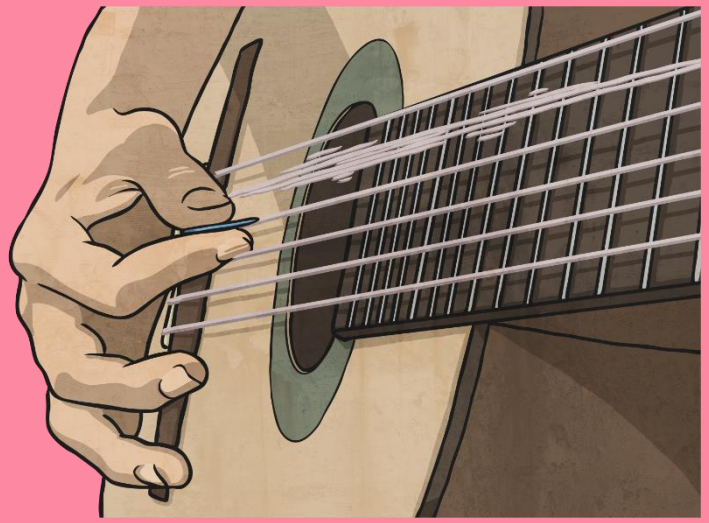
Sound and the Auditory System

Sound

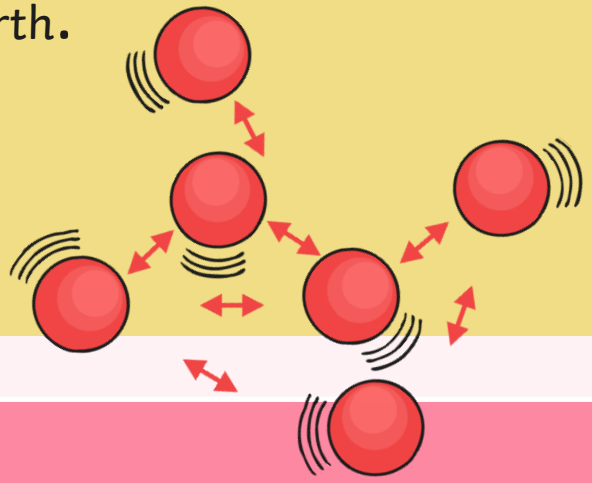


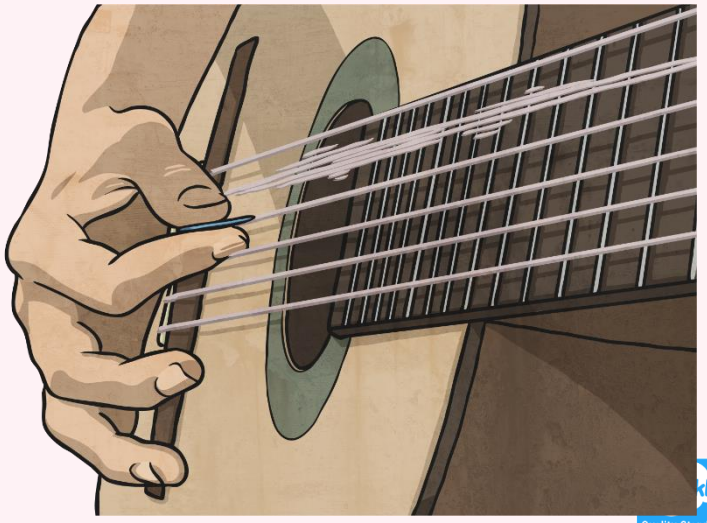
How Sound is Made

- Like light, sound travels through the air in waves.
- Sound is made by air molecules vibrating.
- When you clap your hands, the air around your hands shakes (even though you can't see this). This is the air molecules vibrating.

Meaning

Vibrating – shake quickly back and forth.



