

Sounds Lab

You are going to do some in-class experiments to learn about sound as a form of energy and how that energy travels. You will conduct ten activities to see how sound travels through different objects and mediums and record your observations. You will need to identify the source of vibration, the medium(s) for the sound wave, and answer the questions for each station. Follow your teacher's instructions regarding the order in which you will complete each station.

Starter Questions

1. What is sound? (cause, wave type, etc.)
2. Does sound travel the same through gases, liquids, and solids?

Materials

Various at different stations

Station #1 (will do together as a class)

Press two fingers against the side of your throat and hum softly.

Source of vibrations	Medium(s)
Vocal cords	Air, throat, head, fingers...

1. What do you feel as you hum?
2. What do you hear?
3. How can you create different pitches?

Station #2

Source of vibrations	Medium(s)

Hold one end of the ruler flat and firmly against the table top and gently pluck the other end of the ruler. Be careful not to snap the ruler in half.

1. What do you see?
2. What do you hear?
3. How can you create different pitches?

Station #3

Source of vibrations	Medium(s)

Wrap the rubber band around the plastic cup so that it crosses the opening of the cup. Holding the sides of the cup, pluck the rubber band over the opening.

1. What do you feel?
2. What do you hear?
3. How can you create different pitches?

Station #4

Source of vibrations	Medium(s)

Place the paper clips on the plastic lid of the coffee can. Gently strike the lid with the eraser end of a pencil.

1. What do you see?
2. What do you hear?
3. How can you create different pitches?

Station #5 - Do not tap the tuning fork on any hard surface.

Source of vibrations	Medium(s)

Tap the tuning fork on the green anvil and place the tip of the fork in the water. Clean up any spilled water.

1. What do you see?

Tap the tuning fork on the green anvil and hold the fork up to your ear.

2. What do you hear?

Tap the tuning fork on the green anvil and hold the fork up to your ear. Slowly rotate the tuning fork.

3. What do you hear?

Station #6 - Do not tap the tuning fork on any hard surface.

Source of vibrations	Medium(s)

Tap the tuning fork on the green anvil and place base of the fork's handle firmly against (a) the table, (b) the box, (c) the bottom of the cup, and (d) your forehead. You will need to re-tap the fork each time.

1. Describe what you hear each time.
 - a)
 - b)
 - c)
 - d)
2. Which object (a-d) makes the sound seem loudest?

**Station #7**

Source of vibrations	Medium(s)

Using the string and cup phone, pull the string tight between you and your partner. Take turns talking and listening through the cup phone.

1. Describe what you hear when your partner talks.
2. Describe what you feel.

Station #8

Source of vibrations	Medium(s)

Tap your fingernail against the table.

1. Compare what you hear when your head is up to what you hear when you press your ear against the table.

Station #9

Source of vibrations	Medium(s)

Hold the loose piece of string with your left hand and let it hang down. Squeeze the string with your right thumb and forefinger and slide them down the string. Try pulling in short jerking motions.

1. What do you feel? What do you hear?

Hold the cup with your left hand so that the opening is down and the string hangs down from the cup. Squeeze the string with your right thumb and forefinger and slide them down the string. Try pulling in short jerking motions.

2. What do you feel? What do you hear?

Station #10

Source of vibrations	Medium(s)

Dip one of your fingers in the water in the glass. Lightly run your wetted finger along the rim of the glass until you hear a sound. Repeat with the other glass.

1. Which glass produces the higher pitch.

Using your observations from the sound stations, answer the following questions:

1. How were you able to change the pitch of the sound at Stations #1 - 4?
2. At Station #2 you plucked the end of a ruler. Describe what happened to the air around the ruler while it was vibrating?
3. At Station #4, how do the paper clips model the air that is close to the lid?
4. At Station #5 you placed a vibrating tuning fork in water. Describe how your observation of waves or ripples in the water model the sound waves you heard from the tuning fork when you held it near your ear at Station #6? How are the water ripples different than the sound waves you heard?
5. At Station #5 you rotated the tuning fork near your ear. What do you think caused the sound to get louder and softer?
6. At Station #7 you used a string and cup phone to transmit sound. How does this demonstrate sound traveling through a solid? What do you think would happen if you pinched the string between the two cups while someone was talking?
7. At Station #8, you tapped on the table and listened with your head up and with your ear on the table. Did the sound seem travel better through solid material or gas? Why do you think this is true?
8. At Stations #6 and 9: why do you think the volume of the sound you heard got louder?
9. Station #10: why did the glasses make different pitch sounds?