



Secret Sounds

Design your own silent disco! Investigate how a coat hanger and string can be used to produce musical sounds that only your ears can hear.

TEKS:

SCI 1.6 A: The student is expected to identify and discuss how different forms of energy such as light, thermal, and sound are important to everyday life.

SCI 3-5.6 A: The student is expected to explore different forms of energy, including mechanical, light, sound, and heat/thermal in everyday life.

Materials:

- Metal clothes hanger
- Ruler
- Scissors
- String

How To:

1. Cut two pieces of string that are each 24 inches long.
2. Tie one end of each piece of string to the coat hanger's hook.
3. Wind the other end of each string around the index finger of each of your hands. The coat hanger should now hang from your index fingers.
4. Gently press your index fingers on the flaps on the outside of your ears, blocking outside noise and sealing your ear canals. Do not put your index fingers inside your ears. Instead, your fingers should gently press your ear flaps closed.
5. Carefully swing your coat hanger against a hard surface, such as the edge of a desk or table, or even a door frame.
6. As your coat hanger vibrates, you should be able to hear a chiming musical sound. Test your coat hanger on various surfaces to see how the sounds change!

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STEM Explanation:

Sound travels in waves. Most of the sound we hear travels through air, but the air is not the only way sound waves can travel. A speaker plays music loud enough for us to hear, but the music sounds much louder if you place your ear on the table the speaker is resting on. That's because molecules are packed closer together in different materials. In the air, molecules are more spread out than they are in a wooden table. If you swing a metal coat hanger against a table without touching the string to your ears, the sound might not last for long. However, when you swing the same metal coat hanger with the strings touching your ears, you can hear a nice musical chime sound! The vibrations, or sound waves, from the coat hanger travel up the string, through your fingers, and into your ears. Because the vibrations travel through solid objects (hanger, string, finger) where the molecules are more densely packed, the sound is louder and lasts longer! Your coat hanger demonstrates how the same vibration sounds different when traveling through different materials!

Career Connection:

Acoustical engineers study the science of sounds and vibrations. They design, analyze, and control sound in different environments, and they are an important part of the music, auto manufacturing, architecture, environmental engineering, and urban design industries.

Resources:

<https://www.exploratorium.edu/snacks/secret-bells>

<https://buggyandbuddy.com/exploring-sound-with-a-hanger-science-invitation-saturday/>

<https://www.scienceworld.ca/resource/sound/>

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