# The Ears

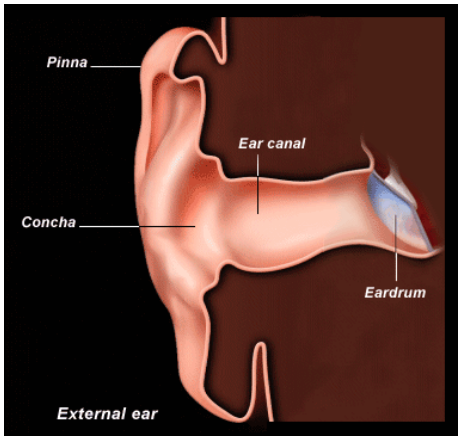
Eyes and Ears and their Connection to the Brain

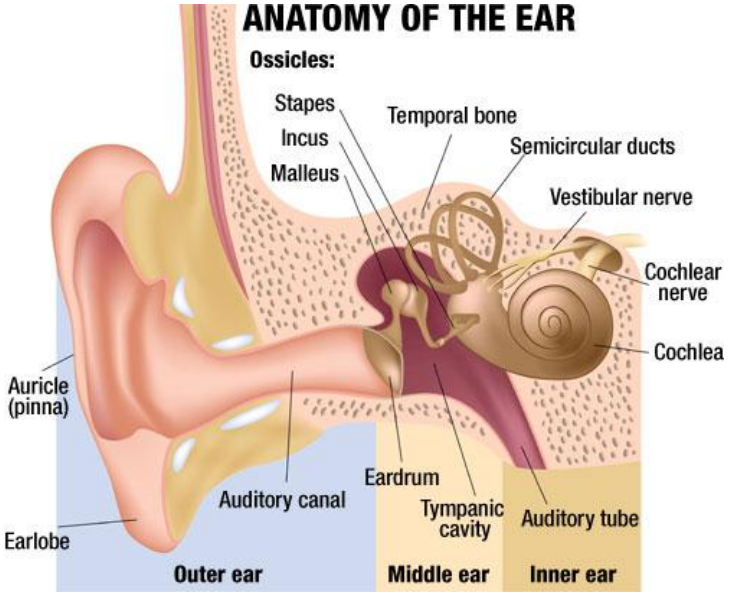
# Objective

- Identify the parts of the ear and perform different activities associated with the ear

# Research

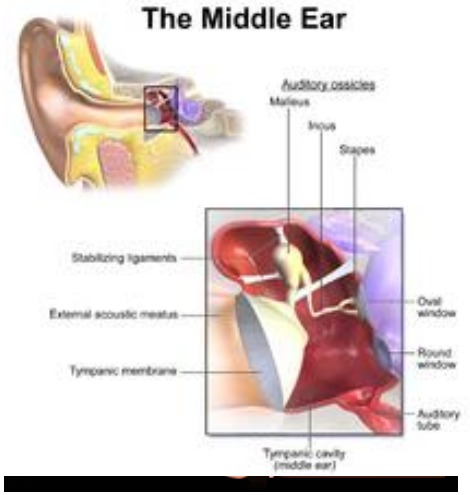
- The **outer ear** is the external part of the ear, which collects sound waves and directs them into the ear.

