

MINISTRY OF EDUCATION
SECONDARY ENGAGEMENT PROGRAMME
GRADE 8
INTEGRATED SCIENCE

Week 10

Lesson 2

Topic: Sense Organs

Sub-topic: The Ear

Objectives: After reading the handout, students will:

- describe how the ear is similar to a simple microphone accurately.
- correctly discuss how the ear functions in balance.
- list at least four (4) ways of caring for our ear.

Content

A Simple Microphone

A man-made instrument that can collect sounds like the ear is the microphone. The microphone is a device that collects sounds waves on its diaphragm which vibrates. The vibrations are converted to electrical signals which eventually come through a speaker as sounds.

Sense of balance

In addition to hearing, the second function of the ear is to ensure balance in humans.

The human ear has special structures that help us keep our balance. They are the semi-circular canals. They contain a fluid that is sensitive to movement. Body movement in any direction is detected by sensory cells and the information is passed on to the brain. The brain then makes you aware of the movement.

How does our sense of balance work?

The ear is a sensory organ that picks up sound waves, allowing us to hear. It is also essential to our sense of balance: the organ of balance (the vestibular system) is found inside the inner ear. It

is made up of three semicircular canals and two otolith organs, known as the utricle and the saccule. The semicircular canals and the otolith organs are filled with fluid.

Each of the semicircular canals ends in a space that has small hair cells in it. These spaces are called ampullae. Whenever we turn our head, the inner ear turns along with it. But it takes a very brief moment for the fluid in the semicircular canals and ampullae to move with our head too. This means that the sensory hair cells in the ear are bent by the “slow” fluid. The hair cells then send this information to the brain via nerves.

Each of the three semicircular canals is responsible for a specific direction of head movement: One of the canals responds to the head

- tilting upwards or downwards,
- one responds to it tilting to the right or the left, and
- one response to it turning sideways.

The otolith organs are found diagonally under the semicircular canals and have a similar function: There are also thin sensory hair cells in both organs. The difference is that, unlike in the semicircular canals, there are small crystals on the hair cells – like pebbles on a carpet. These crystals are called otoliths or “ear rocks.” The otolith organs detect acceleration, for instance when you take an elevator, fall, or gather speed or brake in a car.

Information coming from the vestibular system is processed in the brain and then sent on to other organs that need this information, such as the eyes, joints, or muscles. This allows us to keep our balance and know what position our body is in.

In some situations, for example on a ship or airplane, different sensory organs (e.g. the eyes and the organ of balance) send contradictory messages to the brain. This can cause us to feel unwell, dizzy, or nauseous. The vestibular system is especially sensitive in children and reacts more slowly to movements as we grow older. Inner ear infections and other problems may also affect how well our sense of balance works.

Care the Ears

Our ear is a delicate organ that is an important link with our environment. We should take care not to damage it. We should keep the following points in mind.

- ❖ Never put anything in your ear. This includes pencils, pen, and Q- tips.
- ❖ Clean your ears- the pinna area- with mild soap and water and a soft washcloth.
- ❖ Do not remove wax with hairpins, safety pins, or other small implements. Some cotton wrapped on the finger may be used. A build-up of wax should be removed by a doctor.
- ❖ Avoid loud noises. These include high- volume stereos and television sets.
- ❖ If you have to operate a loud music system, use earplugs or ear muffers for protection.
- ❖ If you have an earache that persists, see a doctor. Do not try homemade remedies. They may do further damage.

Homework

1. Describe how the wings of an areophane have a similar reason why we have two ears.
2. What is the purpose of the auditory nerve?
3. What makes our eardrum vibrate?
4. Describe how sound waves travel from a source of sound to the human ear.

Reference

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