

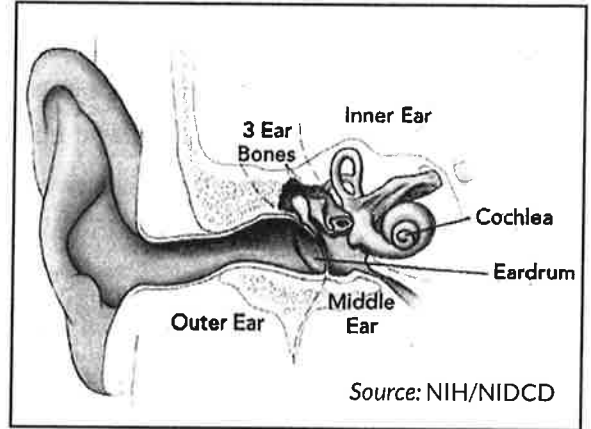
How Does Noise Damage Your Hearing?

<https://www.noisyplanet.nidcd.nih.gov>

Sounds that are too loud for too long can damage your hearing permanently. This is called *noise-induced hearing loss* (NIHL). The louder the noise, the faster it can damage your hearing. If the noise is very loud, you could lose your ability to hear instantly. If the noise is not as loud but long-lasting, hearing damage can build slowly. NIHL can happen to anyone at any age, so it's important to start protecting your hearing—and your children's hearing—early.

Think of the many sounds at different volumes you hear in a day, a week, or a year. The effects of loud sounds add up over a lifetime. Because the damage from noise exposure is usually gradual, you might not notice it, or you might ignore the signs of hearing loss until they become more serious.

Over time, sounds may become distorted or muffled. You might find it difficult to understand people when they talk, or you might turn up the volume on the TV. The damage from NIHL can lead to hearing loss serious enough that you need to make sounds louder with devices like hearing aids, to help you hear, communicate, and participate fully in daily activities.

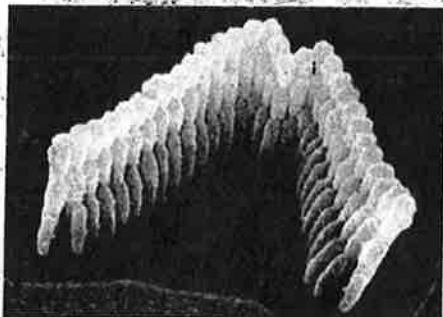


The good news is that you can prevent NIHL. By teaching children healthy hearing habits, you can help them keep their hearing too.

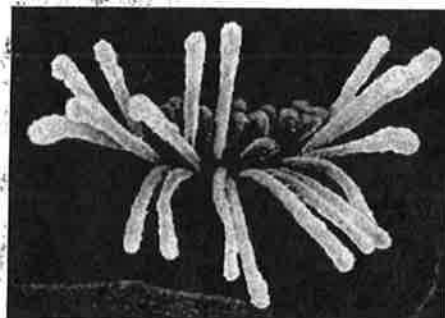
How You Hear

You hear because of a series of steps in your ear that change sound into electrical signals. The auditory nerve carries these signals from your inner ear to your brain, which makes sense of the sounds you've heard.

- The cochlea—a snail-shaped structure in your inner ear—is lined with sensory *hair cells*.
- On top of each hair cell is a wispy bundle of *stereocilia* (pronounced STARE-ee-oh-SILL-ee-ah), which sways with sound vibrations. Over time, sounds that are too loud can damage these hair cell bundles. When that happens, hair cells can't send information about sounds to the brain. In humans, the hair cell bundles cannot be fixed or replaced, so this damage leads to permanent hearing loss.



This wispy bundle of stereocilia sits on top of a hair cell in the ear. The hair cell bundle sways with sound vibrations.



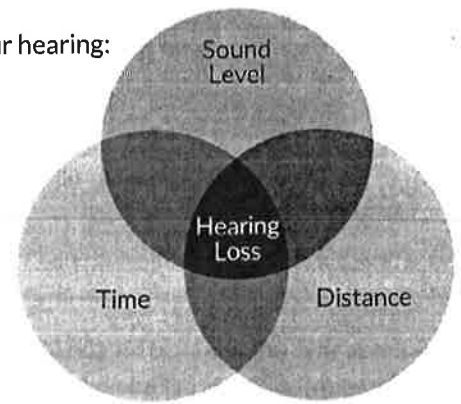
Loud noise can damage the hair cell bundle, and then the hair cell can't respond to sounds.



Causes and Signs of Noise-Induced Hearing Loss

There are three key factors that affect whether and by how much a sound will damage your hearing:

1. Decibel level: How loud the sound is.
2. Distance: How close you are to the source of the sound.
3. Time: The length of time you are exposed to the sound.



NIHL can result from a one-time exposure to a very loud noise, like a nearby explosion or a shotgun firing. You're more likely to lose your hearing gradually, however, from sounds that aren't as loud but that you're exposed to repeatedly for long periods.