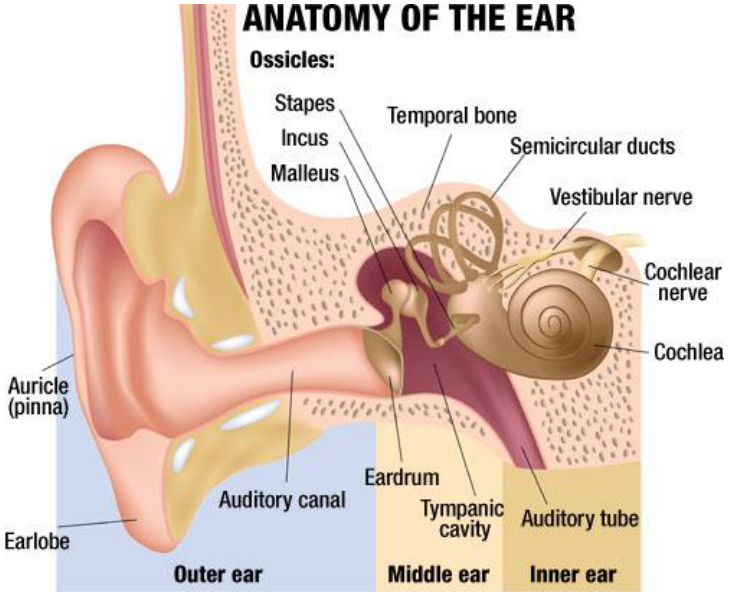


# Research

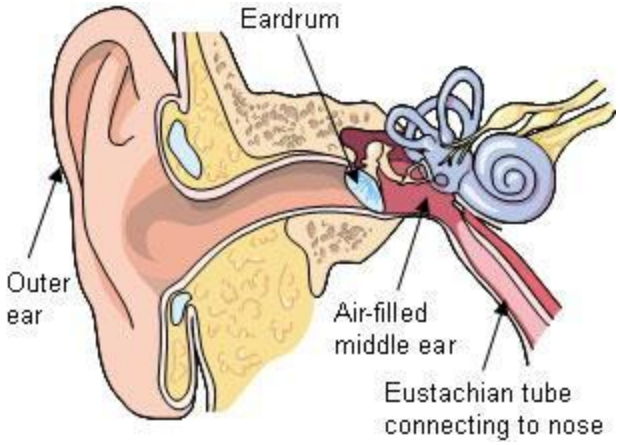
- The **middle ear** is a small membrane-lined cavity that is separated from the outer ear and that transmits sound waves from the to the partition between the middle and inner ears through a chain of tiny bones



# Research

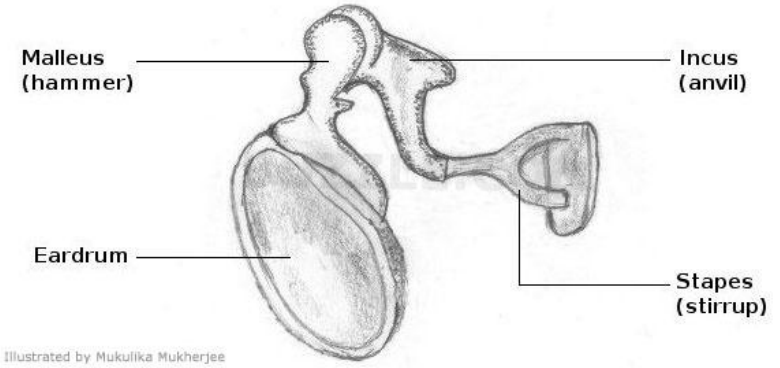
- The **eardrum** is a thin, oval-shaped membrane that separates the middle ear from the outer ear. It vibrates in response to sound waves, which are then transmitted to the ossicles of the middle ear.