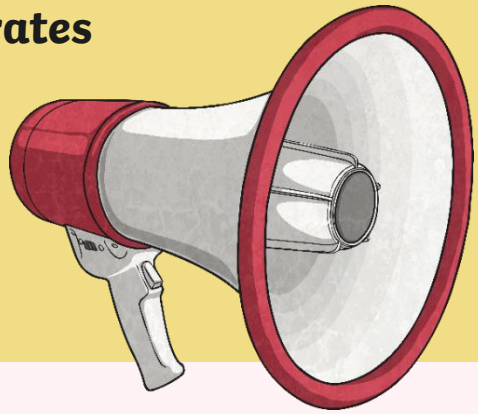


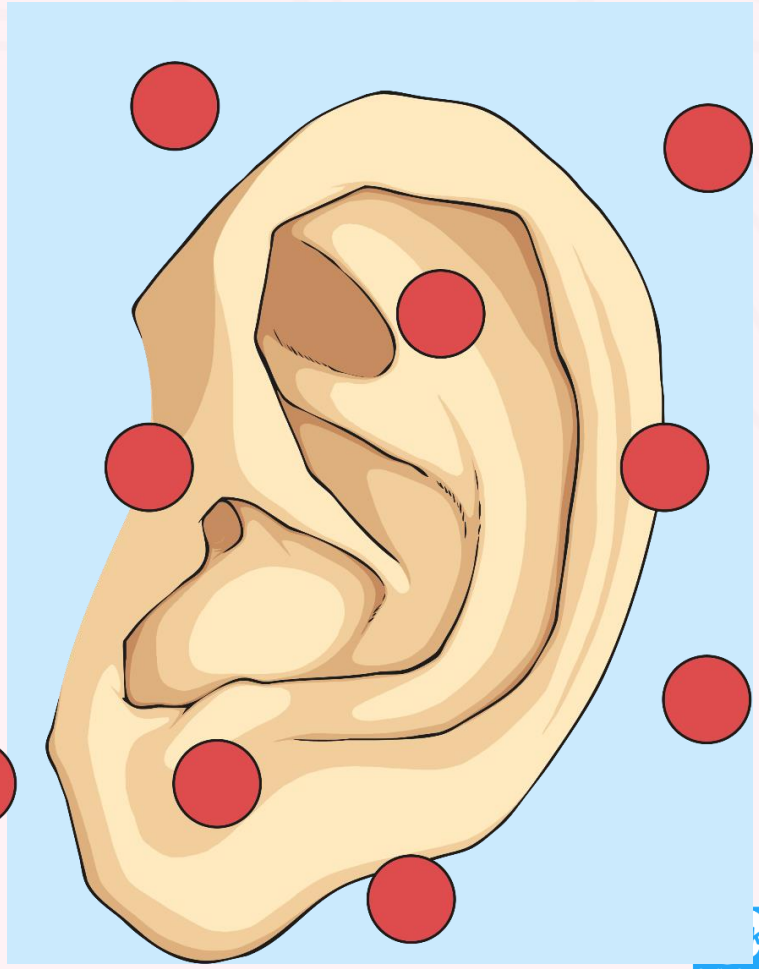
How Sound is Made

- The vibration of the air molecules around the hands, shake the molecules next to them and so on, until the air molecules in the ear are vibrating.

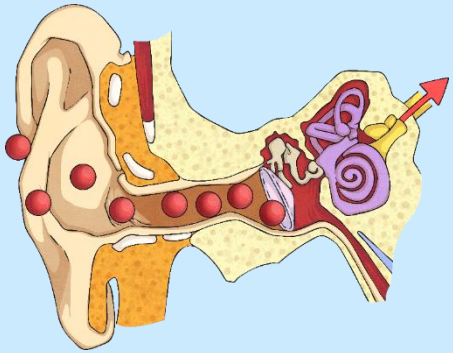
Have you ever felt a speaker when the sound is on?

It vibrates





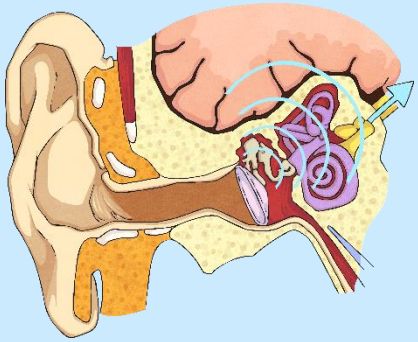
How Sound is Made



Molecules Vibrating

- When air molecules inside the ear vibrate, they shake tiny hairs on the insides of the ears.
- The hairs are connected to nerves under the skin.

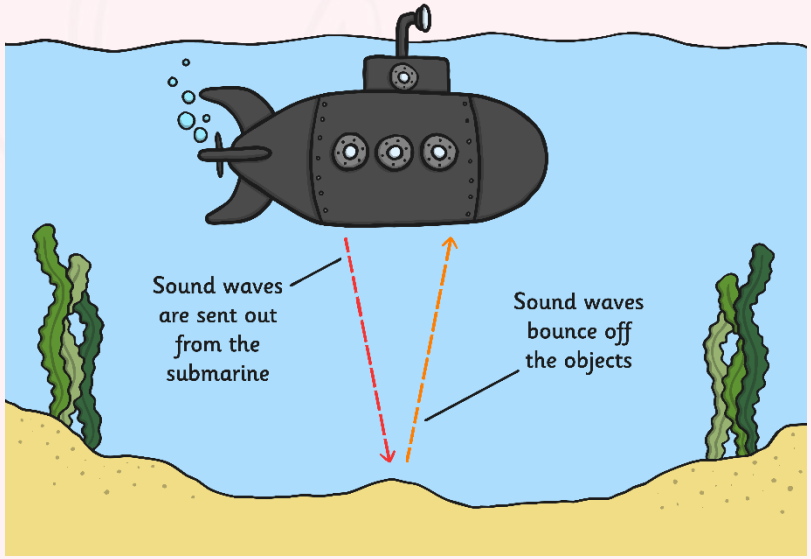
These nerves send messages to your brain to tell you that you heard a noise.



Communicating with the brain

How Sound is Made

- Sound needs molecules to move. It is impossible for sound to travel in space.
- Sound doesn't have to move through air. It can travel through water or metal.
- In fact, sound travels faster through water and solids than it does through air.

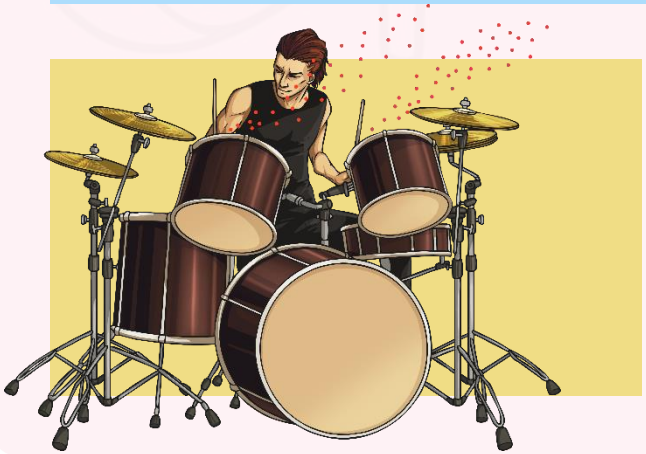


How Sound is Made

- Sound travels much slower than light, whether in air or in water.

Light travels at 186,000 miles per second.
Sound travels at 770 miles per hour.