Some examples of noisy activities that could damage your hearing are:

- Listening to loud music through headphones, at a concert, or while you're playing an instrument.
- Going to the movies in theaters or cranking up the volume on the TV at home.
- Going to sporting events attended by large, noisy crowds.
- Going to fireworks shows.
- Working with loud power tools.

Your hearing might return to normal a day or two after you've been exposed to loud noises. Recent research suggests, however, that your hearing can be permanently damaged even if you don't have noticeable hearing loss right away.

Because NIHL can build slowly over time, you might not notice the early signs of hearing loss. As your hearing gets worse, certain sounds—particularly speech—begin to sound muffled. As a result, you may:

- Ask others to repeat what they've said more often.
- Turn up the sound on the TV, music player, or other devices.
- Have ringing or buzzing in your ears (a condition called tinnitus).
- Have trouble hearing high-frequency speech sounds, like some consonants. For example, the sentence, "I asked Skip if he felt sick" might sound like a series of vowels: "I a___ _i_ i_ _e _el_ _i_."

How Can You Help Your Kids Protect Their Hearing?

Just as wearing sunscreen can protect you from sun damage, healthy hearing habits can help protect you from NIHL. When you talk to your kids about noise and hearing loss, remind them to:

- Lower the volume.
- Move away from the noise.
- Wear hearing protectors, such as earplugs or earmuffs.

It's a Noisy Planet. Protect Their Hearing.[®] is a national public education campaign designed to inform preteens, parents, and educators about the causes and prevention of noise-induced hearing loss. It is supported and administered by the National Institute on Deafness and Other Communication Disorders (NIDCD), part of the National Institutes of Health (NIH).
<https://www.noisyplanet.nidcd.nih.gov>.

For more information about your hearing and hearing loss, contact:

NIDCD Information Clearinghouse
1 Communication Avenue, Bethesda, MD 20892-3456
Voice: (800) 241-1044
TTY: (800) 241-1055
Email: NPInfo@nidcd.nih.gov

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National Institute on
Deafness and Other
Communication Disorders

NIH...Turning Discovery Into Health[®]

NIH Publication No. 18-DC-8058

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Word Search

There are 18 words hidden in this word search that relate to sound and your hearing. Can you find them? Don't forget to look up, down, forward, backward, and diagonal!



damage
decibels
eardrum
earplug
ears
hair cells

hearing
harmful
inner ear
listen
loss
loud

middle ear
noise
outer ear
protection
quiet
sounds





Sounds of Silence

Objectives:

Students will:

- Identify everyday sounds and background noises
- Compare indoor sounds and outdoor sounds

Materials:

- Paper, pencil or pen

Class Time:

- 30 minutes

Activity:

What does silence sound like? Is there a place or time when there is absolutely no sound? What are background noises? Let's investigate. First, let's be quiet for 2 minutes. Put your head down and really listen to the sounds of a quiet classroom. Now, without making a sound, jot down every noise you heard in the 2 minutes. What does a quiet classroom sound like? What background noises do we hear now that usually are drowned out by voices and other activities in class? When everyone is done, we'll share your findings. Now let's do the same activity outside. For the next 5 minutes, silently jot down all of the sounds you hear, then we'll compare notes. How does your brain figure out which sounds to listen to and which ones to drown out?

Extensions:

1. For 5 minutes before you go to sleep tonight, listen to all of the sounds you hear inside and outside. When you wake up, do the same thing. Are the sounds the same or different?
2. Some hearing-impaired kids use sign language to communicate. Check out books or online resources on American Sign Language (ASL) and learn a few signs.

Reproducible Materials

Handout: The Ins and Outs of Your Ears

KidsHealth.org/classroom/3to5/body/functions/hearing_handout1.pdf

Handout: The Ins and Outs of Your Ears

KidsHealth.org/classroom/3to5/body/functions/hearing_handout2.pdf

Quiz: Hearing

KidsHealth.org/classroom/3to5/body/functions/hearing_quiz.pdf

Answer Key: Hearing

KidsHealth.org/classroom/3to5/body/functions/hearing_quiz_answers.pdf

Hearing and the Human Body – Sounds of Silence

What does silence sound like?

	Put your head down and close your eyes for 2 minutes. Then write down everything you hear.
Room 1:	
Room 2:	
Outside:	

How does your brain figure out which sounds to listen to and which ones to drown out?



Activities for Students

Note: The following activities are written in language appropriate for sharing with your students.

The Ins and Outs of Your Ears

Objectives:

Students will:

- Explore their sense of hearing
- Learn the parts of the ear and how ears transmit sound

Materials:

- Computer with Internet access
- “The Ins and Outs of Your Ears” handout

Class Time:

- 1 hour

Activity:

Just like a storybook, your ears have three parts: a beginning, middle, and end. These parts are called the outer ear, the middle ear, and the inner ear, and each part has a specific function. To find out more about how your ears detect and interpret sounds, read the KidsHealth.org articles related to hearing, then take the online quiz on ears (KidsHealth.org/en/kids/earquiz.html) to see how much you learned. Next, label a diagram of the ear on “The Ins and Outs of Your Ears” handout.

