Name: _____ Date: _____

Making a Model of the Human Ear
and Studying Sound Wave Transmission

In this activity, you will build a simple model of the human ear and use it to explore how sound waves travel from the outside ear to the inner ear.

OBJECTIVE

- To build a model of the human ear.
- To understand how sound waves are transmitted through the outer, middle, and inner ear.

MATERIALS

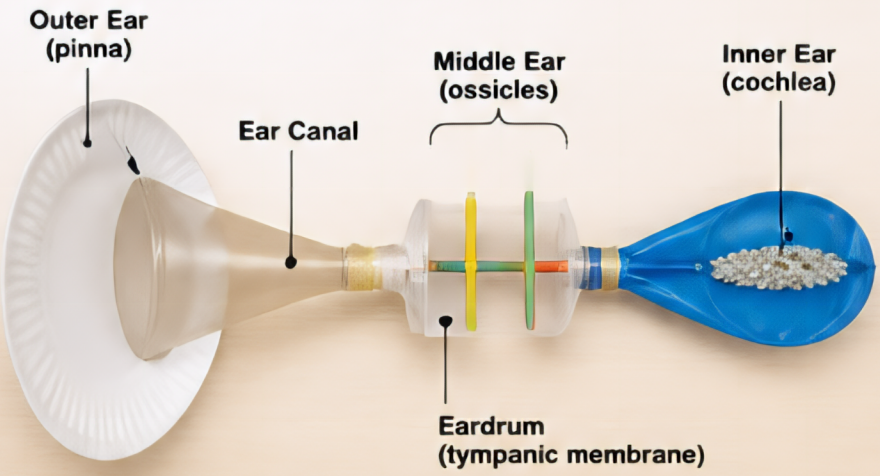
- Paper plate
- Plastic funnel
- Small plastic cup (like a medicine cup)
- Balloon
- 3 small craft sticks or straws
- Tape
- Scissors
- Rubber bands
- Rice or small beads
- Speaker or your voice (sound source)

BACKGROUND

Sound waves are vibrations that travel through the air. When these waves enter your ear, they cause parts of the ear to vibrate. These vibrations are passed along and finally changed into signals that your brain understands as sound.

- Outer ear collects sound waves.
- Eardrum vibrates.
- Middle ear bones (ossicles) pass vibrations along and make them stronger.
- Inner ear (cochlea) changes vibrations into nerve signals.

YOUR EAR MODEL (What each part represents)



PROCEDURE

1. Outer Ear: Cut out the center of a paper plate to make a ring. This will act as the outer ear (pinna).
2. Ear Canal: Tape the narrow end of a plastic funnel to the center opening of the plate.
3. Eardrum: Stretch a balloon tightly over the wide end of the funnel and secure it with a rubber band. This is the eardrum.
4. Middle Ear: Tape a small plastic cup to the center of the balloon. Inside the cup, tape three craft sticks or short straws together so they can move slightly. These represent the ossicles (malleus, incus, stapes).
5. Inner Ear: Stretch another balloon over the open end of the cup and secure it with a rubber band. Put a small amount of rice or beads inside before sealing. This represents the cochlea.
6. Place a speaker near the outer ear (plate) or speak toward it. Watch the parts of your model move!

OBSERVATIONS

1. What happened to the "eardrum" (balloon on the funnel) when sound hit it?

   _____

   _____

2. What happened to the "ossicles" (craft sticks/straws)?

   _____

3. What happened to the "cochlea" (balloon with rice/beads)?

   _____

CONCLUSIONS

1. Describe how sound waves traveled through your ear model.

   _____

   _____

2. **Which part of the model was most important for making the vibration stronger? Why?**

   _____

   _____

THINK FURTHER! How might loud sounds damage the parts of your ear? What can you do to protect your hearing?