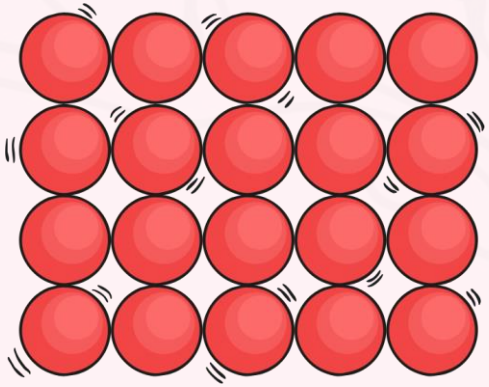
- You often hear things after you see them, for example you see the lightning before you hear the thunder.



How Sound is Made

- Why do you think sound travels faster through solids and liquids, than gases?

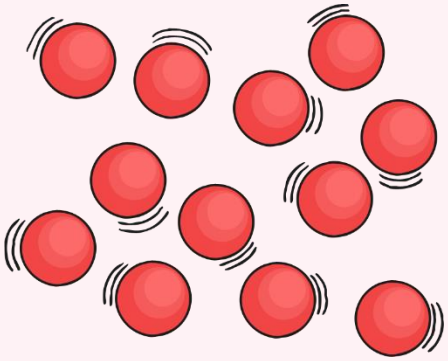
Hint



Solid

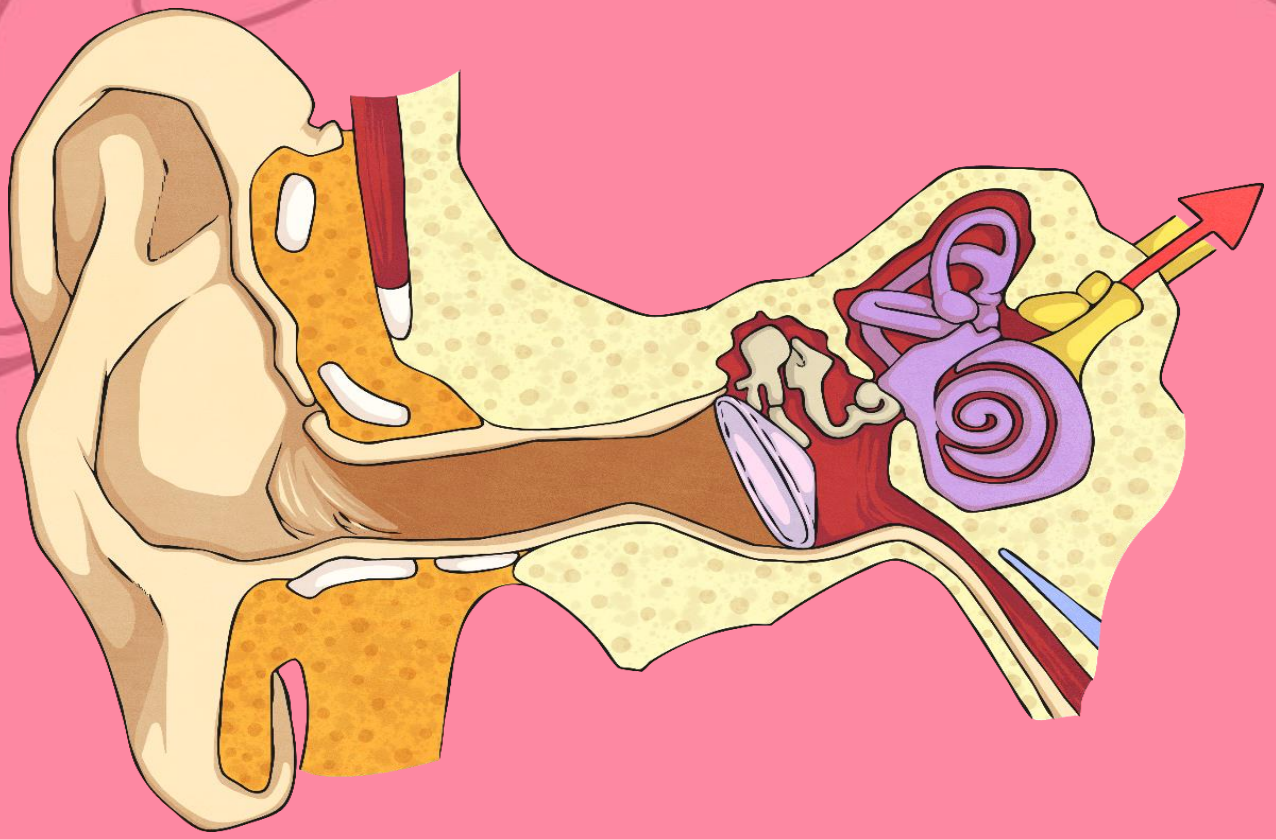
Hint

Think about how close the molecules are to each other.