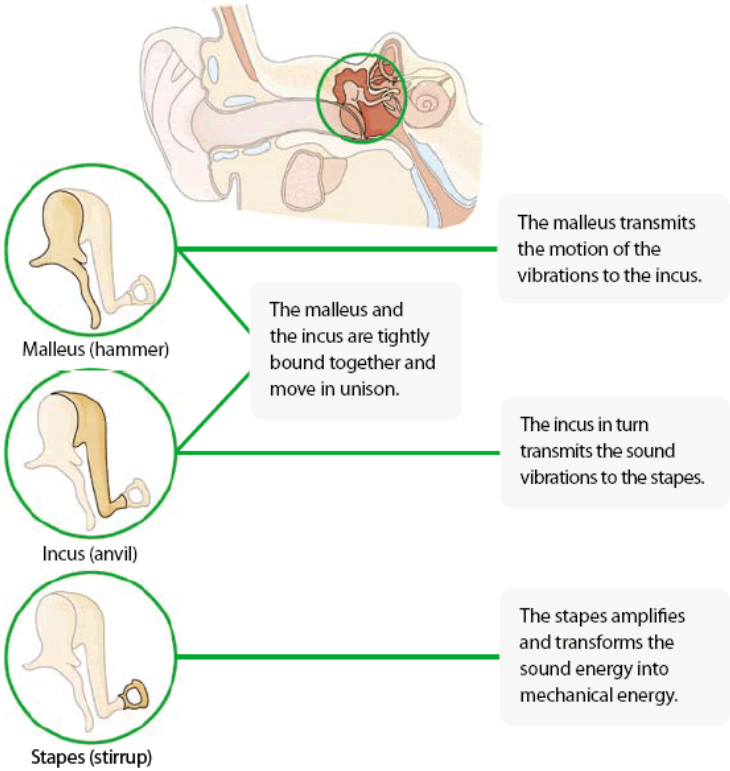



# Research

1. **Hammer**
2. **Anvil**
3. **Stirrup**

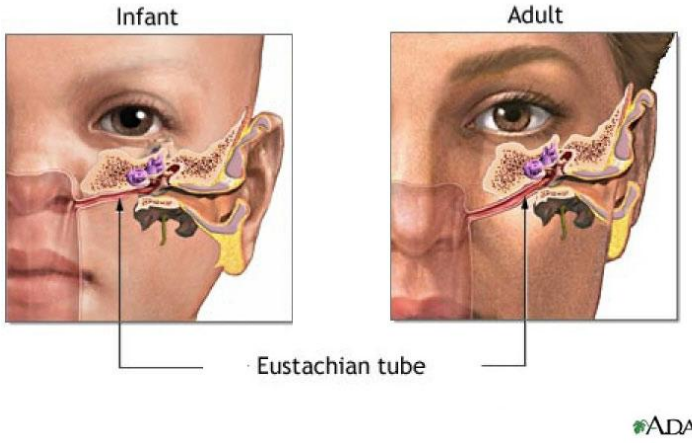
4. The hammer and anvil transmit vibrations to the stirrup to amplify and transform into mechanical energy

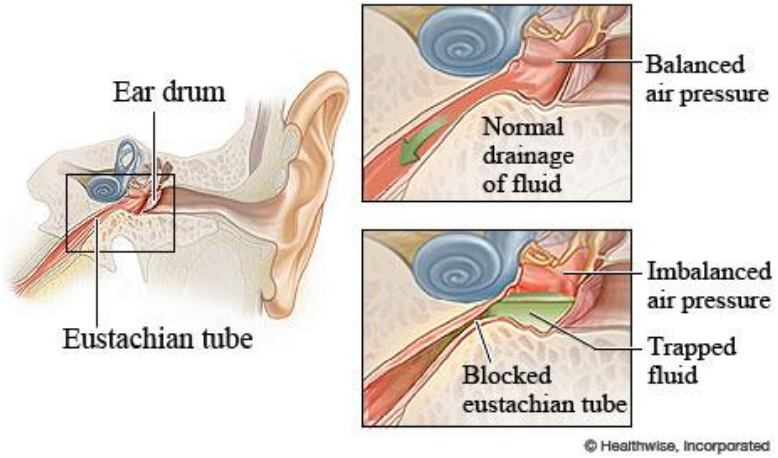


# Research

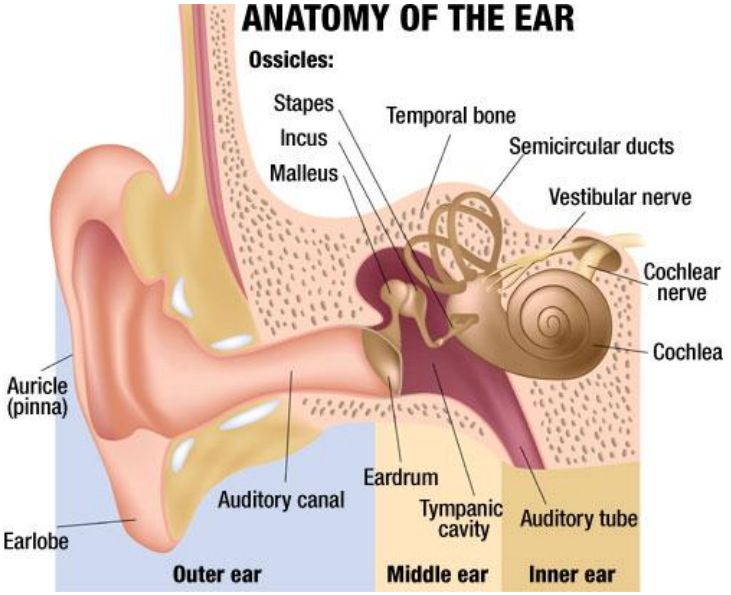
- The **Eustachian tube** ventilates the middle ear space, ensuring that its pressure remains at near normal environmental air pressure and drains the ear from any debris.



