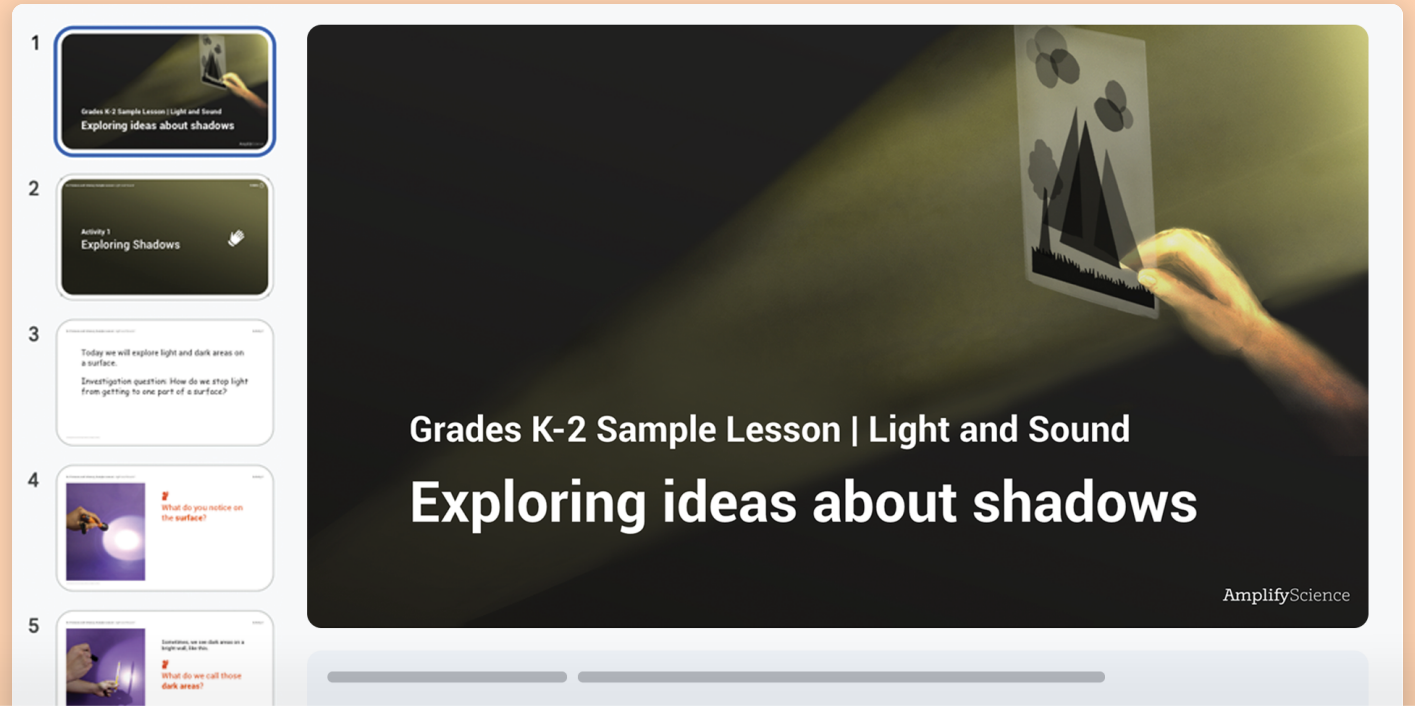



# Sample science-literacy lesson

Grades K–2

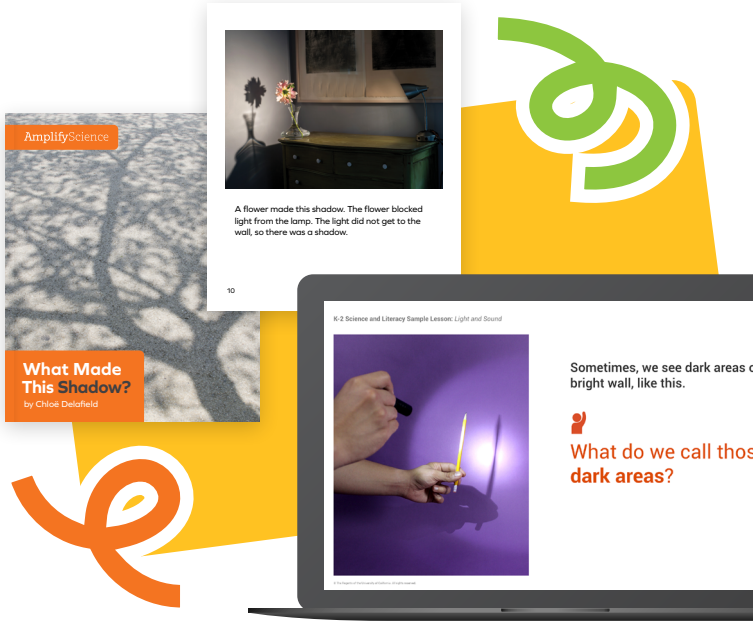
Welcome to Amplify Science! This sample lesson is an excerpt from the grade 1 Amplify Science unit, *Light and Sound: Puppet-Theater Engineers*.

