It's A Noisy Planet PROTECT THEIR HEARING®

A program of the National Institutes of Health

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

How We Hear Activity

Every day, we experience sound in our environment, such as the sounds from television and radio, household appliances, and traffic. Normally, these sounds are at safe levels that do not damage our hearing. However, sounds can be harmful when they are too loud, even for a brief time, or when they are both loud and long lasting. These sounds can damage sensitive structures in the inner ear and cause noise-induced hearing loss (NIHL). Approximately 26 million adults in the United States—and millions of teens—have hearing loss likely caused by noise.

The good news is that NIHL is preventable. Developing healthy hearing habits while young is a key step to preventing hearing loss. To increase awareness among parents and youth about NIHL and how to prevent it, the National Institute on Deafness and Other Communication Disorders (NIDCD), part of the National Institutes of Health, developed the health education campaign *It's a Noisy Planet. Protect Their Hearing.*®

The Noisy Planet campaign offers a wide range of print and online materials to help spread the word and educate youth and adults about the importance of hearing preservation. One component of the campaign is an interactive 45-minute classroom presentation. There are several activities that presenters can choose to reinforce the educational messages. The How We Hear activity demonstrates how sound travels through the ears to the brain. Understanding how we hear is important to knowing how loud noises affect hearing over time and to learning why NIHL is so important. Seven volunteers are needed to represent or act out parts of the ear.

Materials:

- Bike horn
- Frisbee or large disc
- Flash light

Steps:

1. Select seven volunteers from the audience.

2. Line up all of the volunteers so they are shoulder to shoulder and facing the audience.

3. Each of these seven volunteers represents an element in your ear that sound waves pass through to allow you to hear. You will explain to each volunteer what part of the ear they represent and teach them how to act out that part. As the hair cells move up and down, microscopic hair-like projections (known as stereocilia) that perch on top of the

hair cells bump against an overlying structure and bend. Bending causes pore-like channels, which are at the tips of the stereocilia, to open up. When that happens, chemicals rush into the cells, creating an electrical signal.

a. First is the source of sound. The volunteer will honk the bike horn. A good transition is to say that this sound, which is in the form of a vibrating sound wave, passes through the pinna (pin-ah), or outer ear.

b. Second is the eardrum or tympanic membrane. The volunteer will hold up the Frisbee and hit it after the first person honks the horn. This represents how the eardrum reacts when it receives the vibrations from the sound.

c. Third, fourth, and fifth are the three smallest bones in your body: the hammer, anvil, and stirrup. The scientific names for these bones are the malleus, incus, and stapes, respectively. The third participant will be the hammer, the fourth will be the anvil, and the fifth will be the stirrup. Share with the audience that these are the three smallest bones in the entire body and that the three of them together are the size of an orange seed. These three people will "vibrate" or shake after the eardrum hits the saucer.

d. Sixth is the cochlea. This person will ripple around or kind of wave themselves after the stirrup finishes "vibrating". A good transition from the three bones to the cochlea is mentioning that the three bones vibrate against an organ inside the ear called the cochlea (the snail-shaped organ of the ear). Make sure to let the audience know that the cochlea is filled with fluid and approximately 18,000 tiny sensory hair cells called cilia (pronounced s-ill-ee-ah). When the cochlea receives the vibrations from the three smallest bones, the fluid in the cochlea sloshes around and bends the sensory hair cells, which are important to hearing. These cilia then send the sound message through the auditory nerve to the brain.

e. The brain receives and understands the sound message. This is represented by the last person turning on the flashlight representing the electrical signal going to the brain.

4. After all of the participants know their role, ask the first volunteer to honk the bike horn, with each participant moving through the chain of events to complete the demonstration.

For free materials or to learn more about how to prevent NIHL, visit the Noisy Planet website at ***https://www.noisyplanet.nidcd.nih.gov***.

The National Institute on Deafness and Other Communication Disorders (NIDCD), part of the National Institutes of Health (NIH), conducts and supports research in the normal and disordered processes of hearing, balance, taste, smell, voice, speech, and language.

For more information about 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

National Institute on Deafness and Other Communication Disorders

NIH…Turning Discovery Into Health®