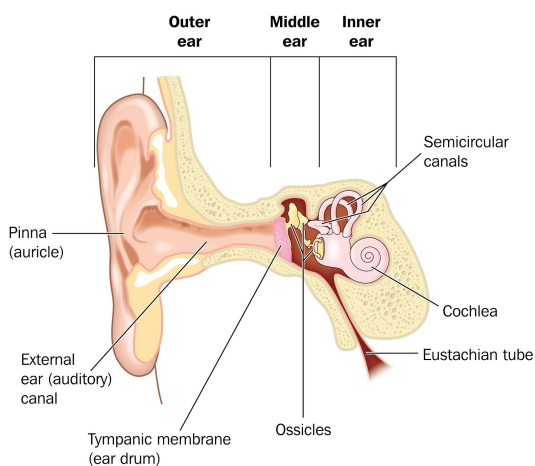


# “Seeing” Sound



## Background Info:

Sound is made up of vibrating energy, or sound waves, that we can hear. These sound waves are formed by objects vibrating. Sound waves travel back and forth through solids, liquids and gases to get to another location. Most of the sounds we hear travel through the air, but sound can also travel through solids and liquids too. Some solids, like metal and glass, are good at transmitting sounds. Other solids, including heavy fabrics and foam, muffle sounds. Sound can also move through liquids. Some animals, such as dolphins and whales, communicate underwater by using sound waves. You may have even felt the vibrating energy from sound waves while standing close to a band at a sporting event or at a concert. The instruments create sound vibrations that can be so strong that you can actually feel the vibrations!



Hearing is how we perceive sound. When sounds reach our ears, the sound waves make the delicate skin of our eardrums vibrate. Our eardrum is a thin, fragile sheet that vibrates when the sound hits it. The middle ear has three bones in it. They are called the hammer (malleus), anvil (incus), and stirrup (stapes) and they amplify the sound or make it louder. In fact, the stirrup is the smallest bone in the body! The middle ear also helps to transfer sounds from the air to fluid inside the inner ear. The inner ear is filled with fluid and has the hearing organ called the cochlea. This organ helps to take the vibrations and translate them into electrical signals for

the nerve to send to the brain. It actually uses little hairs that vibrate with the sound waves in the fluid. It's how our ears take sound waves and turn them into something our brain can understand. It's a pretty amazing process and it all happens without you having to think about doing it. That's how you hear sound waves!



Since we can't really see sound waves, let's try to make these vibrations visible by doing some sound work in the learning lab.

### **Activity:**

#### **Materials:**

2 cell phones  
Large glass beaker or jar  
Balloon  
Scissors  
Sand

#### **Procedure:**

1. Take one cell phone and make sure the sound is on, the volume is turned all the way up and that vibration is turned off. Put that cell phone inside the glass container.
2. Cut the small end off of the balloon and stretch the big end of the balloon around the open end of the glass container. You may use a rubber band to secure the balloon around the glass container if needed.
3. Sprinkle a couple of pinches of sand on top of the stretched balloon.
4. Use the 2nd cell phone to call the cell phone inside the glass container. Observe the sand. Can you see the vibrations made by the sound waves?



#### **Extension Idea:**

If you have a small bluetooth speaker or even a larger speaker or subwoofer, get permission to use it for a demonstration. Do not put anything on the speaker that can damage it. Try placing small ½ inch cut pieces of a plastic drinking straw on the speaker. Play different types of music and see which volume and kind of music makes it easier for you to see the sound waves. Can you make the straw pieces dance??