Lesson 4.1
Exploring Sound Sources
Exploring Sound Sources in the Reference Book

Partners use the reference book to search for solutions that use sound sources.

Instructional Guide

1. Hold up the front cover of the *Engineering with Light and Sound* big book. Remind students that they have used this book to look at the kinds of solutions that engineers design and the kinds of problems they solve. Remind students that they have also used this book to look for light sources.

   ¿Piensan que los ingenieros usan fuentes de sonido para resolver problemas de ingeniería?

   Accept all responses.

   Hoy trabajarán en parejas y usarán el libro de referencia para buscar ejemplos de fuentes de sonido y soluciones que crearon los ingenieros usando fuentes de sonido.

2. Revisit the table of contents.

   Cuando buscamos soluciones que dejaban pasar toda, algo o nada de luz, ¿cómo supimos dónde encontrar esa información en el libro?
   
   [Miramos la lista al principio del libro. Usamos la página Contenido].

   Turn to page 3 and show students the Contents. Read aloud the sections and ask students to signal when they hear a section title that might be useful for finding solutions that use sound sources. If needed, remind students how to use the page number across from the section title to find that section in the book.

3. Revisit how to use sticky notes to mark solutions. Let students know that they will mark possible sound sources and solutions that use sound sources by placing sticky notes in the book.

   - Hold up the book and demonstrate how to flip through the “Designing Sound Sources” section to find possible sound sources and solutions that use sound sources.
• Pause and demonstrate how to place a sticky note on a page of the book next to a possible source or solution, leaving the edge of the note sticking out of the book so you can return to it later.

Briefly review the Partner Reading Guidelines with the class.

4. Assign partners and distribute books. Distribute one copy of Engineering with Light and Sound and five sticky notes to each pair of students. Remind students that they should take turns choosing pages to look at and talking about possible sound sources and solutions that use sound sources. Circulate as students work to observe the possible sources and solutions they find.

5. Gather students in the discussion area. Have partners bring their copies of Engineering with Light and Sound to the discussion area and sit next to each other.

6. Have students share a few examples with the class. Invite students to share pages with solutions they thought were interesting. Have the whole class turn to the page. Ask students what they think the solution does and what they saw or read in the book that makes them think that.

7. Collect all books and Investigation Notebooks.

8. Conclude the lesson and let students know about box for collecting materials.

• Han identificado fuentes de sonido alrededor de nuestro salón de clases y en el libro de referencia. También han tenido oportunidad de probar varias fuentes de sonido y observar qué sucede cuando estas fuentes de sonido diferentes hacen sonidos. La próxima vez, hablaremos más sobre lo que observaron y lo que pensamos que significa.

• En unos cuantos días, cada uno de ustedes estará haciendo su propia fuente de sonido. Después les contaré más sobre eso. Por ahora, quiero que piensen en los diferentes tipos de materiales que puedan traer de su hogar que podrían ser buenas fuentes de sonido.

• Los materiales pueden incluir recipientes de plástico, botellas de plástico, tenedores y cucharas de plástico, latas, tapas de botellas, cartones de huevo, cartones de leche, tubos de papel higiénico o de toallas de papel o cualquier otra cosa que piensen que sería una buena fuente de sonido.

• Cuando entren a la clase, pueden poner sus materiales en esta caja. Cuando estemos listos para hacer nuestras fuentes de sonido, dividiré estos materiales para que cada bandeja que compartirán con otros estudiantes tenga diferentes tipos de materiales para elegir.
Lesson Overview

Students are introduced to their new engineering problem—designing sound sources to accompany their puppet-show scenes—and participate in a brief Sound-Source Hunt in the classroom. Students rotate through four Sound Sources Stations and investigate to determine whether or not different materials are sound sources. This investigation also serves as an assessment that is designed to reveal students’ facility with the performance of the practices of Planning and Conducting Investigations and Analyzing and Interpreting Data, as well as their understanding of unit-specific science concepts and the crosscutting concept of Cause and Effect. Students revisit the reference book, *Engineering with Light and Sound*, to look for sound sources and solutions that include sound sources. The purpose of this lesson is for students to recognize that, just like light comes from a source, sound also comes from a source.

**Design Problem:** Design a sound source for a puppet-show scene.

**Investigative Phenomenon:** A fork chime, a cup and string, a rubber-band guitar, and a wooden-stick thumb piano make sounds.

**Students learn:**

- All sound comes from a source.
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Instructional Guide

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   Do you think engineers use sound sources to solve engineering problems?

   Accept all responses.

   Today, you and your partner will use the reference book to look for examples of sound sources and solutions that engineers made by using sound sources.

2. Revisit the table of contents.

   When we looked for solutions that let all, some, or no light pass through, how did we know where to find that information in the book?

   [We looked at the list in the front of the book. We used the Contents page.]

   Turn to page 3 and show students the Contents. Read aloud the sections and ask students to signal when they hear a section title that might be useful for finding solutions that use sound sources. [Designing Sound Sources.] If needed, remind students how to use the page number across from the section title to find that section in the book.

3. Revisit how to use sticky notes to mark solutions. Let students know that they will mark possible sound sources and solutions that use sound sources by placing sticky notes in the book.

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7. Collect all books and Investigation Notebooks.

8. Conclude the lesson and let students know about box for collecting materials.

You have identified sound sources around our classroom and in the reference book. You have also had a chance to try out several sound sources and observe what happens when these different sound sources make sounds. Next time, we will talk more about what you observed and what we think it means.

In a few days, you will each be making your own sound source. I will tell you more about that later. For now, I want you to think about the different kinds of materials that you can bring in from home that might make good sound sources.

Materials can include plastic containers, plastic bottles, plastic forks and spoons, cans, bottle caps, egg cartons, milk cartons, toilet paper or paper-towel tubes, or anything else that you think might make a good sound source.

When you come into class, you can put your materials into this box. When we are ready to make our sound sources, I will divide up these materials so each tray that you will share with a few other students will have different kinds of materials to choose from.

**Teacher Support**

**Instructional Suggestion**

**Materials Note: Displaying Solutions for Students to Share**

Circulate as students note the interesting sound sources and solutions that use sound sources in *Engineering with Light and Sound*. Make a note of the page number a pair has selected. During the whole-group sharing, hold up the page that
the pair selected and give these students a few moments to share their example of an engineering solution that is or uses a sound source. Checking in with students and then displaying the page with the example they found can also provide an opportunity to include students who are more reluctant to share.