Liquid

The Human Ear



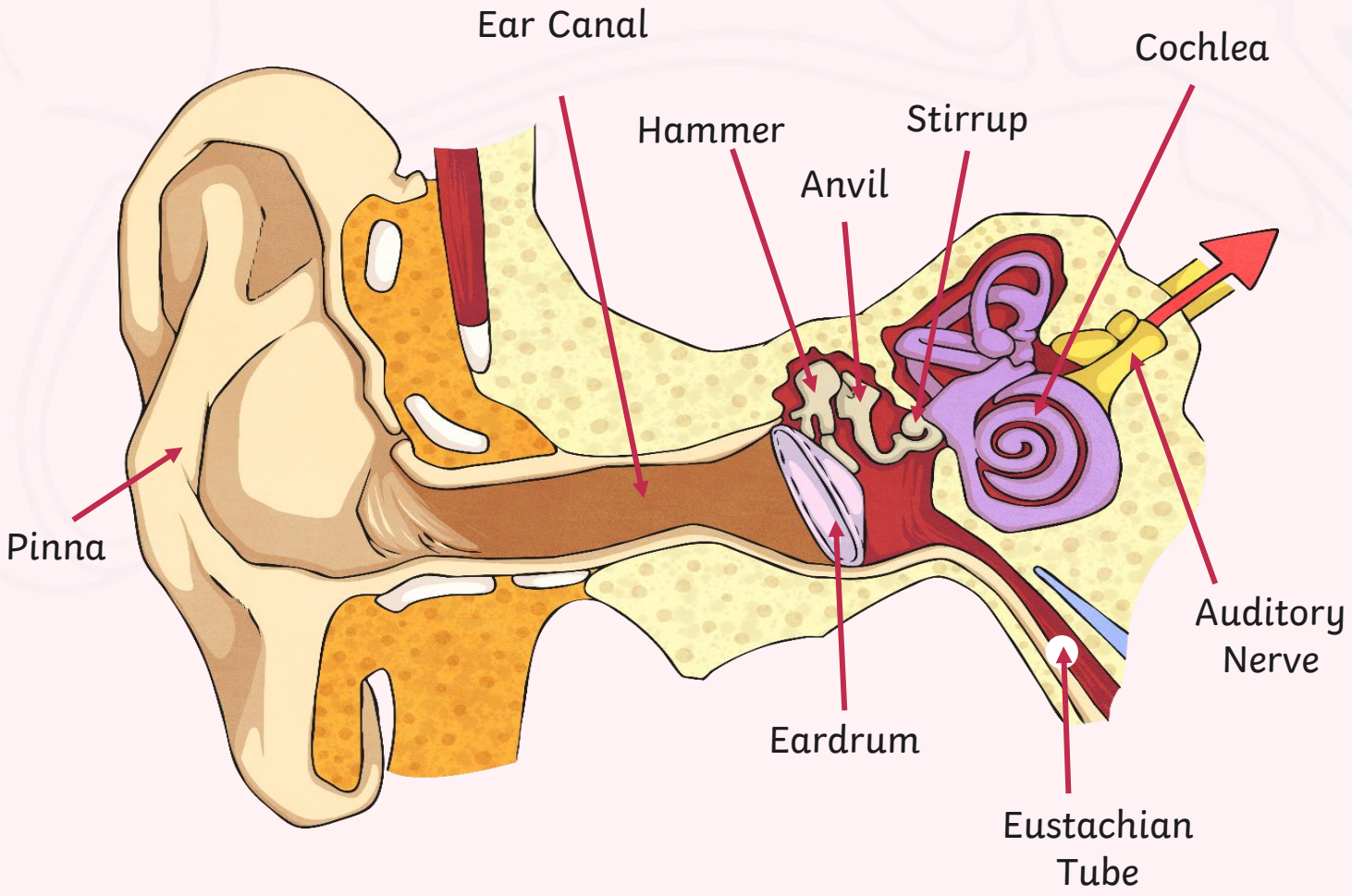
Our Ears

Sound is made when an object vibrates. These vibrations travel through the air in **sound waves**. Our ears can sense these sounds in the air form of vibrations and send and receive signals from the brain.

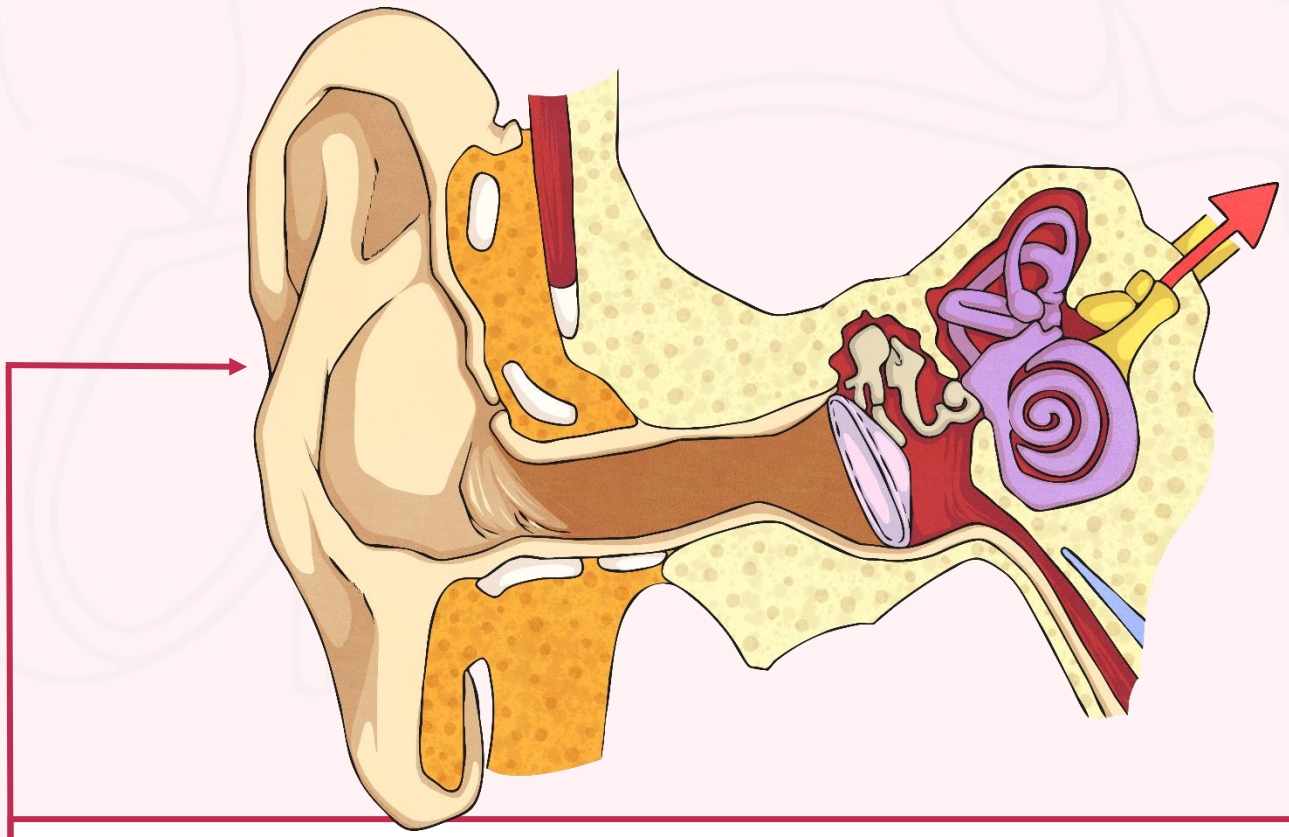
The ear is made up of three parts: the **outer ear**, the **middle ear** and the **inner ear**.