Extensions:

1. Have students read the KidsHealth.org articles about hearing, then create posters for the classroom or hallways promoting safety tips related to their ears and hearing.
2. Try the two KidsHealth.org Senses Experiments related to hearing and write down the results.
3. The next time you’re in a pool, put your head under the water and listen to how things sound different. Try snapping your fingers out of the water, then underwater. Try tapping the ladder. Try talking to someone. Discuss how traveling through air or water affects sounds we hear.
4. Research how bats, dolphins, whales, and other animals use echolocation to “hear” what’s around them. Then choose one animal and write a brief report explaining how it uses echolocation.

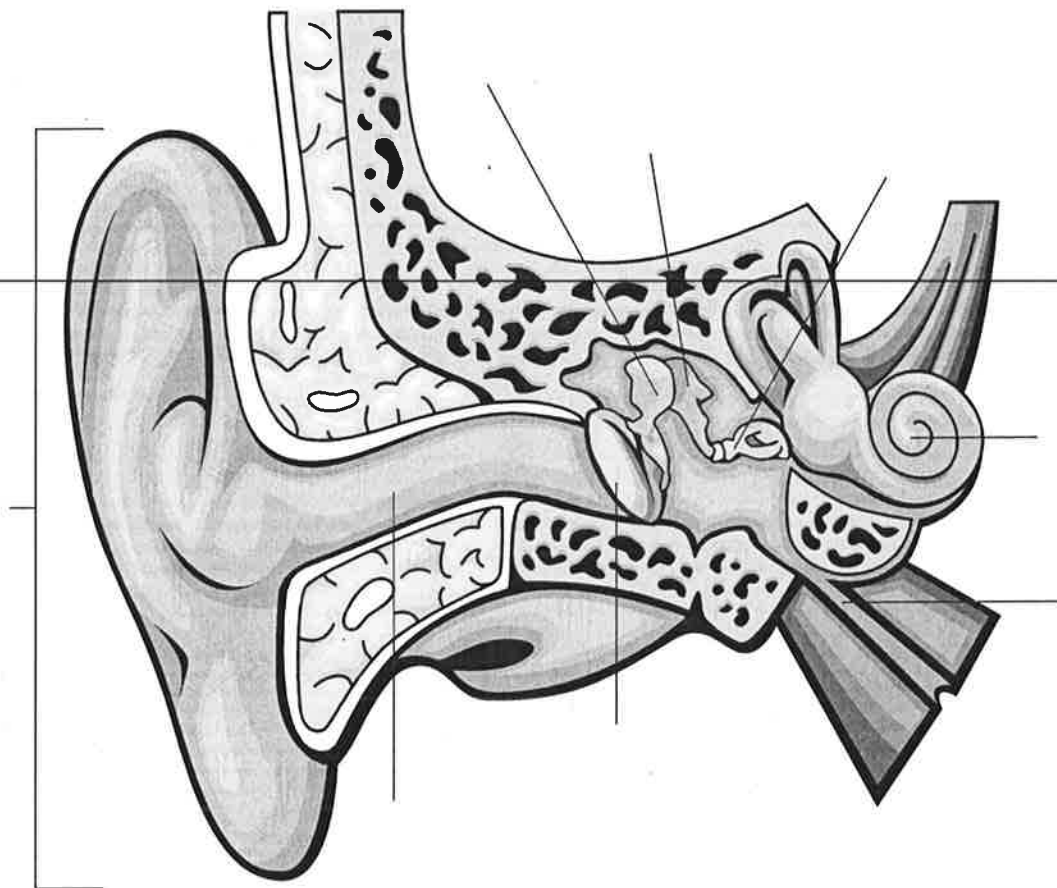


Name: _____

Date: _____

Ins and Outs of Your Ears

Directions: Label the ear, referring to the KidsHealth.org article "Your Ears."





Name: _____

Date: _____

Quiz

Instructions: Answer each question.

1. Your ears:
 - a. collect and process sounds
 - b. send signals to your brain
 - c. help you keep your balance
 - d. all of the above
2. True or false: Earwax contains chemicals that fight off infections (germs) that could hurt the skin inside the ear canal.
3. True or false: People who are exposed to loud noises over long periods of time might lose their hearing permanently.
4. True or false: Listening to loud music using earbuds can damage your hearing.
5. Fill in the blanks using the Word Bank at the bottom of the page:

The main job of the outer ear is to collect _____. The middle ear takes sound _____ and turns them into _____ that are delivered to the inner ear. When sound reaches the inner ear, the vibrations (sounds) cause tiny _____ on the cells to move, creating _____ signals that the _____ understands as sound. The brain puts it all together and that's how you hear and process sounds.

Word Bank

brain

hairs

nerve

sound

vibrations

waves