

# Muse®

### Hear & Now

Auditory information plays an integral part in helping people to navigate the world around them. This issue of MUSE magazine examines the strategies and technology that make it easier for people with hearing loss to experience life at its fullest. The articles help readers to better understand the science of sound and acoustics.

### CONVERSATION QUESTION

How do we hear sound?

### TEACHING OBJECTIVES

- Students will learn how people with hearing impairments interpret sound with a cochlear implant.
- Students will learn communication strategies that are helpful when speaking to a person with a hearing loss.
- Students will learn how architects must consider acoustics when designing a room or building.
- Students will compare and contrast the biological process of hearing with the hearing that is achieved with a cochlear implant.
- Students will examine cause-and-effect relationships.
- Students will examine problem-and-solution relationships.
- Students will create calligrams.
- Students will adapt a favorite game so it can be played by kids who are deaf.
- Students will review the geometrical concepts of two-dimensional and three-dimensional figures.



In addition to supplemental materials focused on core STEM skills, this flexible teaching tool offers vocabulary-building activities, questions for discussion, and cross-curricular activities.

### SELECTIONS

- **Learning to Hear**  
Expository Nonfiction, ~920L
- **Deaf Friends**  
Expository Nonfiction, ~890L
- **Meet Me at the Whispering Spot**  
Expository Nonfiction, ~1100L

# Muse® Teacher Guide: May/June 2021

## Learning to Hear

pp. 14–18, Expository Nonfiction

Words help people understand the world around them and connect with others. Students will learn that the cochlear implant is an option that helps people with severe hearing loss to experience the sounds of speech and the audio features of the environment.



Lexile Score: ~920L

## RESOURCES

Hearing Processes: Compare and Contrast

## OBJECTIVES

- Students will learn how people who have hearing loss interpret sound with a cochlear implant.
- Students will compare and contrast the biological process of hearing with the hearing that is achieved with a cochlear implant.
- Students will create calligrams.

## KEY VOCABULARY

- **audiologist** (p. 15) a medical specialist who diagnoses and treats hearing-related problems
- **otolaryngology** (p. 18) a doctor who specializes in treating diseases of the ears, nose, and throat

## ENGAGE

**Conversation Question:** How do we hear sound?

Read aloud this excerpt from the article: “Spoken language is complex. And fast. The average English speaker produces around 150 words per minute.” Then pose the following questions: If a person is talking for 15 minutes, approximately how many words are said? (Answer:  $15 \times 150 = 2,250$ ) Discuss the challenges this rate of speech might present for people who have hearing loss.

## INTRODUCE VOCABULARY

Post the key vocabulary terms and meanings and have students read the definitions. Point out that both of these professionals assist people who are hard of hearing. Discuss other professionals who would be helpful and important to people who have hearing loss.

## READ & DISCUSS

After students reread the article in small groups, have them discuss and answer these questions:

1. When and how are hearing problems usually diagnosed in children?
2. What is a cochlear implant?
3. Why does it take time to learn how to hear through a cochlear implant?
4. How can parents and caregivers of babies with cochlear implants help their children?
5. Why might learning American Sign Language (ASL) be helpful for people who have a cochlear implant?

## SKILL FOCUS: Compare and Contrast

**INSTRUCT:** Students will compare and contrast the biological hearing process with the cochlear implant hearing process. Have students work in pairs to revisit the text and underline information that will be helpful for this purpose. Then introduce the *Hearing Processes: Compare and Contrast* worksheet and have partners use it to record their data.

**ASSESS:** Reconvene and review the worksheets. Then have students use the information they gathered to write a paragraph that compares and contrasts the two hearing processes. Evaluate written responses.

## EXTEND

**Language Arts** Point out the title’s design on page 14—an aerial view of people arranged in the shape of an ear with the article title wrapped around the ear. Explain to students that this is an example of a calligram—a written word or phrase that is arranged on the page to create an image. The image is related to the meaning of the word or phrase. Show examples of calligrams on the internet. Then have students create calligrams using an inspirational word or phrase, or even paraphrased information from the article. Suggest students use color to enhance their work. Display calligrams in the classroom.

## Hearing Processes

**Compare and Contrast** Reread the article and underline details about the biological process of hearing and the cochlear implant process of hearing. Then note these details in the chart below. Finally, use the information you gathered to write a paragraph that compares and contrasts these two processes of hearing.

Typical Biological Hearing Process	Cochlear Implant Hearing Process

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## Deaf Friends

pp. 20–21, Expository Nonfiction

Being a good friend is important to people of all ages. This article teaches readers simple ways to communicate better with their peers who are deaf.



## RESOURCES

Deaf Friends: Cause and Effect

## OBJECTIVES

- Students will learn communication strategies that are helpful when speaking to a person with hearing loss.
- Students will examine cause-and-effect relationships.
- Students will adapt a favorite game so it can be played by kids who are deaf.

## KEY VOCABULARY

- lipread** (p. 21) to understand what people are saying by watching the movement of their lips
- adapt** (p. 21) to change something so that it functions better or is better suited for a purpose

## ENGAGE

**Conversation Question:** How do we hear sound?

Use these simple sentences to play a few rounds of charades with students: *I'm hungry, I'm thirsty, let's read a book.* Point out that charades uses a form of sign language, though it's different from American Sign Language (ASL). Share with students a video from Signs for Humanity, an organization "dedicated to educating everyone about the beauty and power of ASL. The video "School Signs: ASL vs. Charades" is a good choice. Then explain that this article describes how hearing kids and deaf kids can communicate.