The outer ear is the part you can see on the side of your face.

The Ear

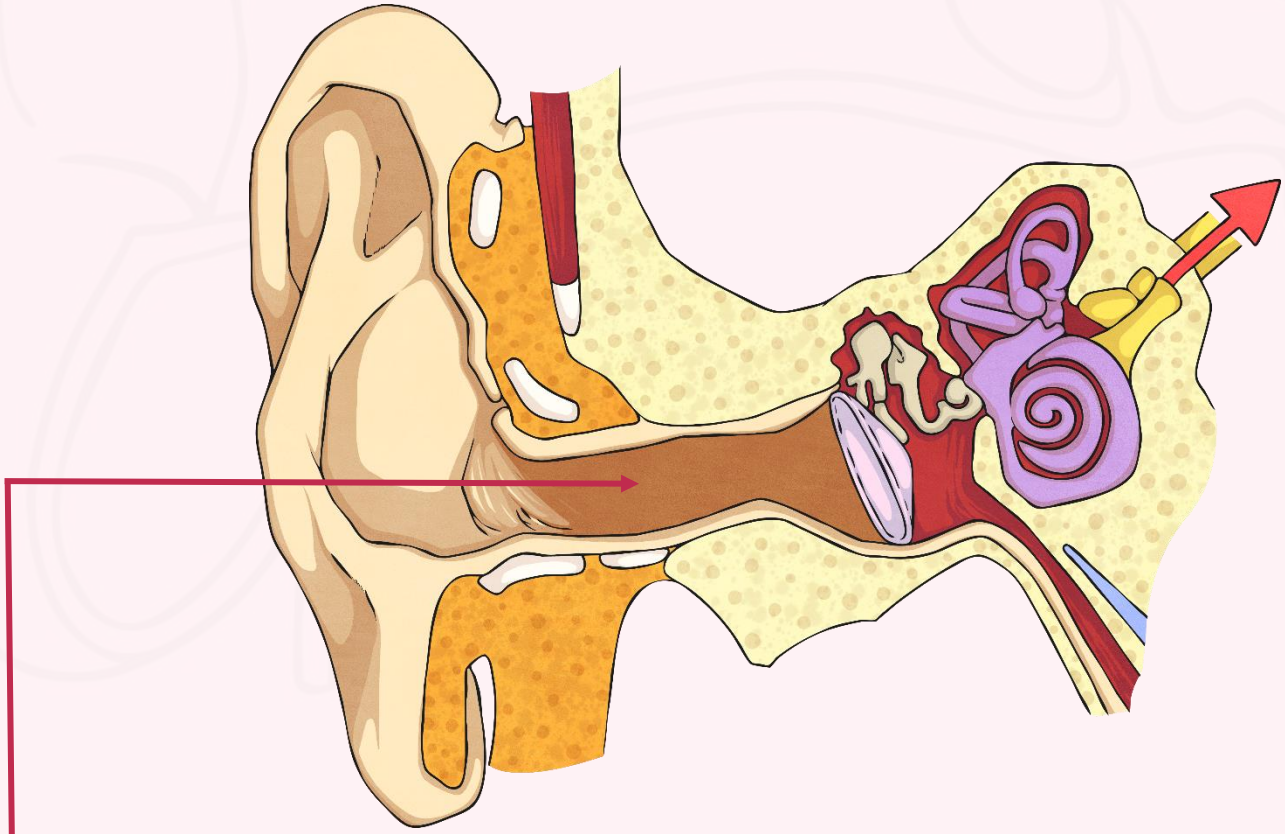


Pinna



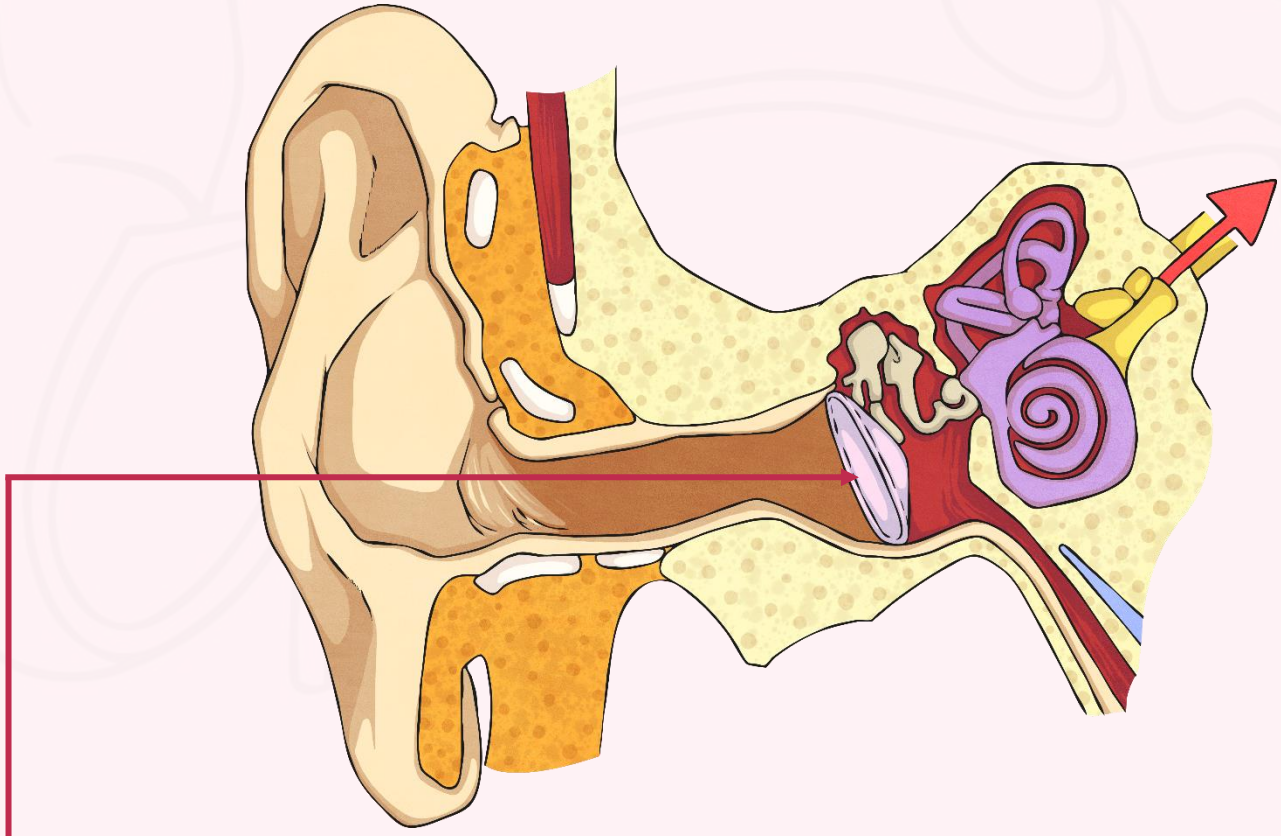
The **pinna** is the part of the ear you can see on the side of your face.
