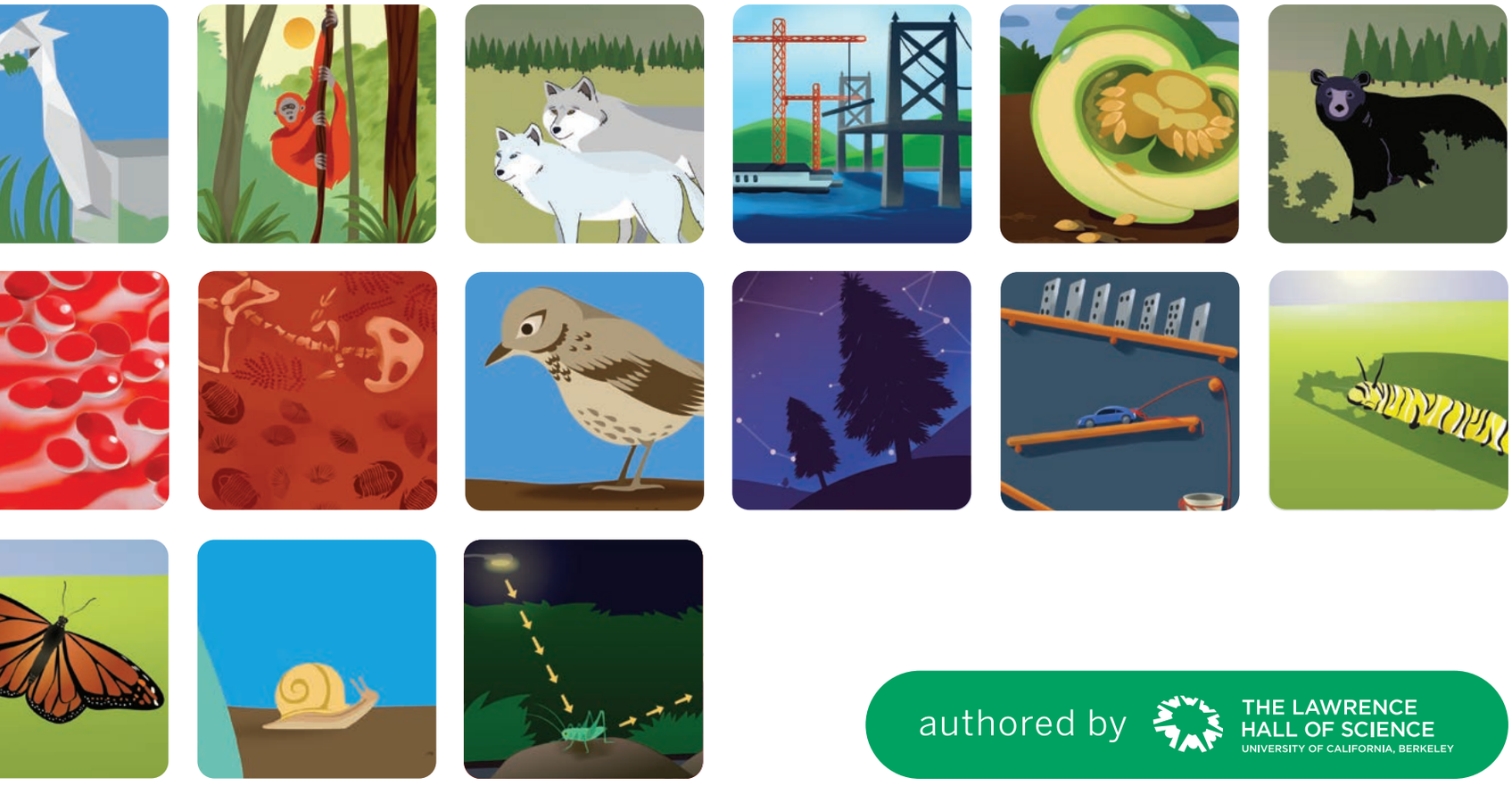
Amplify Science

Grade 4

Planning guide



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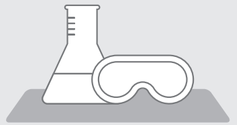
Program components

