

Teacher's Guide

Sound Waves Activities

Students will:

- “carry out investigations to conclude the relationships between sound waves (including rate of vibration, the medium through which vibrations travel) and hearing”.

There are four investigations that can be used as:

- **stations**
- **individual labs**
- **demonstrations**

If you choose stations, you will need the station directions at each station. In addition, each student will need the student sheets for all four stations.

Station 1: Students will explore how sound travels through solids, liquids, and gases. You will need 3 plastic bags, a metal spoon, rice, and water.

Station 2: Students will explore how the size, tension, and material of a rubber band impact the pitch and frequency when it is plucked. You will need a cup and rubber bands that vary in size and thickness.

Station 3: Students will explore what happens to water when a vibrating tuning fork is placed in it. You will need a container, water, and a tuning fork.

Station 4: Students will explore what happens when they create sound with their own instrument (voice). They will explore how different sounds are made. No other materials are needed!

Station One

Station One

You will need:

- 3 plastic bags
- water
- rice
- metal spoon

1. Answer question #1 on student sheet.

2. Place your ear against each bag. Plug your other ear with your finger. Tap the desk with the metal spoon by the bag.

3. Repeat step #2 with each bag and the bag with water.

4. Answer questions #2-4 on student sheet.

Name _____

Date _____

Station One Student Sheet

1. What do you think will happen when you place your ear against each bag and tap the desk (by each bag) with the metal spoon?

2. Collect data.

Bag	Observations
Air (Gas)	
Water (Liquid)	
Rice (Solid)	

3. How did the transmission of sound waves differ between the three bags? Why?

4. Can you think of any real-world situations where the knowledge of how sound waves travel through different mediums might be important?

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Included:

- station directions
- individual lab directions
- student sheet
- answer key



Station Two

Station Two

You will need:

- rubber bands of various sizes and thicknesses placed around a cup vertically

1. Answer question #1 on two student sheet.

2. Pluck the different rubber bands around the cup. Record your observations.

3. Answer questions #3 and #4 on station two student sheet.

Name _____

Date _____

Station Two Student Sheet

1. What do you think will happen when you stretch rubber bands of various sizes and thicknesses over the opening of a cup and pluck them?

2. Collect data.

Observations

3. How did the size, tension, and material impact the pitch and frequency of the sound?

4. How might these concepts apply to the design of musical instruments?

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Station Three

Station Three

You will need:

- large bowl or tub
- water
- tuning fork

1. Answer questions on student sheet.

2. Fill the bowl or tub with water (about halfway).

3. Strike the tuning fork. Slowly lower the tuning fork into the water without touching the bottom.

4. Record your observations.

5. Answer questions on the student sheet.

Station Three Student Sheet

Name _____

Date _____

1. What do you think will happen when you lower a vibrating tuning fork into the water?

2. Collect data.

Observations

3. How did the water respond to the vibrations produced by the tuning fork?

4. How could this experiment demonstrate how our ears detect sound?

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Station Four

Station Four

You will need:

- JUST YOU!

When we speak, hum, or vibrate as air passes through our throat and mouth. Change the size and shape of our mouth and throat and waves resonate.

1. Answer question #1 of sheet.
2. Place your hand over your throat and hum. Experiment with changing the size and shape of your mouth and throat. Record your observations.
3. Answer question #2 of sheet.

Station Four Student Sheet

Name _____

Date _____

1. What do you think will happen when you place your hand over your throat and hum? What if you change the size and shape of your mouth or throat?

2. Collect data.

Observations

3. How might understanding these concepts help singers improve their vocal technique?

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