It is made of cartilage covered by skin.
It funnels sound waves into the ear canal.

Ear Canal



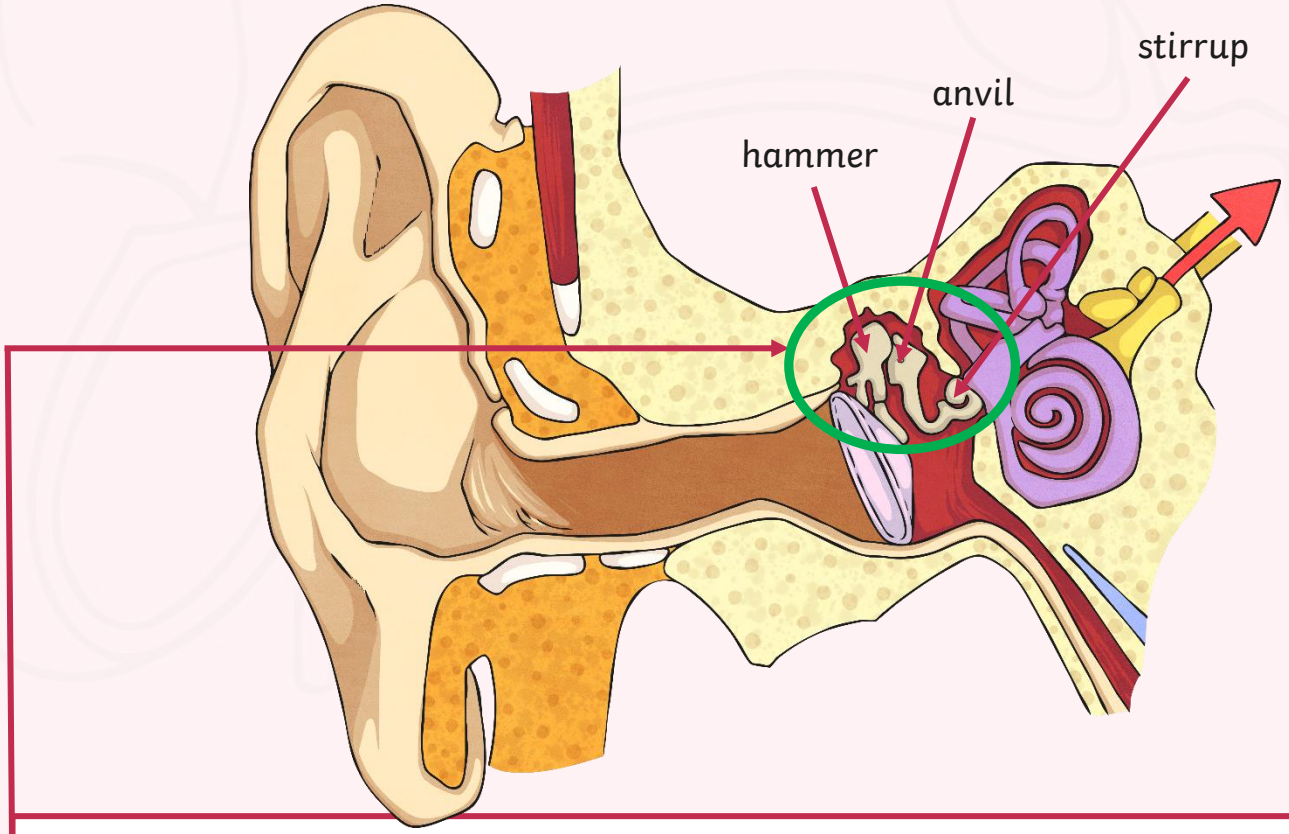
The **ear canal** (sometimes called the auditory canal) is a short tube that transmits sound from the pinna to the eardrum.

