

It's Too Loud



OVERVIEW

Sound and noise are all around us. Hearing sounds in order to work and survive in an environment is beneficial. Sometimes the sounds can become too loud and we need a way to reduce the sounds to a safer and more pleasant level. In this lesson, young scientists will investigate the effect of using ear protectors to reduce sound levels.

OBJECTIVES

Students will be able to:

- work together to measure sound levels.
- collect, organize, display, and analyze data about sound levels.
- investigate the effect of wearing ear protection on the attenuation of sound.

BACKGROUND INFORMATION

Sound, a form of energy, is an acoustic wave that results when a vibrating source, such as a machine, produces a disturbance in an elastic substance like air or water. Sound that is unwanted is usually considered to be noise. It can be subjective, sound to one person could be noise to another. Sound has several qualities that are used to identify and describe it: frequency, wavelength, speed, and loudness. The loudness of sound diminishes with distance from the source of the sound. Controlling sounds can be a major concern in schools, workplaces, homes, and public spaces. If sounds become too loud, hearing loss can result. One way to address this problem is to reduce the level of sound in an environment; another way is to provide ear protection for people within the environment.

MATERIALS

- Items that make noise (smartphone playing music, portable radio, alarm clock, buzzer, bell, etc.)
- Computer or mobile device with an internet connection (optional)

HOME ACTIVITY

1. **Demonstration Activity:** Your young scientist could demonstrate the attenuation of sound as distance increases by moving a source of sound away from you in increments. Sources could include a portable radio, alarm clock, buzzer, bell, etc.

2. **Short Activity:** Is sound attenuated when it has to travel around corners? Does the distance sound travels depend on the frequency or pitch of the sound?
3. **Problem to Solve Activity:** One room of your home seems particularly noisy and loud. Is there something you and your student can do to the room to make it less noisy?
4. **Research Activity:** You and your young scientist could use the internet to research the science of sound and how our ears detect sound.
5. **Explore Activity:** There are a number of free applications available on the internet that enable your computer to measure, record, and analyze sound. Your computer might even have a built-in application that controls the sound input for the microphone built into most computers.

VOCABULARY

- **Attenuated :** to reduce, or is lessened or weakened.

THOUGHT/CONVERSATION STARTERS

- Tell me how you were able to test out sound protection. Can we try it here? What items do we have that can help protect our ears?
- When have you heard a noise, sound, or music that hurt your ears? What are ways that we can protect your ears? Why is this important?
- How does sound travel?

DOCUMENT THE LEARNING IDEA

- Allow the young scientist to document learning by reflecting in their science journal.
- Take a moment to document what was learned after researching sound. What surprised you?

CONTINUE MAKING CONNECTIONS

- As you are out and about with your young scientist, listen for sounds and consider those that are close to loud sounds. Take the opportunity to have a discussion. Is ear protection needed for anyone in the environment? If you notice ear protection being used, what are they using?
- Talk about ways to improve safety in the many environments you visit. It may be surprising how often loud sounds and noises are present (listening to music in headphones, music in the car, music at a live concert, car shows, races, restaurants, parties).