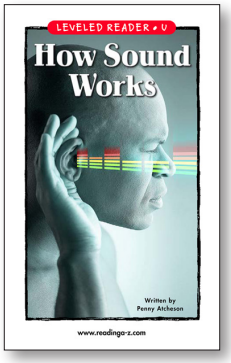
How Sound Works



About the Book

Text Type: Nonfiction/Informational **Page Count:** 24 **Word Count:** 1,028

Book Summary

How Sound Works is an informative book that explores the world of sound around us. It looks at where sound comes from, how sound is used, and how we hear sound. Science and math experiments are provided as an extra challenge. Photographs, diagrams, illustrations, charts, and a graph support the text.

About the Lesson

Targeted Reading Strategy

- Main idea and details

Objectives

- Identify main idea and supporting details in text
- Interpret charts and graphs
- Identify conjunctions used in text
- Understand and use suffixes

Materials

Green text indicates resources available on the website

- Book—*How Sound Works* (copy for each student)
- Chalkboard or dry erase board
- Main idea and details, charts and graphs, conjunctions worksheets
- Discussion cards

Indicates an opportunity for students to mark in the book. (All activities may be demonstrated by projecting book on interactive whiteboard or completed with paper and pencil if books are reused.)

Vocabulary

*Bold vocabulary words also appear in a pre-made lesson for this title on VocabularyA–Z.com.

- **Content words:**
  Story critical: ***decibel*** *(n.),* ***frequency*** *(n.),* ***intensity*** *(n.),* ***pitch*** *(n.),* ***sound wave*** *(n.),* ***vibrating*** *(v.)*
  Enrichment: *cochlea (n.), compressed (v.),* ***echolocation*** *(n.),* ***hertz*** *(n.), onomatopoeia (n.),* ***sonar*** *(n.),* ***sonic boom*** *(n.),* ***sound barrier*** *(n.),* ***ultrasound*** *(n.)*

Before Reading

Build Background

- Ask students what they know about sound and how it works. Ask if they know how sound travels through air. Talk about different types of sound.
- Ask: *If a tree falls in the forest and no one is around to hear it fall, does it still make a sound?* Discuss students' answers.

Preview the Book

Introduce the Book

- Give students a copy of the book and have them preview the front and back covers and read the title. Have students discuss what they see on the covers and offer ideas as to what kind of book this is and what it might be about.
- Have students preview the rest of the book. Show students the title page, photos, charts, graph, and glossary.
- Show students the index. Review or explain that an index is an alphabetized list with page numbers that tell where readers can find information about topics in the book. Ask students to tell which page teaches about echolocation (page 20).

Introduce the Reading Strategy: Main idea and details

- Review or explain that many books, such as this one, contain the main idea, or topic, of the book in the title *(How Sound Works).* Direct students to the table of contents. Explain that each section title provides a main idea about what will be discussed in the section; the body of each section contains details that tell more about the main idea. For example, ask students what they expect to read about in a section titled "Listening for Sound" (listening for sound).
- After reviewing the section titles, model how to apply the main idea and details reading strategy.
- **Think-aloud:** *The table of contents gives me a much clearer idea of the main ideas I will read about in the book. I will pause after each section to review in my mind the main idea and the important details in each section. This strategy will help me keep track of the important information I read and will help me make sure I understand what I'm reading.*
- As students read, they should use other reading strategies in addition to the targeted strategy presented in this section.

Introduce the Vocabulary

- Remind students of the strategies they can use to work out words they don't know. For example, they can use what they know about letter and sound correspondence to figure out the word. They can look for base words, prefixes, and suffixes, or other word endings. They can use the context to work out meanings of unfamiliar words.
- Model how to apply word-attack strategies. Direct students to page 9. Have them find the words *sonic boom* in the "Math Minute" section. Model how they can use context clues to figure out the meaning of the unfamiliar word. Explain that the sentences before the one containing the word describe jets that travel faster than the speed of sound. The sentence containing the unfamiliar words tells that when these jets break the sound barrier they make a loud *sonic boom*, which can be heard miles away from where the jet is flying. Tell students that these clues make you think that the words *sonic boom* mean *an explosive sound made by jets moving faster than the speed of sound.* Have students follow along as you reread the sentence on the page to confirm the meaning of the word.