Eardrum



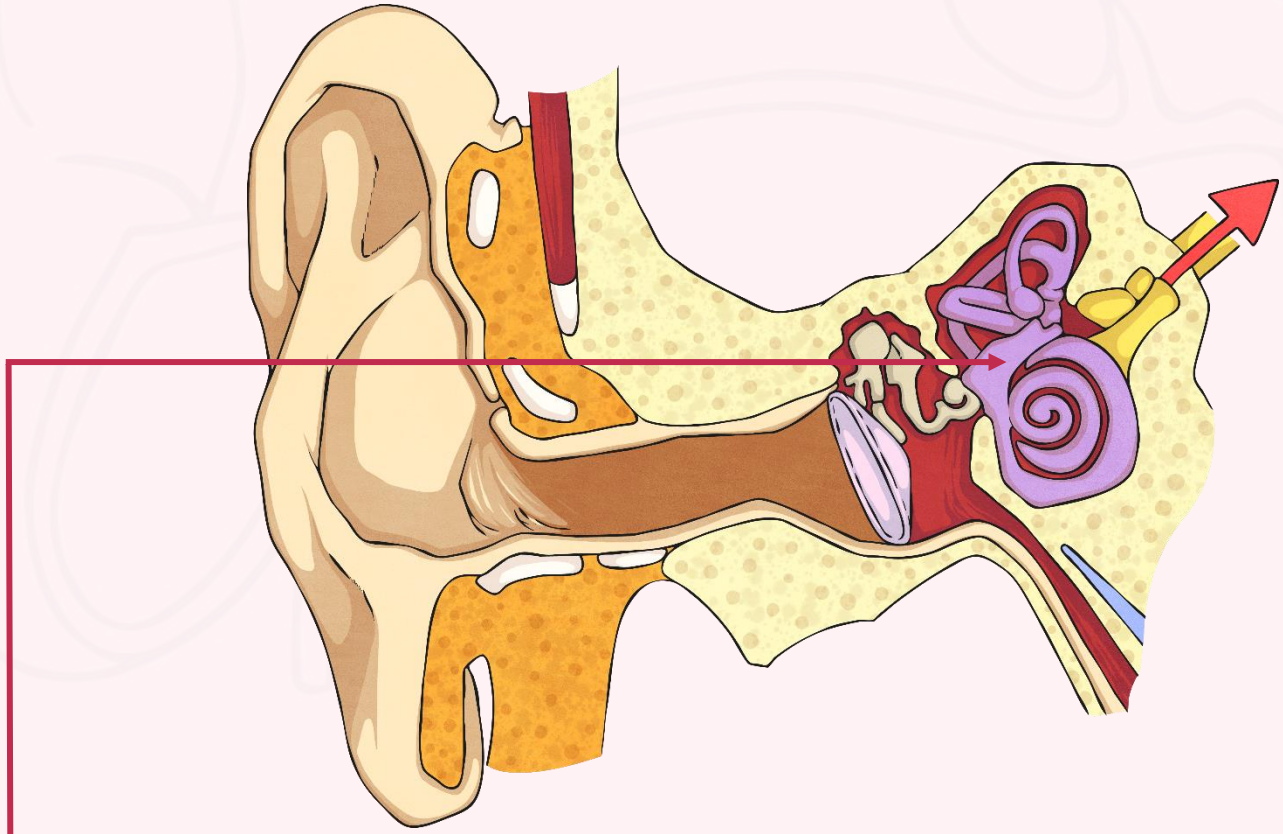
The **eardrum** is a thin, tough layer of tissue at the end of the auditory canal. Sound waves make the eardrum vibrate.

