

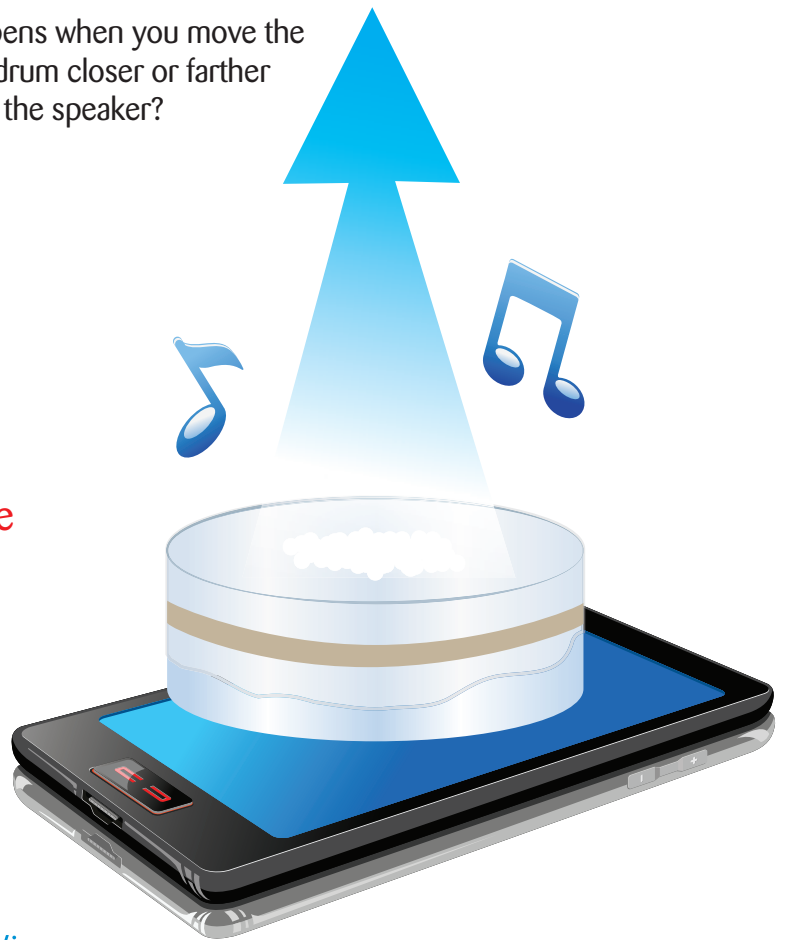
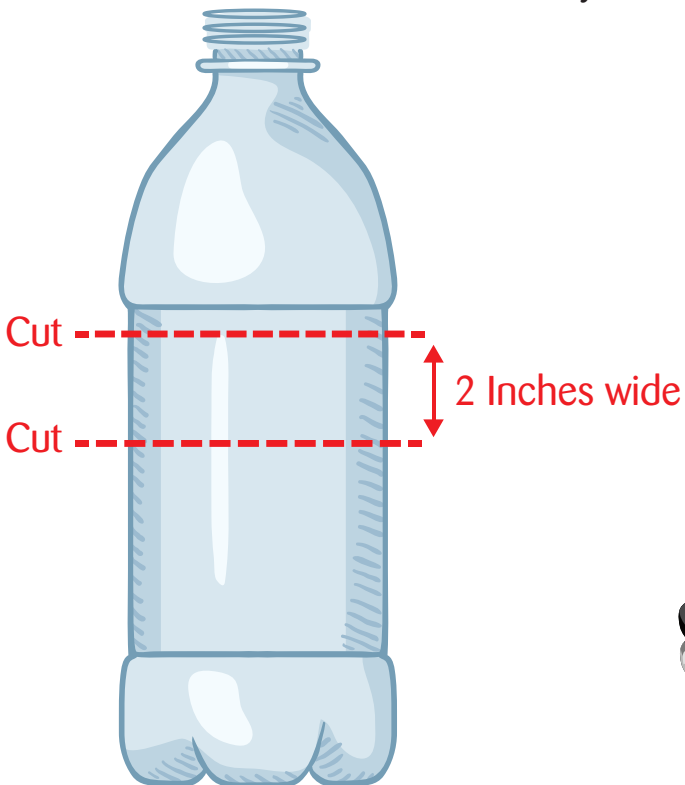
# Make a Model Eardrum!

## What You'll Need

- Empty plastic cup or bottle (at least 2-inch diameter)
- Scissors
- Plastic wrap
- Rubber band
- Salt (or other sand-like substance such as sugar or ground coffee)
- Small speaker (like a smartphone, headphones or portable Bluetooth speaker)

## What You'll Do

1. Carefully cut a 2-inch wide ring out of the bottle or cup.
2. Stretch plastic wrap tightly over one side of the ring and secure it in place with the rubber band. Make sure it's snug! If needed, you can tighten the plastic wrap by gently pulling the sides that overhang the rubber band.
3. Sprinkle a small amount of salt on top of the plastic wrap.
4. Hold the device over the top of some small speakers - a smartphone, earbuds or other small speaker - while playing loud music and observe the salt. How can you describe what's happening?
5. Try this with other types of music or with different volumes. Do you notice any changes to the salt?
6. What happens when you move the model eardrum closer or farther away from the speaker?





## Make a Model Eardrum!

### What's Going On?

Sound is created when something vibrates and sends waves of energy into our ears. The vibrations travel through air or another medium (solid, liquid or gas) to the ear. The stronger the vibrations, the louder the sound. Sounds are fainter the further you get from the sound source.

Sound changes depending on how fast or slow an object vibrates to make sound waves. Pitch is the quality of a sound (high or low) and depends on the speed of the vibrations. Different materials produce different pitches. If an object vibrates quickly we hear a high-pitched sound; if an object vibrates slowly we hear a low-pitched sound. Sounds are usually a mixture of lots of different kinds of sound waves.

Speakers work by vibrating back and forth to create sound waves. When the waves hit the plastic wrap on the model eardrum they push on the membrane causing the salt to bounce! The same thing is happening in our ears. Sound waves are traveling through our ear canal and hitting the eardrum causing it to vibrate. There are three tiny bones, called ossicles, on the other side of the eardrum that transmit those vibrations to the cochlea in our inner ear. Our brain takes those vibrations and processes them as sound!