Set the Purpose

- Have students read the book to learn about how sound works, remembering to stop after each section to review the main idea and details in their mind.

During Reading

Student Reading

- **Guide the reading:** Have students read to the end of page 12. Tell them to look for details about how sound works as they read. If students finish before everyone else, they can go back and reread.

- Model finding supporting details in text.
  Think-aloud: *I made sure to stop after each section to review in my mind the important details. First, I reminded myself that the main idea of the second section was "Where Do Sounds Come From?" Next, I decided which of the details were important and which weren't. Then, in my mind, I organized the important information into a list of details and thought about them for a couple of moments:*
  Sound is a form of energy caused by something vibrating.
  The greater the vibration, the more sound energy is created.
  Sound moves outward in all directions.
- Tell students to read the remainder of the book. Remind them to think about, or review, the supporting details in their minds after they finish reading each section.

Have students make a question mark in their book beside any word they do not understand or cannot pronounce. Encourage them to use the strategies they have learned to read each word and figure out its meaning.

After Reading

- Ask students what words, if any, they marked in their book. Use this opportunity to model how they can read these words using decoding strategies and context clues.

Reflect on the Reading Strategy

- Discuss how stopping to review in their minds the main idea and details of each section helps them remember the important information and better understand what the book is teaching.
- Have students complete the main-idea-and-details worksheet. Discuss their responses as a group.

Teach the Comprehension Skill: Interpret charts and graphs

- **Discussion:** Explain that there are many different ways for an author to provide the reader with information. Some books use illustrations, others use photographs, and others, such as *How Sounds Works,* also use a third means of expressing information: charts and graphs. Explain that charts and graphs are often used to show concepts, relationships between items, and quantities.
- **Introduce and model:** Review or explain that charts and graphs are most commonly used in nonfiction books. There are many different types of graphs, such as bar graphs, pictographs, line graphs, and pie graphs. Turn to page 8. Tell students that this is a bar graph. Explain that the bars along the left tell what is being measured (the speed of sound through a gas, liquid, and solid), and the numbers along the bottom tell the rate of measurement (feet per second, or *fps*). Show students how this graph helps clarify the information in the text—it shows how sound waves travel more quickly through solids, such as glass, and more slowly through gases, such as air.
- Ask students to tell what increment the numbers at the bottom of the graph are increasing by (thousands) and what numbers it starts and ends with (0–15,000).
- Have students tell which solid is represented by the longest bar (glass) and how fast sound waves move through glass (14,764 fps). Ask how many feet per second sound waves move through water (4,921). Ask which of the three types of matter allows sound waves to move through it at the slowest rate (air, at 1,115 fps). Point out that this is how we typically hear sound (as it travels through air), even though it is the slowest mode at which sound waves travel.
- Have students turn to page 11 and find the *Table of Decibels.* Ask students to define *Sound Source* (where sound comes from) and *decibels* (a measurement of sound).
- **Check for understanding:** Referring to the table on page 11, have students tell which sound is the least intense (a whisper) and which is the most intense (a jet airplane). Have students explain their answer.
- Remind students that they can help themselves understand and remember important information in nonfiction books by looking carefully at the information in charts and graphs.
- **Independent practice:** Have students complete the charts-and-graphs worksheet. When they finish working independently, discuss their responses with references to the text.

Extend the discussion: Tell students to work with a partner to complete the chart on page 16 titled "What could be making the noises in this chart?"

