

# Distinguishing Between Sound and Noise

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## Description:

Students will learn how to distinguish between sound and noise, and experiment with how sounds are created in their environment.

## Objectives:

- Distinguish between the concepts of sound and noise in the environment
- Explain and demonstrate how sound and noise are produced
- Discuss the health effects of noise in our environment

## Vocabulary:

Noise, perception, sound, vibration

## Materials:

- Tuning fork
- Cup of water
- Whistle
- Blackboard or interactive whiteboard
- Plastic straws
- Scissors
- Ping pong ball
- String or thread

## Background Information:

Sound is a collection of vibrations that are heard by our ears. These vibrations are particles that can travel through air, water, and solid objects. Sound requires a medium to travel through and therefore can't travel in a vacuum. That's the reason why there is no sound in outer space! When these vibrations reach our ears, they pass through different parts of our ear before reaching our brain, where sounds are understood, classified and can be labeled and even located! The size and shape of the vibration dictates how soft or loud a sound actually is. Different people's eardrums vibrate

differently to certain sounds hence everyone hears sounds differently. Sound is a form of energy. Like other forms of energy, it can be generated, it can move from one place to another, and it can dissipate over distance. Sounds can be used to communicate, warn, navigate and as a form of entertainment. Noise is an unwanted or unpleasant sound. Therefore, all noises are sounds while not all sounds are noises. People may perceive sounds and noise differently. Noise can cause mental and physical disturbances, which can affect our quality of life.

## Method:

- Ask your students for examples of sounds they hear in their environment (indoors and outdoors). Consider what sounds they hear, for example, over the course of a school day or while at lunch. Have students write or draw the sounds they hear in their notebooks.
- Ask students how they think sound is produced and heard. Discuss these responses with your students.
- Have your students put two fingers on their neck. At the count of three, have everyone hum for five seconds and then stop. Ask students what they felt (vibrations and buzzing). This demonstrates that sounds are produced by vibrations.
- Ask students to describe or draw what they think vibrations might look like. Tell students you are now going to show them what these vibrations look like. Take an empty can and place a rubber band from the base of the can to the open top. Pluck the rubber band and then watch and listen.

### Part 1:

- Divide students into groups to rotate through different "Sound Labs" or experiments with sound. Explain what materials will be used at each station and

provide some simple written instructions. Ask students to make predictions beforehand and observations afterwards in their notebooks.

- **Using a Tuning Fork:**
  - Introduce the tuning fork and how it is used. Have students predict what will happen when a tuning fork is placed in water or strikes another object in the air.
  - Provide a few cups of water, tunings forks, and ping pong balls that have been attached to a foot of string or thread. Experiment with what happens when the tuning fork comes in contact with the water in the cup or with the ping pong ball while holding the string still in the air. Hit the tuning fork at different intensities; what happens when it is struck harder or softer?
- **Making Straw Instruments:**
  - Students will use straws to create a reed instrument. Provide one plastic straw for each student and scissors.
  - Take the sipping side of the straw and bite down to flatten about one inch of the straw. Once flat, cut the two sides diagonally to form a triangle at the tip. Instruct students to place the straw in their mouth just past the cut point and then blow into the straw.
  - What makes the straw make sound? The “reeds” or two pieces of plastic create vibrations that pass from your mouth through the straw and out the other end.
  - Cut the other end of the straw by an inch to make your instrument shorter. What difference is there in the sound that’s produced? Have students discuss the possible reasons why.
- **Speaking through a String Telephone:**
  - Students can either build these in their labs (if time allows) or you can prepare them ahead of time. Using two paper cups, several feet of string, and a paper clip, you can form string telephones. Create a small hole at the center of the bottom of each cup. Place the string through the holes and tie it around a paper clip inside each cup to keep it in place.
  - Do you think these cups will work as a telephone? Remind students to hold the cups far enough apart that the string is taut, or tight. Test out the telephones by speaking and listening into the cups from a distance.
- Regroup to discuss how their sound lab experiments went. Discuss how they were able to hear and visualize the vibrations they were creating using these different techniques.
- Consider including activity modifications, such as incorporating a distance or amplification aspect.
  - Distance:
    - Students can form pairs or small groups in a hallway, with each group getting one of the previously created straw instruments.
    - One student will hold and make sound from the straw instrument while the other student(s) will play the role of the observer.
    - Every 30 seconds, have the observer student(s) take two steps back. Do this until they reach the end of the hallway.
    - What happens to the sound of the straw instrument as you step back? How does

the distance affect the way you hear the sound?

- Amplification:
  - Arrange the class in a circle if possible. Alternatively, teachers can have students sit at their desks.
  - Have students use the straw instrument again. Alternatively, teachers can choose to have the class clap, snap, or pat their legs. Ask for a student volunteer or pick a student to start the class off with the selected noise making activity. Once they start, have a new student join in one by one until the whole class is participating.
  - What happens to the sound as more students join in?

### Part 2:

- Tell the students that you are now going to play two different sound recordings. First play birds chirping and then play cars honking (find sound clips on YouTube).
- Have them raise their right hand when they hear a sound or raise both hands when they hear a noise. Ask students: Which recording is a noise? Why?
- At this point, it is important to emphasize to students the role of perception in differentiating between sound and noise. One person's definition of noise is different from the next person. Use the example of loud music.
- Ask the students to look back to the list of sounds they made at the beginning of the activity. Can they decide which are noises and which are sounds?
- Encourage students to think about and document how listening to each sound and noise makes them feel. Is there a difference in the emotions they feel towards sound and the emotions they feel towards noise?

### Discussion:

- How are sounds produced?
- What is the difference between sound and noise?
- How can noise hurt us?
- How does noise make you feel?
- Does sound and noise help us?
- How many sources of sound are there in the classroom?
  - Which are sounds and which are noises?

### Extension:

- We likely receive hundreds of different messages through the sounds we hear every day. Have students complete the [Sounds of the Day Worksheet](#), illustrating the different sounds they heard from the moment they woke up to the moment they went to sleep. Discuss which sounds are considered noises. Follow up by discussing whether they consider the sounds to be from natural or unnatural sources.
- Have students make a sound map (use DEP's [Mapping Sound and Noise](#) lesson). Each student can find their own "sit spot" within view of the teacher. They will then listen carefully and attentively to their surroundings to draw a "sound map" of what they hear.
- In a Venn diagram, have students compare and contrast sound and noise.
- Have students share what they learned by making a video with audio clips of different sounds and noises and then explain how to distinguish between the two.

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