RAFT IDEAS

Topics: Sound, Vibration, Sound Transfer

Materials List

- ✓ String or fishing line, at least 6 m (19 ft) long
- ✓ 2 Cups or lids (plastic preferable, paper cups, OK)
- ✓ 2 thin straw sections, ~3 cm (1½") long
- ✓ Nail, sharpened pencil (or hole punch if using lids)

This activity can be used to teach:

- Sound (Next Generation Science Standards: Grade 1, Physical Science, 4-1; 4-4)
- Energy and sound (Next Generation Science Standards: Grade 4, Physical Science, 3-2)
- Waves (Next Generation Science Standards: Grade 4, Physical Science, 4-1)
- Science & Engineering Practices (Next Generation Science Standards: grades K-6)

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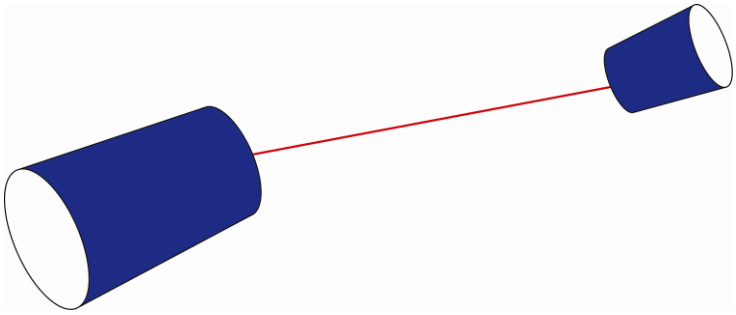
Sound String

Transmitting sounds using only two cups and a string



Students can transmit sound using a simple device constructed from cups and string.

Assembly

1. Using the nail or sharpened pencil, punch a small hole in the center of the bottom of each cup or center of each lid. (A hole punch may be used for lids.)
2. Starting from the outside of one cup, thread the string through the hole, and tie around a straw section. The straw prevents the string from being pulled through the hole during use. (Tip: Tie an overhand knot first, and then thread the straw through the overhand loop **before** cinching the knot down tight). The knot and straw are on the inside of the cup so that the cup can be placed over the ear.
3. Repeat step 2, with the other cup and the other end of the string.

To Do and Notice

1. Working in pairs, each student holds a cup and moves apart so that the string is stretched taut between them.
2. With both students holding a cup over an ear, one student plucks the string. If the students don't hear a sound in the cup, they should stretch the string a little tighter and pluck the string, until a sound is heard.
3. Maintaining the tension in the string, one student holds the cup to the ear, while the other talks into the cup. Does the listening student hear sound transmitted over the string? Have students take turns listening and talking (transmitting sound) over the string.

The Science Behind the Activity

Sound is caused by vibrations that travel in compression waves through the air or other medium and into the ear. When a person speaks into the cup, the sound causes the bottom of the cup to vibrate. The string, when sufficiently taut, transmits the vibrations to the other cup bottom, which vibrates in turn. The cup amplifys the vibrations and make them audible.

Taking it Further

- Explore sound waves with RAFT Idea Sheets ***Tongue Depressor Harmonica, Sound Shakers,*** and ***Buzz Off***.
- For more on waves see RAFT Idea Sheet ***Making Waves***.

Web Resources (Visit www.raft.net/raft-idea?isid=475 for more resources!)

- Exploratorium "Secret Bells" - http://www.exploratorium.edu/science_explorer/secret_bells.html
- Sound wave exploration-http://illuminations.nctm.org/ActivityDetail.aspx?ID=37

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