Can't See introduces students to the work of three scientists, each of whom studies a phenomenon that cannot be observed directly. Karen Chin studies dinosaurs, Edward Saade investigates the ocean floor, and Farid El Gabaly uses an electron microscope to make images of atoms. In order to answer their questions, these scientists must make inferences based on evidence rather than direct observations. *Science You Can't See* models an important aspect of the nature of science for students—making sound inferences based on evidence.



ISBN: 978-1-943228-17-1
Lexile Measure: 860L

Food Scientist's Handbook

Students learn about the nanoscale and observable properties of various food ingredients, and how food scientists use them, in *Food Scientist's Handbook*. They also learn about some common processes that food scientists use to change foods: heating, cooling, and mixing. Each ingredient page provides an introduction to the ingredient and its uses and includes a chart that helps students relate properties of the molecules in the ingredient to its observable properties. The process pages help students understand what is happening on a molecular level when ingredients undergo various changes, some reversible and some not. This latter section also introduces chemical reactions and some of the surprising changes that can occur when substances are involved in a chemical reaction. *Food Scientist's Handbook* provides a helpful resource for students to use throughout the unit as they explore their salad dressing mixtures.

Reference Book

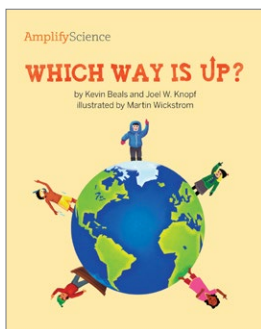
Patterns of Earth and Sky: Analyzing Stars on Ancient Artifacts



ISBN: 978-1-939787-45-3
Lexile Measure: 900L

How Big Is Big? How Far Is Far?

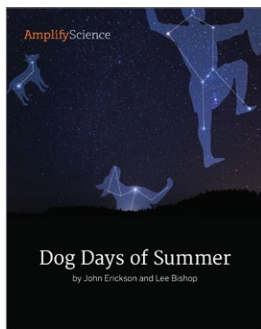
How Big Is Big? How Far Is Far? challenges students to reframe their ideas about size and distance. Beginning with a beluga whale, the book zooms out to bigger and bigger things, from blue whales to stars. Next, the book explores relative distances, starting with a familiar example—the distance between home and school—before moving to distances between astronomical objects. This book sets the context for the unit by orienting students to the nearly incomprehensible immensity of space and to some objects that they will investigate. It also helps prepare students to understand unit content as they think about the question of how distant and how huge stars actually are; they only look small because they are so far away.



ISBN: 978-1-943228-64-5
Lexile Measure: 920L

Which Way Is Up?

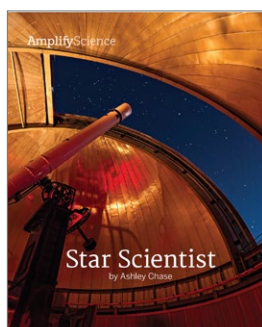
Which Way Is Up? with its clear text and simple illustrations, helps students explore the meaning of the directions up and down in various locations on our spinning, spherical planet. The book introduces the force of gravity, which causes Earth to pull everything toward its center. Various examples show that this pull is inescapable and always in the downward direction, up is the opposite, and gravity is measured by an object's weight. This book delivers essential content and supports students in understanding a key idea that is difficult to observe firsthand: What people on Earth see in the sky when they look up changes, and we do not all see the same thing at the same time. However, gravity is the constant force that helps people determine which way is up.



ISBN: 978-1-943228-70-6
Lexile Measure: 940L

Dog Days of Summer

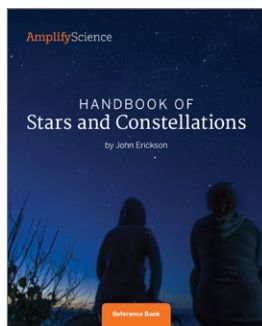
As they get to know Sirius, the Dog Star, students are introduced to several important concepts in *Dog Days of Summer*. They learn what a constellation is, the names of a few specific constellations, and some features of the brightest star in the night sky. Students read about astronomy ideas from ancient times that have been disproven through observation and investigation and how the Dog Star served as a guide to important events in the lives of ancient people. The book also explains why particular stars are visible during some parts of the year, but not others—it's all due to Earth's orbit. *Dog Days of Summer* helps students understand content about stars and constellations, as well as historical ideas in astronomy.



ISBN: 978-1-943228-72-0
Lexile Measure: 960L

Star Scientist

In *Star Scientist*, students meet Gibor Basri, an astronomer who investigates how stars form, how they change over time, and relationships between stars and planets. This book follows one particular investigation: Basri, along with a group of other scientists, gathered data to discover whether stars other than the sun have orbiting planets. Students read about Basri's process of deciding which data would help answer the question, gathering measurements using the Kepler telescope, creating models to compare different scenarios, and analyzing the data to arrive at a conclusion. This book models the investigative process for students, giving them a real-world example of how data can answer a fascinating astronomy question, but also how it can lead to new questions.



ISBN: 978-1-943228-74-4
Lexile Measure: N/A

Handbook of Stars and Constellations

Handbook of Stars and Constellations is the reference book for this unit. Students can look up specific constellations and astronomical objects, such as stars and nebulae. The book introduces constellations and some of the objects within them, then lists 28 constellations that students might be able to see for themselves, either with the unaided eye or a pair of binoculars. Each constellation entry includes a brief note about how it got its name, interesting facts, and viewing hints for its most visible objects. Star maps for each season of the year (in the Northern Hemisphere) are included so students can go outside at night and discover the constellations for themselves. Photos and diagrams throughout the book provide students with rich visual evidence. This book supports students' firsthand investigations, as they learn about the sun and constellations and when they are visible.

Reference Book

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THE LAWRENCE
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