The sample lesson contains:

- **Classroom Slides** with lesson notes
- A digital copy of the Amplify Science student book, ***What Made This Shadow?***
- Teacher reference: ***Light and Sound Coherence Flowchart***

In this lesson, students explore shadows. By engaging in exploration, discussion, and reading, students work to answer the question, *How do we stop light from getting to one part of a surface?*

Specific instructions for teaching this lesson are on the following pages and detailed in the Classroom Slide notes.



## Unit Background and Overview

The full Amplify Science *Light and Sound* unit is 22 lessons long and designed to meet NGSS physical science standards in grade 1 as well as a number of CCSS-ELA standards for listening, speaking, reading, and writing. In this unit, students take on the dual role of light engineers and sound engineers for a puppet show company as they investigate cause-and-effect relationships and learn about the nature of light and sound. They apply what they learn to designing shadow scenery and sound effects for a puppet show.

Amplify Science units are broken into chapters, with each chapter building on the one before it. This sample lesson is part of the Chapter 2 sequence where students are figuring out *How do we make a dark area in a bright puppet show scene?* To answer this question, students gather and make sense of evidence by engaging in hands-on activities, card sorts, discourse routines, and by constructing diagrams. They figure out ideas related to how light can be blocked by objects to create a shadow which they can apply back to the anchor phenomenon. This chapter-by-chapter storyline is represented in the *Light and Sound* **Coherence Flowchart**.

## The Amplify Science Approach

In each Amplify Science unit, students figure out an anchor phenomenon by asking questions, gathering evidence, and coming up with an explanation of how the phenomenon works. Amplify Science is rooted in the research-based Do, Talk, Read, Write, Visualize model of learning, where students engage with science and engineering practices, figure out disciplinary core ideas, and utilize and apply crosscutting concepts in multiple modalities across thoughtful, structured lessons. As they progress through each unit, students work to figure out increasingly complex ideas and construct arguments and explanations about the anchor phenomenon.

Reading in Amplify Science is approached from an inquiry stance—students ask questions, make connections, evaluate information, search for evidence, and clarify difficult concepts as they read. Amplify Science provides students with well-written, grade-level-appropriate informational texts alongside explicit, embedded instruction on specific strategies that support their reading in science. Throughout the program, students are apprenticed into reading like scientists—that is, reading actively, curiously, and critically, with a focus on making meaning and using the text as a source of evidence. As students read science texts in conjunction with other multimodal experiences around a topic (doing, talking, visualizing, writing), they increase their skill in accessing these complex texts, as well as their understanding of the importance of text for finding information.

For more information about the full Amplify Science Approach and unit components see the **Amplify Science Program Guide**.

# Getting ready to teach the sample lesson

This sample lesson is designed to take approximately 35 minutes in the classroom, with minimal preparation. Note that these activities are meant to be taught sequentially but do not need to be taught the same day.

## Lesson Overview

- Activity 1: Exploring Shadows (10 minutes)
  - A partner exploration with a light source provides students with firsthand experience in making shadows of different shapes and sizes on surfaces around the classroom.
- Activity 2: Debriefing the Shadow Exploration (10 minutes)
  - Students share their shadow discoveries in a class discussion and further their understanding of what makes shadows of different shapes and sizes. The Explanation Language Frames help students discuss cause and effect in the context of shadows.
- Activity 3: Reading: *What Made This Shadow?* (15 minutes)
  - Students practice the strategy of asking and answering questions while participating in a Shared Reading with the book, *What Made This Shadow?* The consistent sentence pattern of this book helps students notice that all shadows are made by an object blocking a light source.