Student

Hands-on



Kit materials

Reading

Student Books for read-alouds, shared reading, and partner reading

Writing

Student Investigation Notebooks

Apps

Student practice apps and digital simulations

Teacher

Instruction

Print Teacher's Guide

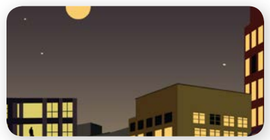
Digital Teacher's Guide

Display and hands-on materials (vocabulary cards, unit questions, key concepts, sorting cards, and more)

Planning for a year

Grade 4 scope and sequence

(88 days of instruction)



Energy Conversions

20 60-minute lessons
2 dedicated assessment days

Focal NGSS Performance Expectations:

- 4-PS3-1
- 4-PS3-2
- 4-PS3-4
- 4-ESS3-1
- 3-5 ETS1-1
- 3-5 ETS1-2
- 3-5 ETS1-3

Focal Disciplinary Core Ideas:

- PS3.A
- PS3.B
- PS3.D
- ESS3.A
- ETS1.A
- ETS1.B
- ETS1.C

Vision and Light

20 60-minute lessons
2 dedicated assessment days

Focal NGSS Performance Expectations:

- 4-LS1-1
- 4-LS1-2
- 4-PS4-2

Focal Disciplinary Core Ideas:

- LS1.A
- LS1.D
- PS4.B

Earth's Features

20 60-minute lessons
2 dedicated assessment days

Focal NGSS Performance Expectations:

- 4-ESS1-1
- 4-ESS2-1
- 4-ESS2-2
- 4-ESS3-2

Focal Disciplinary Core Ideas:

- ESS1.C
- ESS2.A
- ESS2.B
- ESS2.E
- ESS3.B

Waves, Energy, and Information

20 60-minute lessons
2 dedicated assessment days

Focal NGSS Performance Expectations:

- 4-PS3-2
- 4-PS3-3
- 4-PS4-1
- 4-PS4-3
- 4-ESS3-2

Focal Disciplinary Core Ideas:

- PS3.A
- PS3.B
- PS3.C
- PS4.A
- PS4.C
- ESS3.B

Amplify Science was built from the ground up for 3-dimensional learning. Access the Teacher's Guide to see the complete list of Disciplinary Core Ideas, Crosscutting Concepts, and Science and Engineering Practices addressed in each unit.

Scheduling options

No matter what your scheduling preference, Amplify Science will work in your classroom.

"I teach science twice each week"

Each Amplify Science unit at Grade 4 is made up of 22 60-minute lessons, which includes two lessons for pre- and post-assessment. With two scheduled 60-minute sessions each week, each Amplify Science unit will take between 2 and 2.5 months to complete.

"I teach science three times each week"

The easiest option is to plan for three 60-minute sessions each week. This way, each Amplify Science unit will take approximately 1.5 months. This plan will provide you the freedom to slow down the pace of instruction if your students need more time, or if you'd like to weave in additional experiences.

45-minute option

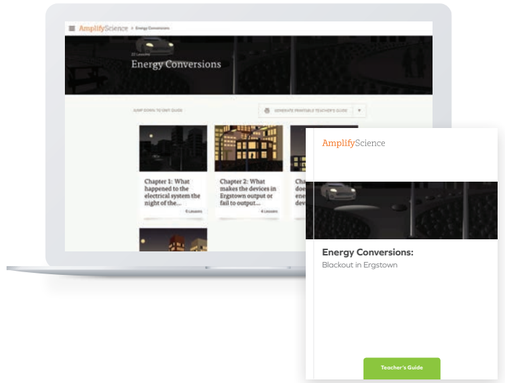
If you plan for sessions of less than 60 minutes, Amplify Science lessons can be spread out over more than one session. For instance, if you allocate three 45-minute lessons per week, each Amplify Science unit will take approximately 2.25 months. This option will still provide time for you to address all four Grade 4 units across the year.

"I teach science everyday"

It will take you approximately 5 weeks (22 school days) to complete each unit. If you plan for sessions shorter than 60 minutes, the units will take slightly longer to complete.

