

SPEAKERS

By: Shaun Dychko (with credit to Vincent Tang)

School: University Hill / UBC Transition Program (Vancouver School Board)

Grade Level: Physics 12 or Science 10

Purpose: Create electronic speakers.

Materials (per speaker):

- Yogurt container
- rare earth magnet. Available from Lee Valley Tools <http://www.leevalley.com> located on SW Marine Dr. I recommend the following:

| | Outside Dia. | Thickness | 1+ | 10+ | 50+ |
|-------------|--------------|-----------|--------|--------|--------|
| B. 99K32.03 | 3/8" | 1/10" | \$0.60 | \$0.48 | \$0.42 |

- Magnet wire. Available from Radio Shack
- Tape

(per class):

- a stereo with speaker outputs

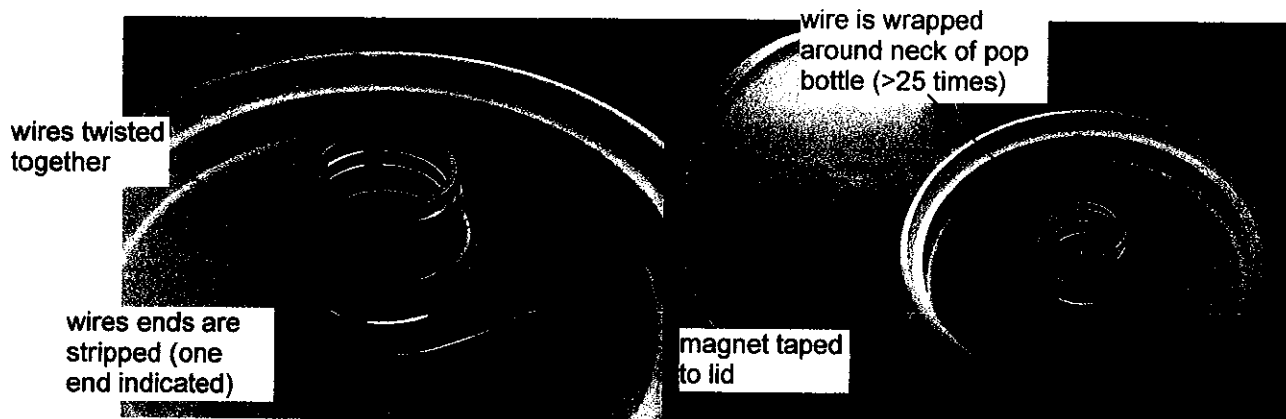


Fig. 1: close up of pop bottle inside container Fig. 2: The speaker lid and container

Method:

- The neck of a pop bottle will serve to position a coil of wire directly beneath a magnet taped to the lid of the container. Cut off the top of a pop bottle such when put inside the yogurt container it reaches just below the top. The closer the coil is to the lid (without the bottle and lid touching) the louder the speaker.
- Wrap the neck of the bottle with at least 25 turns of magnet wire. The more turns the louder the speaker. Leave enough length on both ends to reach outside the container to the speaker outputs of a stereo. Strip the ends by scraping them with sand paper.
- Tape the magnet to the lid so that it is located above the centre of the coil.
- Put the lid on and connect both wires to the speaker outputs of a stereo, and enjoy!

Explanation:

The current coming from the stereo is oscillating the same way as the sound that was originally recorded. Current through a wire creates a magnetic field, which is particularly strong at (and above) the centre of a loop (and even stronger with many loops stacked on top of each other). This oscillating current therefore produces an oscillating magnetic field which causes the magnet to vibrate, which makes the lid vibrate, and since sound is caused by things vibrating: voila!