

The Science of Telephones

The Science Behind it . . .

How do landline telephones work?

When you speak into a landline phone, your voice travels in small sound waves. The sound waves are carried to a thin metal disk inside the phone, called a diaphragm, and are converted into electrical energy. The electrical energy travels over wires to another phone and is converted from electrical energy to sound waves again which can be heard by someone on the other end of the phone!

How do cell phones work?

A cell phone does not use wires to transfer your voice. When you speak into a cell phone a microphone turns your voice into electrical signals. A microchip in the phone modulates (or varies) a radio wave using the electrical signal. The radio wave travels through the air to a nearby cell tower; the tower sends your voice to the person you are calling and the process is reversed so that the person on the other end can hear your voice.

How does the string telephone work?

A string telephone works very much like a landline phone. When you talk into the cup your voice sends sound waves inside the cup, vibrating the bottom of the cup. The vibrations are transferred to the string, across the string and into the bottom of the other cup. The sound waves become vibrations inside the second cup, transferring the sound of your voice.

Materials

- ⇒ Paper cups (2 per youth)
- ⇒ String (10 feet or more per youth)
- ⇒ Paperclips (2 per youth)
- ⇒ Pushpins (to share)
- ⇒ Scissors (to share)

Making and Exploring Further

Make activities encourage problem solving through trial and error, allowing for individual creativity and experimentation. Youth will ignite their curiosity and expand their critical thinking skills as they move from the planned and guided activity to an open exploration of different materials and methods.

- ⇒ Encourage youth to substitute 'phones' using recycled containers, or larger paper cups.
- ⇒ Encourage youth to substitute 'phone lines' using fishing line, yarn, or embroidery thread.
- ⇒ Encourage youth to personalize their 'phone' with markers or stickers.

Sources

- ⇒ Science Kids: Make a String Telephone: www.sciencekids.co.nz/projects/stringphone.html
- ⇒ Scientific American: Talk through a String Telephone: <http://www.scientificamerican.com/article/talk-through-a-string-telephone-bring-science-home/>
- ⇒ University of Wisconsin-Madison: Build a String Telephone: <http://wonders.physics.wisc.edu/build-a-string-telephone.htm>
- ⇒ Yale-New Haven Teacher's Institute: www.yale.edu/ynhti/curriculum/units/2003/4/03.04.07.x.html
www.ext.vt.edu/topics/4h-youth/makers

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