

Visualizing Sound Waves

Purpose: How sound travels through different mediums.

Background Information:

Medium – the material that carries a wave.

Pitch – how high or low a sound is.

Hypothesis:

Do you think sound travels better through gases or through solids?



Procedures:

1. Softly tapping his or her pencil on the desk. Have the student keep tapping softer and softer until his or her partner no longer hears it.
2. Tell students the other partner will raise his or her hand as a silent indicator to the tapping partner when he or she can no longer hear the tapping.
3. Tell them that at this point, the tapping student should continue tapping at that sound level.
4. Place his or her ear on the desk to determine if he or she hears the sound any louder.
5. Switch roles and repeat the process.
 - A. Based on the pencil-tapping activity, do sounds waves travel better through solids or gases?
 - B. Explain your thinking
 - C. Native-American trackers would place their ears to the ground to listen for far-off herds. Why do you think they did this?

Visualizing Sound Part I: Making Waves

1. Lightly tap a tuning fork against a rubber surface (like the bottom of a tennis shoe).
2. At an angle, tap the surface of the water with the tuning fork.
 - C. Sketch and write your observations on your paper.
3. Use one paper towel to dry up any water droplets on the table.
4. Answer the following questions:
 - D. Based on your observations, define “wave” in your own words.
 - E. What kind of wave does the tuning fork generate?
 - F. What medium did the wave travel through at this station?
 - G. Define “medium” in your own words.

Part II: Eardrum of Science

1. Place the cup in the center of the table.
2. Pour a spoonful of rice on the top of the balloon.
3. Strike the tuning fork on a rubber surface and touch its end to the center of the stretched balloon.
 - H. Make observations in the space below.
5. Clean up the station.
6. Answer the following questions:
 - i. Define “sound wave” in your own words.
 - j. How do you think this models the human ear?
 - k. Make sure to identify what the balloon and rice represent.

Part III: Transfer

1. Cut a string about 1-1 ½ feet long and tape one end of it to the ping-pong ball.
2. Have one student hold the string away from her body. Without striking the tuning fork, move it toward the ping-pong ball.
 - L. Write what happened.
3. This time have students strike the tuning fork and move it slowly toward the ping-pong ball.
 - M. What happens to the ball as the tuning fork gets closer?

Part IV: Pitch

1. Gently strike one of the tuning forks against the rubber surface
2. Listen to the pitch (sound that it is making)
3. Continue to do this with all of the tuning forks and put them in order from highest pitch to lowest pitch.
4. Record the letter that is written on the tuning forks in order.
 - n. Which letter had the lowest pitch?
 - o. Which letter had the highest pitch?

Analyzing the Data

- P. What type of medium does sound travel the best through?
- Q. What is the relationship between PITCH and length of the tuning fork?
- R. Draw a picture of something making a sound and a human ear.
 - Add to the drawing to show your understanding how sound can leave something and travel to a person ear.