Ear Bones



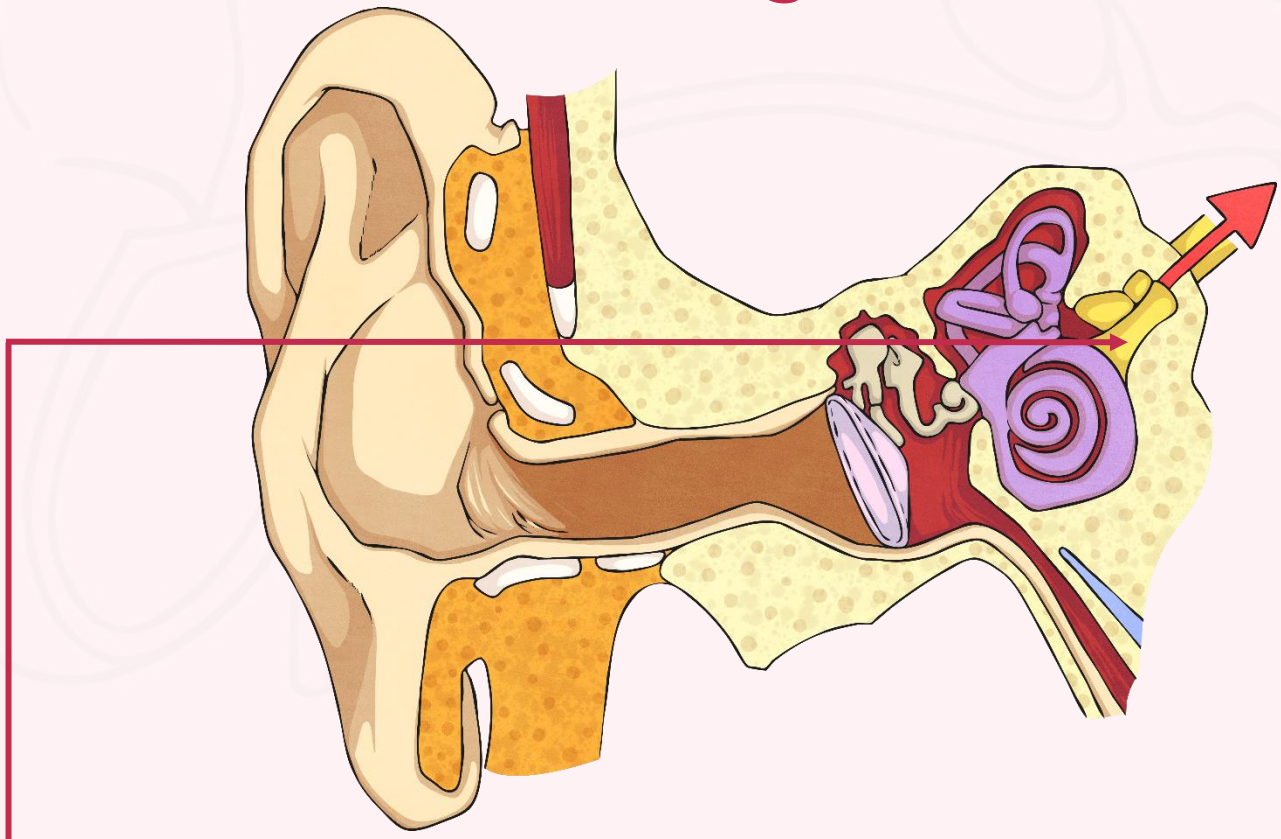
Ear bones, or ossicles, are made up of three tiny bones- the **hammer**, the **anvil** and the **stirrup**. These amplify and transmit the vibrations from the eardrum to the cochlea.

Cochlea



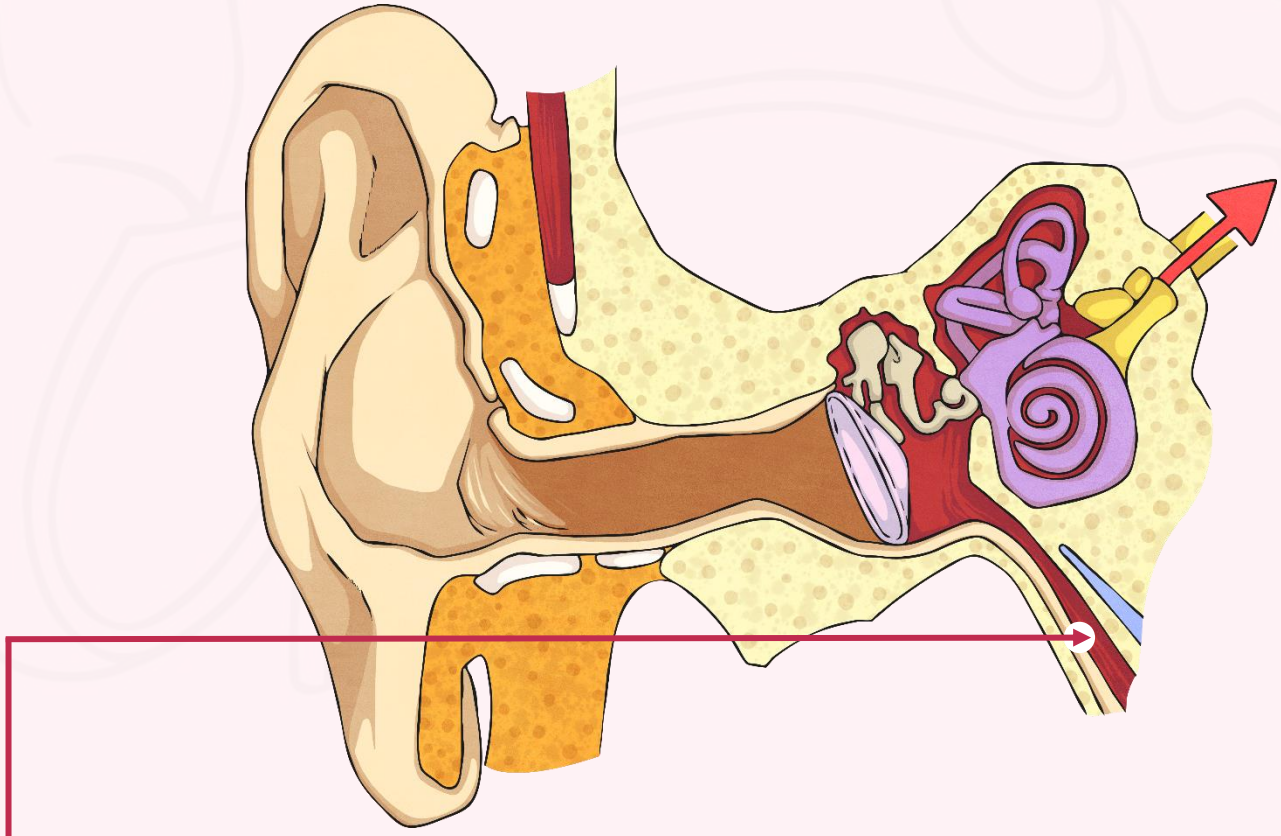
The **cochlea** is an organ filled with fluid. Receptor cells change vibrations in the fluid into electrical impulses.

Auditory Nerve



The **auditory nerve** contains sensory neurons that send information to the brain for processing.

Eustachian Tube



The **Eustachian tube** connects the middle ear to the nasal cavity. It helps to balance the pressure outside and inside the ear.