Build Skills

Grammar and Mechanics: Conjunctions

- Explain or review that a *conjunction* is a word that links together two parts of a sentence. Examples of conjunctions include: *and, but, because, when, for, or, so,* and *yet.*
- Ask students to turn to page 13. Write the following sentence from the book on the board: *The middle ear **and** the inner ear are designed to transfer sound.* Explain that the conjunction *and* connects the two descriptive phrases of the sentence, *middle ear* and *inner ear.* On the board under the example, write the following: *Its shape helps gather sound waves. Its shape moves them along to the middle ear.* Discuss how the author chose to link these two phrases *(Its shape helps gather sound waves **and** move them along to the middle ear.)* instead of writing two repetitive sentences one after another. Explain that this is an example of how conjunctions help writers make their writing more fluent, or smooth flowing.
- Ask students to turn to page 5. Write the following sentence from the book on the board: *Vibration occurs when an object moves quickly back and forth.* Explain that the conjunction *when* connects the description *(an object moves quickly back and forth)* with the example *(vibration occurs).* Discuss how the conjunction links the two parts of the sentence together.
- **Check for understanding:** Have students complete the conjunctions worksheet. Review student answers aloud.

Word Work: Suffixes

- Review or explain that a *suffix* is a word part added to the end of a base word to change the meaning of the word. Ask students to brainstorm some examples of suffixes while you write them on the board *(-ion, -ing, -ed, -s, -ful, -es, -ly, -ness).* Label the list *Suffixes.*
- Write the word *quest* on the board. Ask a volunteer to tell the meaning of the word or look it up in the dictionary (a journey for adventure). Write the word *question* on the board. Explain that the suffix *-ion* has been added to make a new word. Ask a volunteer to tell the meaning of the new word *(something asked).*
- Tell students to turn to page 8. Ask them to find and circle all of the suffixes they can find *(-es* in *particles* and *gases; -er* in *closer, slower, farther, colder,* and *warmer; -ly* in *quickly; -s* in *solids, particles,* and *liquids).*
- Emphasize that adding a suffix to a word can change the meaning of the word. For example, *-ion* often makes a verb into a noun, *-ly* makes an adjective into an adverb, etc.
- Point out that the author compares many things on page 8. Ask which suffix is added onto a word that compares *(-er).* Point out that there are five words used to compare in this paragraph: *closer, slower, farther, colder,* and *warmer.*

Check for understanding: Have students find the three words that compare on page 10 (closer, farther).

Build Fluency

Independent Reading

- Allow students to read their book independently. Additionally, partners can take turns reading parts of the book to each other.

Home Connection

- Give students their books to take home to read with parents, caregivers, siblings, or friends.

Extend the Reading

Science Connection

Provide the materials necessary for students to experiment with the "Try This!" sections of the book: Vibration on page 7, Sound in Solids on page 8, and Pitch Practice on page 12. Encourage them to also figure out the Math Minute on page 9.

Writing Connection

After completing the Science Connection above, have students choose one experiment to comment on. Have them write at least two paragraphs, one explaining how to do the experiment and the necessary materials, and another describing how it works and the science behind it. Have students present their experiment and read their writing to the class.

Visit Writing A–Z for a lesson and leveled materials on procedural writing.

Skill Review

Discussion cards covering comprehension skills and strategies not explicitly taught with the book are provided as an extension activity. The following is a list of some ways these cards can be used with students:

- Use as discussion starters for literature circles.
- Have students choose one or more cards and write a response, either as an essay or as a journal entry.
- Distribute before reading the book and have students use one of the questions as a purpose for reading.
- Cut apart and use the cards as game cards with a board game.
- Conduct a class discussion as a review before the book quiz.

Assessment

Monitor students to determine if they can:

- consistently use the strategy of finding the main idea and supporting details in text to understand and remember information; record main ideas and details on a graphic organizer
- analyze and interpret charts and graphs in nonfiction text and on a worksheet
- understand the use of conjunctions in text and to complete a worksheet
- identify and understand suffixes

Comprehension Checks

- Book Quiz
- Retelling Rubric