# Materials & Preparation

## Materials

- Source(s) of light such as flashlight(s), cell phone light, clamp lamp(s). Alternatively you could conduct the activity outdoors with the sun as the source of light.
- Two sentence strips or space on the board to write
- Pocket chart (optional)
- *What Made this Shadow?* digital book (optional)

## Preparation

- Review the slides and slide notes.
- Make a plan for how you will project the slides and digital book for students.
  - Note: The full book, *What Made This Shadow?*, and associated lesson notes are in the Classroom Slides. You have the option to either read the book aloud directly from the slides or project the stand-alone digital book.
- Determine how you will conduct the shadow exploration in Activity 1.
  - Gather materials for the exploration and determine how you will group students. For example, every pair of students could work with a flashlight, or multiple pairs could work with a clamp lamp. Alternatively, you could plan to take the class outdoors on a sunny day.
  - Be prepared to discuss and model safety with using lights, including how to check to see if flashlights are on by pointing them at your hand, and the importance of not looking directly into any source of light.
- Prepare the Explanation Language Frames.
  - On a sentence strip or on the board, write "_____, so _____."
  - On another sentence strip or on the board, write "_____ because _____."
  - If you create the Explanation Language Frames on sentence strips, place them in the pocket chart or post them on board.

# Standards addressed

## K–2 Grade Band Standards

The activities in this sample lesson are appropriate for grades K–2 classrooms, and support students in working toward facility with the following Next Generation Science Standards (NGSS) and Common Core State Standards for English Language Arts (CCSS-ELA) Anchor Standards.

### NGSS SCIENCE AND ENGINEERING PRACTICES

- Practice 1: Asking Questions and Defining Problems
- Practice 3: Planning and Carrying Out Investigations
- Practice 4: Analyzing and Interpreting Data
- Practice 8: Obtaining, Evaluating, and Communicating Information

### NGSS DISCIPLINARY CORE IDEAS

- PS4.B: Electromagnetic Radiation (K–2): Objects can be seen only when light is available to illuminate them.
- ETS1.A: Defining and Delimiting Engineering Problems: Asking questions, making observations, and gathering information are helpful in thinking about problems. (K-2-ETS1-1)

### NGSS CROSSCUTTING CONCEPTS

- Cause and Effect

### CCSS-ELA ANCHOR STANDARDS

- CCSS.ELA-LITERACY.CCRA.R.3: Analyze how and why individuals, events, or ideas develop and interact over the course of a text.
- CCSS.ELA-LITERACY.CCRA.R.7: Integrate and evaluate content presented in diverse media and formats, including visually and quantitatively, as well as in words.
- CCSS.ELA-LITERACY.CCRA.SL.1: Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.
- CCSS.ELA-LITERACY.CCRA.SL.2: Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally.
- CCSS.ELA-LITERACY.CCRA.L.6: Acquire and use accurately a range of general academic and domain-specific words and phrases sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when encountering an unknown term important to comprehension or expression.

## Grade 1 Standards

The unit *Light and Sound* was designed to meet the three-dimensional goals of NGSS in grade 1. The activities in this sample lesson were derived from lessons that address the following NGSS Disciplinary Core Ideas (DCIs) and grade 1 Common Core State Standards for English Language Arts (CCSS-ELA):

### NGSS DISCIPLINARY CORE IDEAS

- PS4.B: Electromagnetic Radiation: Some materials allow light to pass through them, others allow only some light through and others block all the light and create a dark shadow on any surface beyond them, where the light cannot reach. Mirrors can be used to redirect a light beam. (1-PS4-3)
- ETS1.A: Defining and Delimiting Engineering Problems: Asking questions, making observations, and gathering information are helpful in thinking about problems. (K-2-ETS1-1)

### CCSS-ELA

- CCSS.ELA-LITERACY.RI.1.3: Describe the connection between two individuals, events, ideas, or pieces of information in a text.
- CCSS.ELA-LITERACY.RI.1.7: Use the illustrations and details in a text to describe its key ideas.
- CCSS.ELA-LITERACY.SL.1.1: Participate in collaborative conversations with diverse partners about grade 1 topics and texts with peers and adults in small and larger groups.
- CCSS.ELA-LITERACY.SL.1.2: Ask and answer questions about key details in a text read aloud or information presented orally or through other media.
- CCSS.ELA-LITERACY.L.1.6: Use words and phrases acquired through conversations, reading and being read to, and responding to texts, including using frequently occurring conjunctions to signal simple relationships (e.g., because).

Amplify.

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