Planning for a unit

Each unit's Teacher's Guide has all the information you need to learn about that unit's content and structure, materials, storyline, and student learning objectives.



Planning options

1 hour per unit

If you want to thoroughly prepare for a unit, the most important resources to locate and read are:

Foundational:

- **Unit Overview:** a few paragraphs outlining the unit, including what the unit is about, why it was written this particular way, and how students experience the unit.
- **Unit Map:** A one-page summary showing how the chapters build upon each other, what questions students will investigate, and what evidence sources they will use to figure those questions out.
- **Lesson Overview Compilation:** 1–2 pages on each lesson provide insight into each lesson's sequence of activities, intent, materials used, and how the lessons connect with and build upon each other.

Supporting:

- **Progress Build:** A thorough explanation of the unit's learning progression (called the "Progress Build"). Understanding and internalizing the Progress Build is key to understanding the embedded unit assessments.
- **Science Background:** A teacher-facing document that gives valuable science content information and calls out common student misconceptions and preconceptions. The Science Background resource provides all the context and subject matter knowledge needed to teach the unit.

30 minutes per unit

If you're a bit strapped for time but still want to get the essentials, try to focus on:

- **Unit Overview**, 1 page
- **Unit Map**, 1 page
- **Lesson Overview Compilation**

5 minutes per unit

If you have only 5 minutes to familiarize yourself with the most essential aspects of the unit, skip right to the **Unit Overview** and **Unit Map**. At the very least, you'll understand the unit narrative and structure, and get a sense of the materials used.

NOTE

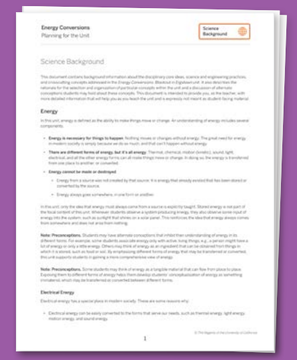
There's much more information available in the Teacher's Guide, including overviews of the unit's assessments, readings, student-facing technology, and standards.

Unit Overview
1 page

Unit Map
1 page

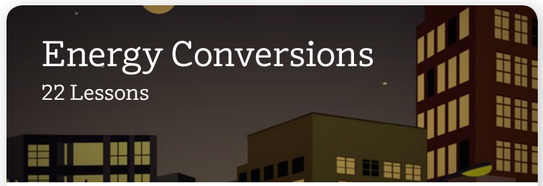
Lesson Overview Compilation
Read through the lesson overviews in Chapter 1 - ***1 page each***

Progress Build
1 page



Science Background
Between 8 and 10 pages

Planning for a unit



Engineering design focus

In *Energy Conversions: Blackout in Ergstown*, students learn about how energy is converted from one form to another, how it can be transferred from place to place, and the variety of energy sources that exist.

Student role and phenomena

Students take on the role of systems engineers for Ergstown, a fictional town that experiences frequent blackouts, the anchor phenomenon for the unit. Throughout the unit, they explore reasons why an electrical system may fail.

Insights

As they work to solve the problem of blackouts in Ergstown, students will use and construct devices that convert energy from one form to another, build an understanding of the electrical system, and learn to identify energy forms all around them.

Investigation focus

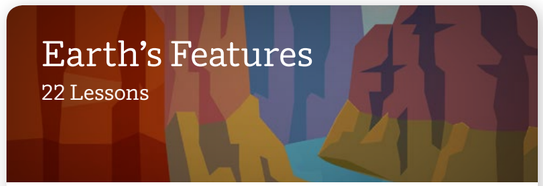
In the *Vision and Light: Investigating Animal Eyes* unit, students investigate the role that animal senses, primarily vision, play in survival as they try to understand a realistic fictional problem with a real organism.

Student role and phenomena

Students assume the role of conservation biologists, working to figure out why a population of Tokay geckos has decreased since the installation of new highway lights in the rainforest.

Insights

Throughout their investigations, students use an interactive digital simulation, hands-on activities, reading, and discourse as they learn how animal eyes function, discovering that some animals see well in bright light and others see well in low light.



