



3-5 Physical Science 3-5 Nature of Science

Southern Nevada Regional Professional Development Program

Spoon Chimes

INTRODUCTION

From a young age, children experiment with sound by creating their own instruments. This lesson investigates one particular homemade instrument, the spoon chime. Students will investigate how vibrations travel to the ear and are interpreted as sound.

WHERE'S THE SCIENCE?

Sounds travel through a medium from the **sound source** to the sound receiver. Most animals have **sound receivers**, something that detects sound, in the form of ears. Our outer ears are formed specifically to amplify and channel the sound to our inner ear for interpretation in our brain. In this investigation, hitting the spoon, **sound source**, causes it to vibrate. The **vibrations** bounce the **molecules** in the air, which in turn bumps into the other molecules producing a spreading pressure in the air. If this pressure wave travels into your ear and hits your eardrum, your eardrum and the tiny bones behind it vibrate just like the spoons did. Your brain then transmits this information as a sound or an echo.

MATERIALS

(per group)

- String – 30 cm
- Metal spoon
- Plastic cup (punch a hole in the bottom of each cup with a small nail)
- Pencil
- Wind chime – for the class



PROCEDURES

1. Call the students to the carpet area and ask them to close their eyes. Strike the wind chime to make it vibrate and produce sound. With their eyes still closed, ask students to describe what they hear. What do they think made that sound? Chart their responses. Ask them to open their eyes and discuss the sounds that they heard. Show them the wind chime. Tell them that today they will be creating their own chime, out of spoons. They will get to investigate firsthand how and why the spoon chime makes sound.
2. Post the following directions in a visible place in the room. This will avoid confusion, or missing steps. Equip the students with their science notebooks to record all observations and questions during this investigation.

Spoon Chimes

- 1) Tie the string to the spoon.
 - 2) Thread the other end of the string through the hole in the bottom of the cup. Knot the end inside the cup by tying it to a paper clip placed inside the cup.
 - 3) Hold the cup over your ear with the spoon dangling away from your body.
 - 4) Have a partner tap the spoon with the pencil. Be careful not to tap too hard.
 - 5) Listen to the sound
 - 6) Record your observation in your science notebook.
3. Call the students to the carpet area and discuss their observations. What sounds did you hear? What made the sounds? What happened when you struck the spoon with a lot of force? Record the students' ideas and further questions on a piece of chart paper and post.

Extension Activities

1. Have different lengths of the same type of string. Does this make a difference in the sounds?

2. Try using different types of string, but make sure they are the same length. Yarn, dental floss, and twine are some suggestions to use. Do you notice any differences in the sounds?

Additional Resources

<http://www.fossweb.com/modules3-6/PhysicsofSound/index.html>

Interactive site to support the Sound FOSS kit.

http://www.exploratorium.edu/listen/online_activities.php

Great sound and listening activities.

Vocabulary

Frequency: The speed at which something vibrates. High-frequency vibrations are rapid vibrations

Inner ear: The innermost part of the ear, containing the essential organs of hearing and equilibrium.

Middle ear: The hollow space between the ear drum and the inner ear where the hammer, anvil, and stirrup are located.

Molecule: A tiny particle of matter.

Outer ear: A flap of flesh and cartilage visible on the sides of many animals' heads. The outer ear gathers sound vibrations and directs them into the middle ear.

Sound receiver: Something that detects sound.

Sound source: An object or material that vibrates in a way that makes sound.

Vibration: A rapid back-and-forth movement.

Nevada State Science Standard

P5C2 Students know the wave characteristics of sound. E/S

N5A1 Students know scientific progress is made by conducting careful investigations, recording data, and communicating the results in an accurate method. E/S

N5A5 Students know how to plan and conduct a safe and simple investigation. E/S

N5B3 Students know the benefits of working with a team and sharing findings. E/L