

Good Vibrations

LESSON PLAN

RECOMMENDED FOR YEARS 3 - 5

Lesson summary

In this lesson, students learn about the structure of their ears by building a model of the ear drum. By the end of this lesson, students will be better at explaining how the ear drum works in interpreting sound and why it is important to keep our ears healthy.

Learning objectives

Students can create a model of an ear drum and explain how it works.
Students can explain why it is important to keep our ears healthy.

Possible Australian Curriculum links

Science Understanding / Biological sciences

Health and Physical Education / Personal, Social and Community Health / Being healthy, safe and active

STARTER

1. Have students form a circle with one student blindfolded in the middle. Explain that you are going to silently point to different students around the circle, and as you point at someone, that student is going to call out the name of the student blindfolded. The blindfolded student needs to then try to point in the direction of the voice and identify the name of the student who called his/her name.
2. Invite different students to have a go being blindfolded in the middle. You can challenge the blindfolded student by asking them to cover one ear, then both ears to block the sound. Discuss what strategies students use to identify where and from whom the sound is coming from. Ask students whether it was easier with one ear or both ears and why they think that is. Ask students whether they had one ear that they found easier to listen with (some people have a dominant ear).

Resources

- Blindfold

Each group will need:

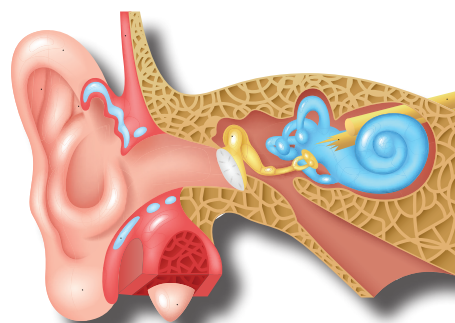
- A plastic cup
- A piece of plastic wrap large enough to stretch over the opening of the cup
- A rubber band
- 10 grains of rice
- A variety of noisemakers

BODY

1. Explain to students we are going to create an ear drum model. You may like to discuss the different parts of the ear first and have students complete "Label Parts of the Ear" from the [Discovery Centre's Fun for Kids website](#).
2. Have students work in pairs or small groups to create their models. Give each group a plastic cup to represent the ear canal. Hand out a piece of plastic wrap for each group and ask students to stretch the wrap over the opening of the cup, securing it in place using a rubber band. Explain that the plastic wrap represents the ear drum.
3. Give each group about 10 grains of rice (you can also use other kinds of sand-like substances, such as salt, sugar, or ground coffee). Explain to students the cup is going to be a visual representation of what happens to our ear drums when it is exposed to loud noises.
4. Allow groups to experiment with a variety of noisemakers to see if they can get their ear drum models to vibrate (some examples of noisemakers include maracas, whistles, tambourines, small speakers, bells, drums, etc. You could even ask students to hum or make noises with their mouths). You should be able to observe this happening, as the rice will bounce around the plastic wrap with each vibration. Explain to students that this simulates what happens when the sound waves reach our ear drums. As the ear drum vibrates, it sends vibrations

Health and safety

Ensure that the space is clear and there are no objects on the ground students could trip over when playing the blindfolded game.



through the ear passage, which sends signals to the brain and interprets this into sound.

5. Have students complete the first part of the activity sheet by drawing a diagram of their ear drum models and writing their initial observations of what happened when their models were exposed to loud noises. Now ask students to predict what might happen if we poked a hole or made a tear to the plastic wrap, which represents the ear drum. Ask students to try this out with their models, starting with a small hole (poked with a pencil) and eventually turning it into a bigger tear. Discuss with students whether their ear drum worked as well and why (it doesn't work as well because it doesn't vibrate as much and the rice can fall through).
6. Ask students to imagine what it would be like if they had a hole or tear in their own eardrums. Ask students to predict what might happen to their hearing (you could have temporary hearing loss, or if the tear doesn't heal, permanent hearing loss). Discuss how bacteria and other contaminants could get in through this tear and cause an infection (such as a middle ear infection or otitis media). It is therefore important to remember to never stick anything in your ear for any reason, so that you do not damage your ear drum.

Question prompts

How do ears work?
 How do ear drums help us hear?
 What would happen if you had a tear in your eardrum?
 Why is it important that we take good care of our ears?
 What can we do to protect our ears?



PLENARY

Have students create posters to explain to others why it is important to keep our ears healthy. As a class, brainstorm different ways we can protect our ears (some examples include avoiding loud noises, wearing ear plugs if we are in loud environments, never putting things inside our ears, wearing a helmet when riding a bike or playing contact sports). You can put the posters up around school or present them to another class to teach others about keeping their ears healthy.

THE SCIENCE BEHIND THE ACTIVITY

Your ear is composed of three parts – the outer ear, middle ear, and inner ear. The outer ear is the part you can see. It is where the sounds are collected and moved along the ear canal towards the middle ear. The middle ear is separated from the outer ear by the ear drum. Ear drums are membranes inside your ears that vibrate when sound waves hit them. The vibrations then travel through the little bones of the middle ear and are sent to the inner ear. Inside the inner ear, the vibrations create nerve signals which are sent to the brain and gets converted into the sounds you hear.

Sound is the transfer of energy in the form of waves. It can travel through a substance or medium, such as air, water, and flexible solids. This is why you can hear loud music coming from a room even with the door closed. When you hear music coming from a speaker, you are actually “feeling” the air particles vibrating against your ear drum as the sound waves vibrate back and forth through the air. These vibrations are transmitted to your inner ear, where the brain interprets it as sound. We are able to distinguish different sounds based on a range of factors, including the sound waves' duration, wavelength, wave height (amplitude) and rate (frequency).

Otitis media (middle ear infection) occurs when infection causes inflammation of the middle ear and the ear drum. Fluid can build up in the middle ear which can result in perforation of the ear drum. In severe cases of otitis media, grommets (small tubes) can be inserted in the ear drum to allow the fluid to drain. Otitis media can seriously affect childhood development, school performance and subsequent social and economic wellbeing.

At the Telethon Kids Institute, [our Ear Health team](#) aims to understand the causes of Otitis Media to identify the extent of the problem, and design and evaluate interventions to reduce the burden of the disease and inform policy. The team also aims to reduce the prevalence of chronic otitis media and hearing loss in Aboriginal children. Some of the ways our team does this include conducting epidemiological studies, qualitative research, data linkage, pathogenesis and clinical trials. An integral linkage for the team is the Aboriginal Community Advisory Group, which guides the team in working in a culturally-sensitive manner and provides direction to ensure the program is relevant and appropriate for their communities.

Have you checked out the [Telethon Kids Discovery Centre](#)? Enrich this lesson with an excursion to our interactive Discovery Centre, full of fun games designed to get kids excited about science, health and research. Check out [our website](#) or [send us an email](#) for more information and to book your next school visit!

Good Vibrations Activity Sheet

Name: _____ Date: _____

Create your ear drum model using the materials provided.
In the box below, draw a diagram of your model.

Don't forget to
label your
diagram when you
have finished.



Explain what happened when your ear drum was exposed to different noises.

Which noisemaker caused your ear drum model to vibrate the most? _____

Why do you think that is? _____

Explain what happened when you poked a hole or made a tear in your ear drum model. Did it work as well? Why do you think that happened?