Argumentation focus

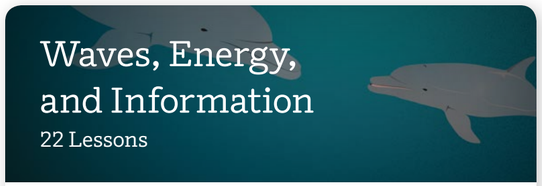
In the *Earth's Features: Mystery in Desert Rocks Canyon* unit, students will construct scientific explanations and arguments about how the rocks and fossils in Desert Rocks National Park can be used to infer the environmental history of the area.

Student role and phenomena

Playing the role of geologists, students help the director of Desert Rocks National Park explain how and when a particular fossil formed and how it came to be in its c urrent location.

Insights

Students use books, hands-on investigations, and the Earth's Features Simulation to figure out how fossils and sedimentary rock form and how different sediments build up in different environments, forming different rock in those environments. This helps them learn how to tell the environmental history of a place by observing the rock layers present.



Modeling focus

To learn about important characteristics of sound and how sound travels through materials, students engage with several models of sound waves. These models support discovery and understanding of how dolphins use sound to communicate.

Student role and phenomena

Students take on the role of marine scientists investigating how bottlenose dolphin mothers and their calves in the fictional Blue Bay National Park use patterns of sound to communicate across distances.

Insights

Models, as well as informational text and first-hand investigations with sound, help students visualize things that are not possible to see: how sound waves travel at the particle level and how a sound's volume and pitch correspond to the amplitude and wavelength of the sound wave.

Planning for a lesson

Amplify Science makes lesson prep as easy as 1, 2, 3. You can use either the printed or digital Teacher's Guide.

1

Read the 1-page **Lesson Overview**, which contains:

- A **one-paragraph summary of the lesson**, including insights into the lesson's activities and any materials used.
- Clearly labeled **phenomena**.
- **Student learning objectives**
- **Lesson at a Glance**, which provides an outline of the lesson along with pacing suggestions.

Have some extra time? Read through the full step-by-step instructions for the lesson to see exactly where different materials are used, where projections are shown, and where to insert recommended teacher talk moments.

2

Every lesson includes a **Materials and Preparation** section, which clearly identifies all of the hands-on manipulatives, Student Books, printed classroom wall materials, and digital tools needed for the lesson. Remember: every lesson is different! Some lessons might call for Student Books; other lessons might call for setting up stations for hands-on investigations. Be sure to glance at the Materials and Preparation section to see what you need for your specific lesson.

You'll want to bookmark **apps.learning.amplify.com/elementary** before the first day of class.

3

Download any **Digital Resources** needed for the lesson. For example, most lessons have projections that you can show to your students at specific parts in the lesson. Be sure to download the PDF of projections before class.

