

Sounds Around

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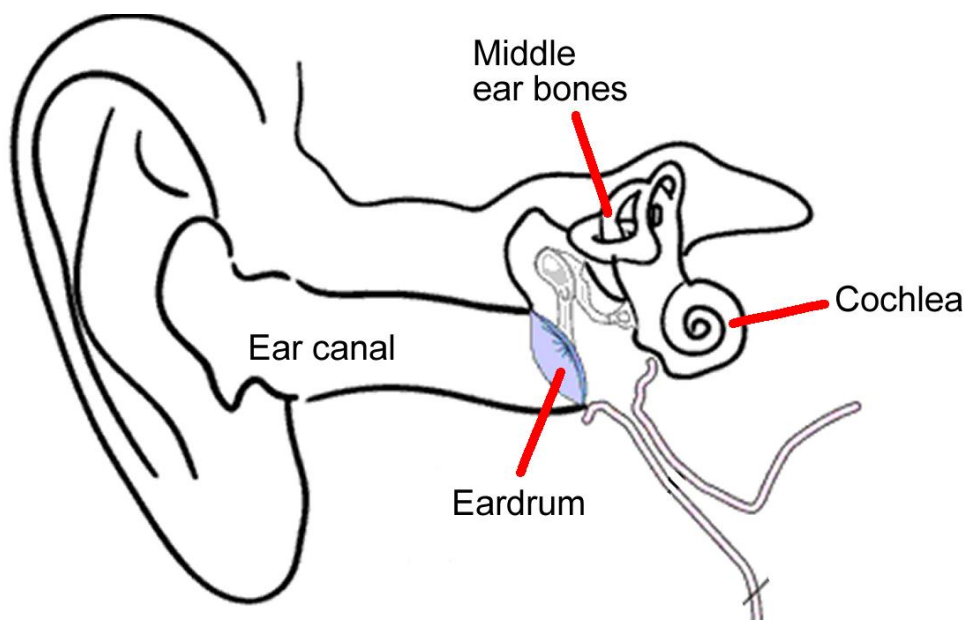
Introduction

Our ears are constantly being bombarded with sound – so much that we automatically “tune out” a lot of it. Some sounds are “music to our ears” while others can annoy us and even damage the delicate structures in our ears. This activity helps students “tune in” to the sounds in their environment and helps them identify and lessen local noise problems. They also learn how different sounds in nature have inspired cultural stories.

Background

Sound is a form of energy that travels in waves. Sound waves can be transmitted only when molecules (like air or water) are present. Sound energy causes molecules to vibrate and bump into each other, creating a wave that travels through the “sea of molecules.” If molecules are not present, as in outer space, sound waves cannot exist. That’s why space explorers must use radios to talk with each other when taking a spacewalk.

When sound waves reach our ears, they are funneled down the ear canal to the eardrum. The eardrum is a circular membrane that is stretched across the ear canal and vibrates when sound waves strike it. It separates the outer ear from the middle ear. The middle ear contains three tiny bones, the first of which is attached to the eardrum. Vibrations of the eardrum pass through these three bones. The third bone rests on the cochlea (KAHK-lee-uh), a structure in the inner ear. The cochlea is a fluid-filled tube that contains hair-like receptors for sound. Sound vibrations pass through the fluid and cause the hair-like structures to bend. The receptors send impulses to the auditory nerve that connects the ear to the brain. Impulses from the ear are interpreted in the hearing center in the brain.



Having two ears helps humans and other animals determine which direction a sound is coming from. The sound of a bird, for example, reaches the closer ear microseconds earlier and is a little louder than in the farther ear. The brain detects these small differences in the signals and calculates the direction and distance of the sound source.

Sounds vary in their loudness and softness and in their pitch. Sounds with slower vibrations have a lower pitch. Sounds with faster vibrations have a higher pitch. Loud sounds can be harmful to ears and even moderate sounds can cause hearing loss over time.

Sound helps animals in many different ways. Animals that hunt by sound use hearing to listen for movement of prey. Bats and whales find their way around by listening to echoes bounce off objects. Other animals listen for sounds to find each other or to be alert to danger. Still other animals produce sounds to scare away predators.

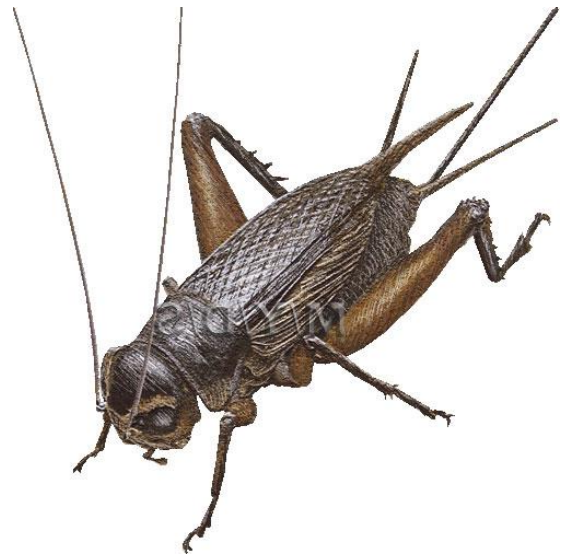


Sounds can be explored scientifically but there are other ways to experience sound. In many cultures throughout human history, people have used legends and myths to explain sounds in nature in a more lyrical or symbolic way.

Doing the Activity

Part A – Little Kids Listen Up!

- 1.) Ask students about their experiences listening in the dark.
- 2.) Have students sit quietly in a circle with their eyes closed to listen for sounds.
- 3.) After a brief interval, ask them what they are hearing and what they think is making each sound. You can have them point in the direction each sound is coming from.
- 4.) You can also have them imitate the sounds.
- 5.) Have them create a journal and draw pictures of what they think made the sounds.
- 6.) Afterwards lead the students in a discussion. What was their favorite sound? Which sound was the loudest? Which sound was the softest?



Doing the Activity

Part B – Listen Up!

- 1.) Ask the students if they've ever tried to move around in a place so dark that they couldn't see. How did they get around without seeing? Did they rely on other senses? Did they notice sounds around them more than they might have otherwise?
- 2.) Ask the students to name some examples of animals that are active at night. Do they have special adaptations for seeing or for hearing? (Owls have large conical discs around their eyes that funnel sound to their ears, and foxes have large ears for picking up sounds.)



- 3.) Explain that having ears on opposite sides of our head helps us judge the location a sound comes from.
- 4.) Pass out paper, crayons or markers, and a clipboard for each student to create a journal. Have students find a place where they can sit comfortably, away from others. Then have them close their eyes and listen quietly to sounds around them for several minutes. Tell them to try to remember all the sounds they hear.
- 5.) After they've listened for a few minutes, have students make a "sound map." They should put an X in the middle of the page to represent themselves, and then use pictures or words to show that location of the sounds around them. They can draw lines to show directions and distances. Students can create multiple maps from different locations for comparison.
- 6.) Afterwards, lead the students in a discussion of their experiences. What were the sources of the sounds they heard? Were they plants, animals, people, or machines? Which sounds did the students like? Which did they dislike? Call on students to present and explain their sound maps.