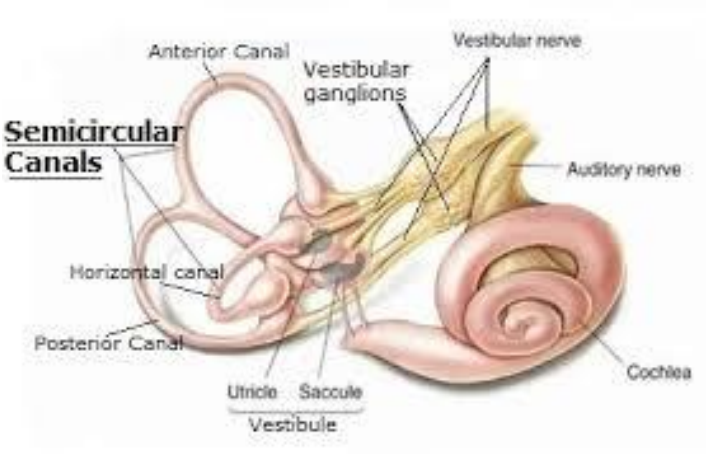
# Research

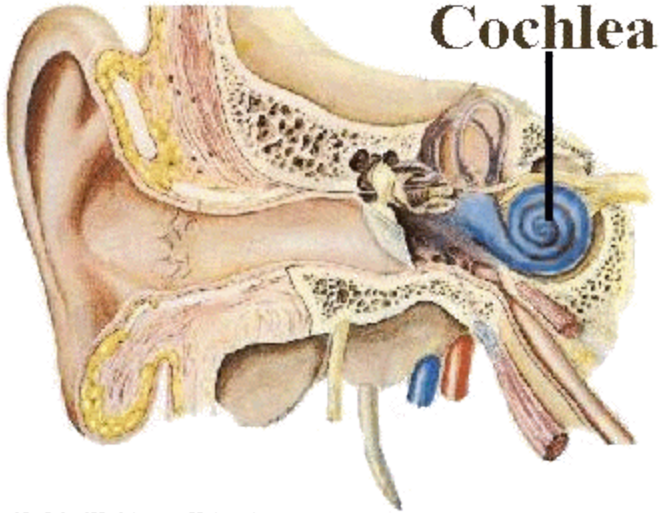
- The **inner ear** convert mechanical energy to sound and helps with balance

# Research

- **Semicircular canals** are filled with fluids that help with balance
- The **cochlea** receives sound in the form of vibrations, which causes movement and then convert these vibrations into nerve impulses which are taken up to the brain to be interpreted.

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# Research: Hearing

1. The outer ear collects sound waves moving through the air and directs them to the eardrum.
2. The eardrum vibrates with sound.
3. Sound vibrations move from the eardrum through bones in the middle ear to the cochlea.
4. Sound vibrations cause the fluid and tiny hair cells inside the cochlea to move.
5. Hair cell movement creates neural signals, which are picked up by the auditory nerve.
6. The auditory nerve sends signals to the brain, where they are interpreted as sounds and speech.

# Activity 1: Sounds of Silence

- Sit **quietly** for five minutes and write down all the sounds you hear. **Exclude anybody who is talking.**

# Activity 2: Mystery Sounds

- Identify each of the five mystery sounds that the teacher will play from the computer.

# Activity 3: Where Did I Hear That

- Have a partner close his/her eyes and strike two metal pieces together. The partner will have to try to identify where the sound is coming from.
  - To the Right
  - To the Left
  - Right in front
  - Right in behind

# Activity 4: Sounds of the Sea?

- Have you ever heard sounds when you put a seashell to your ear?
- It is not the sea you hear, but the sounds of air inside the shell, which is vibrating in response to sound waves in the air around the shell
- What happens when you cup your hands and hold it to your ear?
- Try cupping your ear with other objects: tin can, paper cup, and Styrofoam cup

# Activity 5: Homemade Telephones

- With your partner, pick up the styrofoam cups with the string already attached. Pull on the cups so there is tension but without pulling too firmly and breaking the cups
- One person will put the cup to his/her ear. The other person will talk into the other cup.
- Record whether the transmission of sound was good, fair, or poor.
- Try the tin phones and paper cup phones

# Activity 6: Make Sound Waves

- Use the string with the spoon to it. Push each end of the string in one your ears.
- Swing the string so it strikes the table.