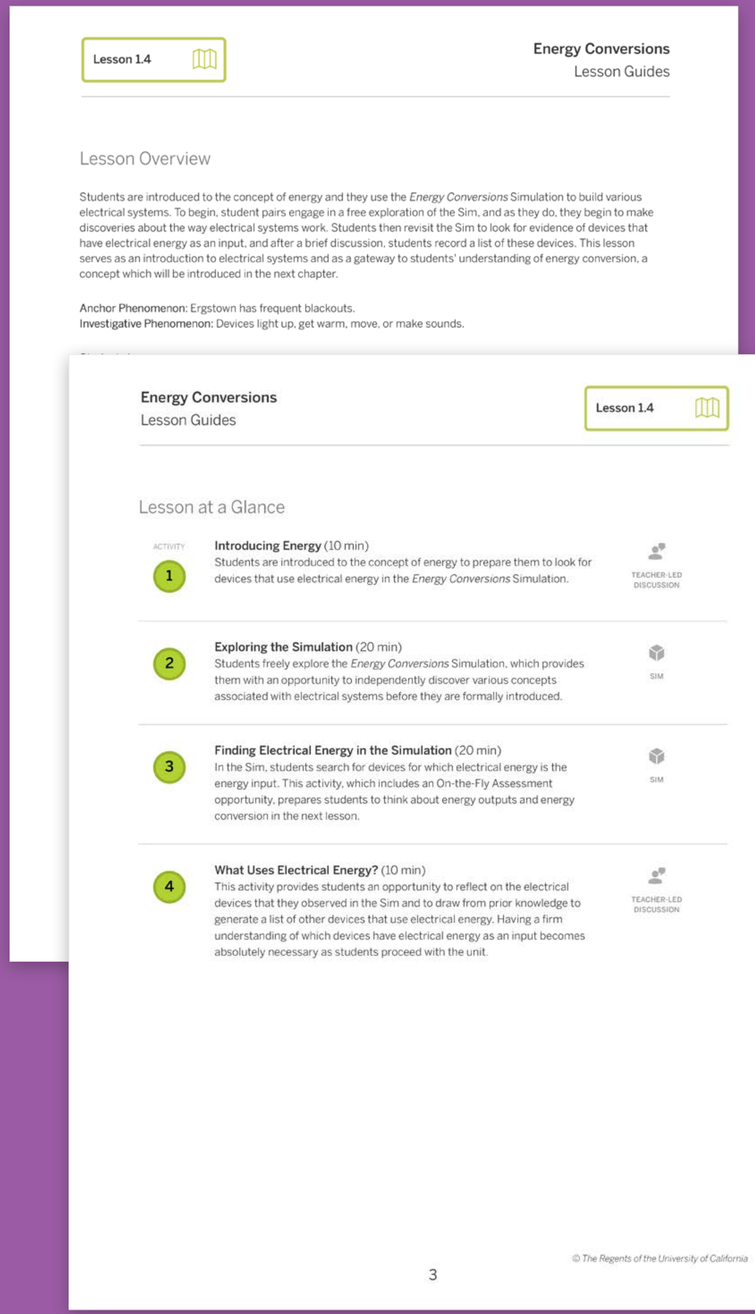
TIP

Did you know that you can download all digital resources you'll need in the unit with just a few clicks? Look for the **Offline Guide** in your digital Teacher's Guide to download all projections, assessments, videos, and more.

Offline Preparation

Teaching without reliable classroom internet? Prepare unit and lesson materials for offline access.

OFFLINE GUIDE



Lesson 1.4

Energy Conversions
Lesson Guides

Lesson Overview

Students are introduced to the concept of energy and they use the *Energy Conversions* Simulation to build various electrical systems. To begin, student pairs engage in a free exploration of the Sim, and as they do, they begin to make discoveries about the way electrical systems work. Students then revisit the Sim to look for evidence of devices that have electrical energy as an input, and after a brief discussion, students record a list of these devices. This lesson serves as an introduction to electrical systems and as a gateway to students' understanding of energy conversion, a concept which will be introduced in the next chapter.

Anchor Phenomenon: Ergstown has frequent blackouts.
Investigative Phenomenon: Devices light up, get warm, move, or make sounds.

Energy Conversions
Lesson Guides

Lesson 1.4

Lesson at a Glance

ACTIVITY 1 — **Introducing Energy** (10 min)
Students are introduced to the concept of energy to prepare them to look for devices that use electrical energy in the *Energy Conversions* Simulation. TEACHER-LED DISCUSSION

2 — **Exploring the Simulation** (20 min)
Students freely explore the *Energy Conversions* Simulation, which provides them with an opportunity to independently discover various concepts associated with electrical systems before they are formally introduced. SIM

3 — **Finding Electrical Energy in the Simulation** (20 min)
In the Sim, students search for devices for which electrical energy is the energy input. This activity, which includes an On-the-Fly Assessment opportunity, prepares students to think about energy outputs and energy conversion in the next lesson. SIM

4 — **What Uses Electrical Energy?** (10 min)
This activity provides students an opportunity to reflect on the electrical devices that they observed in the Sim and to draw from prior knowledge to generate a list of other devices that use electrical energy. Having a firm understanding of which devices have electrical energy as an input becomes absolutely necessary as students proceed with the unit. TEACHER-LED DISCUSSION

For more information on Amplify Science, visit **amplify.com/science**.







Amplify.

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