## INTRODUCE VOCABULARY

Post the key terms and discuss the definitions. Then display the following questions and have students discuss responses with a partner.

- List three things that you can do to make it easier for someone to **lipread** your conversation.
- How can you **adapt** a particular activity to be more inclusive to people with hearing loss?

## READ & DISCUSS

Post and discuss the questions prior to reading. Read the article aloud, pausing when answers to the questions are revealed, and encourage students to elaborate.

- What are the four different levels of hearing loss?
- Why does the article state that deafness is a very individual thing?
- Why might some people avoid a person with a hearing impairment?
- Explain four strategies that can help someone communicate with a deaf friend.
- Why does the author of the article point out that being deaf isn't the same thing as being stupid?
- How is technology helping deaf and hearing friends connect?

## SKILL FOCUS: Cause and Effect

**INSTRUCT:** Review cause and effect: a relationship in which one event is the reason another event happens. Then discuss with students the challenging effects caused by hearing loss as described in the article. Introduce the *Deaf Friends: Cause and Effect* worksheet and tell students they will be searching through the article for information that demonstrates how hearing loss can affect many facets of life.

**ASSESS:** Converse with students as they are working. Focus on the last column of the chart to stress the solutions that remedy negative effects.

## EXTEND

**Game Design** Have students work in pairs to select either a board game or a physical game to adapt for kids who are deaf. Explain that they need to come up with at least three changes to the game so that deaf players can participate. Have students share their adapted games with the class.

## Deaf Friends

**Cause and Effect** Refer to the article to determine the challenges caused by hearing loss and solutions to these challenges. Record information in the chart below.

**Primary Cause: Hearing Loss**



Challenges caused by hearing loss (Effects)		Solutions to these challenges
	➡	
	➡	
	➡	
	➡	

**Think, Pair, & Share:** Why do you think communication became more challenging for the Deaf community during the pandemic?

# Muse® Teacher Guide: May/June 2021

## Meet Me at the Whispering Spot

pp. 28–33, Expository Nonfiction

Architects and ancient mathematicians are responsible for modern-day rooms and buildings that boast excellent acoustics. Readers will learn how engineers work together to expertly scatter sound.



## RESOURCES

Sound Solutions: Problems and Solutions

## OBJECTIVES

- Students will learn how architects must consider acoustics when designing a room or building.
- Students will examine problem-and-solution relationships.
- Students will review geometrical concepts of two-dimensional and three-dimensional figures.

## KEY VOCABULARY

- **acoustics** (p. 29) the qualities of a room, such as shape or size, that make it easy or difficult for people inside to hear sounds clearly
- **foci** (p. 30) in geometry, special fixed points that define the curve of an ellipse
- **reflect** (p. 30) to move in one direction, hit a surface, and then quickly move in a different and usually opposite direction

## ENGAGE

**Conversation Question:** How do we hear sound?

This article refers to the ellipse as “a certain kind of oval that has a curious role in human history.” Use the activity on page 30 of the article (second-to-last paragraph) to give the students a concrete visual of an ellipse and its foci. You will need a piece of cardboard, two pushpins, and a length of string.

## INTRODUCE VOCABULARY

Post and discuss the key vocabulary words and definitions on the board. Then display the following cloze sentences and have students use the vocabulary words to complete them:

1. The sun is located at one of the two \_\_\_\_\_ of the earth’s orbit.
2. White window shades will \_\_\_\_\_ heat away from the house.
3. The theater’s poor \_\_\_\_\_ made the concert difficult to hear.

## READ & DISCUSS

Reinforce comprehension of the concepts in the article by using the following prompts to direct discussion:

1. What is unique about the spot where John Quincy Adams once kept his desk in the US Capitol building?
2. What causes a room to have a whispering spot?
3. List three buildings that have a whispering spot.
4. What happens when sound waves originate from one of the foci in a partly ellipsoidal room?
5. Why do architects who understand acoustics generally avoid designing rooms with a perfect elliptical shape?

## SKILL FOCUS: Problem and Solutions

**INSTRUCT:** Inform students that they will be rereading the article with a partner and highlighting passages that depict how experts are trying to solve acoustical problems caused by various elements, primarily room design. Distribute copies of the *Sound Solutions: Problems and Solutions* worksheet and tell students they will be responsible for recording the problem-and-solution relationship from the article. Pairs should discuss and amend their findings as they are completing their work.

**ASSESS:** Review the information that the students listed on their charts. Evaluate the thoroughness and accuracy of their statements.

## EXTEND

**Mathematics** This article mentions 2-dimensional shapes (plane geometry) and 3-dimensional shapes (solid geometry). Review that plane geometry studies closed figures with straight lines that have two dimensions (length and width), while 3-dimensional figures include length, width, and height. Have students make a T-chart with the headings “2-D figures” and “3-D figures.” Model the activity by writing *square* in the 2-D column and *cube* in the 3-D column. Give students three minutes to fill columns and then share and compare answers.

## Sound Solutions

**Problems and Solutions** Refer to the article to help you record and explain how each of the listed solutions helps in solving acoustical issues.

<b>Problem:</b> How can architects, mathematicians, and sound experts improve the acoustics in a room?		
<b>Solution 1:</b> Sound Absorption	<b>Solution 2:</b> Sound Reflection	<b>Solution 3:</b> Room Design