

MINISTRY OF EDUCATION
SECONDARY ENGAGEMENT PROGRAMME
GRADE 8
INTEGRATED SCIENCE

Week 10

Lesson 1

Topic: Sense Organ

Sub-topic: The Ear

Objectives: After observing pictures, students will:

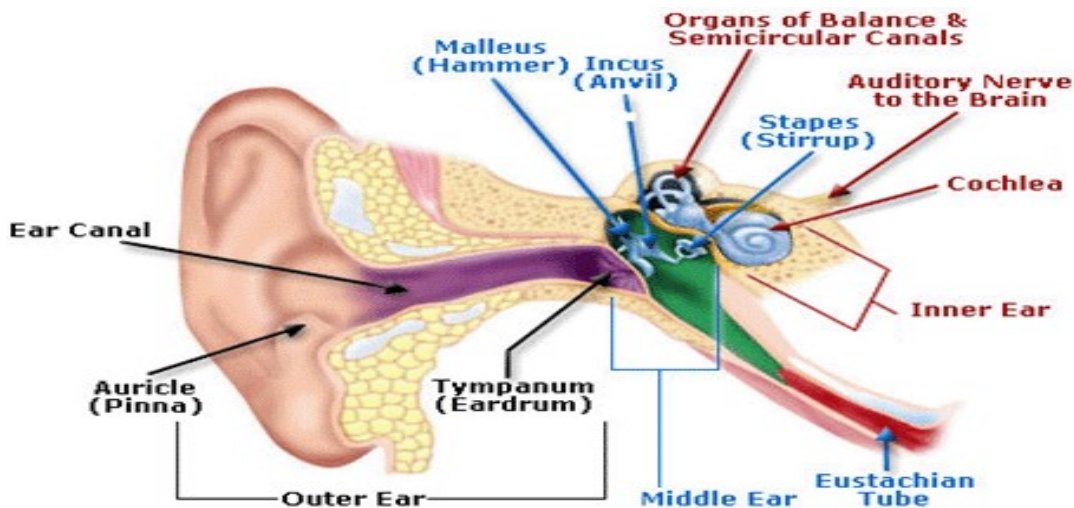
- correctly relate the structure of the ear to its functions.
- label at least four (4) parts of the ear.
- correctly describe how the ear functions for hearing.

Content

The Ear

The ear is the sense organ for hearing. Our sense of hearing responds to sounds and the organ through which we perceive these sounds is the ear.

Structure of the Ear



Parts of the Ear and their Functions

Parts	Function/s
Pinna	Collects sound and channels it down the ear. Help determine the direction of sound. Protects internal parts of the ear.
Auditory Canal	Channels sound waves towards the tympanic membrane. Provides a waxy substance to protect and lube the ear.
Malleus	It transmits the sound vibrations from the eardrum to the incus.
Incus	The incus transmits sound vibrations from the malleus to the stapes, which it is connected to through the incudomalleolar and incudostapedial joint respectively.
Tympanic Membrane	Vibrate with the same frequency as the sound wave that hits it. Provides an air tight protection between the external and middle ear.
Eustachian Tube	To equalize the pressure between the outer and inner ear.
Semicircular Canals	These are fluid-filled loops, attached to the cochlea and help in maintaining the balance.
Stapes or Stirrup	Vibrates and passes the compression waves to the inner ear.
Vestibular nerve	Transform vestibular information (related to balance) into an egocentric frame of reference based on the position of the head in relation to the body.
Vestibule	Sensory apparatus of the inner ear that helps the body maintain its postural equilibrium
Cochlea	the actual organ that helps in hearing functions as a sound wave interpreter and converter
Round Window	Keep the cochlear fluids contained within the scala vestibuli and scala tympani. It also functions as a multiplier of the sound waves generated from the oval window membrane.

How the Ear Works

Here are 6 basic steps to how we hear:

1. Sound transfers into the ear canal and causes the eardrum to move.
2. The eardrum will vibrate with the different sounds.
3. These sound vibrations make their way through the ossicles to the cochlea.
4. Sound vibrations make the fluid in the cochlea travel like ocean waves
5. Movement of fluid in turn makes the hair cells The auditory nerve picks up any neural signals created by the hair cells. Hair cells at one end of the cochlea transfer low pitch sound information and hair cells at the opposite end transfer high pitch sound information.
6. The auditory nerve moves signals to the brain where they are then translated into recognizable and meaningful sounds. It is the brain that “hears”.

Hearing Sounds

Sound waves enter the outer ear and travel through a narrow passageway called the ear canal, which leads to the eardrum. The eardrum vibrates from the incoming sound waves and sends these vibrations to three tiny bones in the middle ear.

The human ear is a remarkable organ that can detect a wide range of sounds. How does it do this? It can convert signals carried by sound waves into nerve impulses that it sends to the brain.

Sound Travels

Sounds can travel through the **air, solids and liquids**.

For instance, how does the sound of your friend’s voice reach you when he calls you from a distance?

The vibrations from your friend’s voice produce sound waves that can travel through the air.

Secondly, if you are to place your ear to the table at one end and your friend tap the table with a pencil. The tapping can be heard through the wood. Since the wood is solid, we can conclude that the sound travels through solids.

Lastly, if you let your partner press his/her ear to the glass tank while you knock two bricks together underwater, your partner should hear the knocking of the bricks. The water is liquid, so we can safely say that sound travels through liquids.

Home Work

1. Name at least five (5) parts of the ear without looking into a book.
2. Draw a labelled diagram of the human ear. State how each part helps in hearing.
3. In your own words describe why our ear is important to us.

Reference

1. <https://www.uhac.ca/hearing-loss/how-we-hear/>
2. Blackman, S., Bernard, M., Dalgety, F., & Sadoo, d.s (2000) Science in Daily Life Bk.2. Georgetown, Guyana. Ministry of Education, Guyana
3. https://www.google.com/search?q=how+the+ear+works&source=lmns&bih=789&biw=1600&hl=en&sa=X&ved=2ahUKEwjy1qXVuu7rAhV7jOAKHS6XDFEO_AUoAHoECAEOAA