RAFT IDEAS

Topics: Sound, Vibration, Music, Instruments

Materials List
(For each "Finger Phone")

- ✓ Pointer, middle or ring finger cut from a Nitrile or latex examination glove (Vinyl is not stretchy enough); **powder-free gloves only!** (neater to use, no inhalation risk)
- ✓ Half a drinking straw
- ✓ Sturdy tube, plastic or cardboard, ~15 cm (6") long, with a ~3 cm (~1") diameter
- ✓ Masking tape, and/or adhesive labels
- ✓ Pointed pencil or =
- ✓ Scissors

This activity can be used to teach:
Next Generation Science:

- Sound (Grade 1, Physical Science 4-1, 4-4)
- Senses (Grade 4, Life Science 1-2)
- Energy and sound (Grade 4, Physical Science 3-2, 3-4)
- Waves (Grade 4, Physical Science 4-1)
- Science & Eng. Practices (Grades K-8)

raft resource area for teaching
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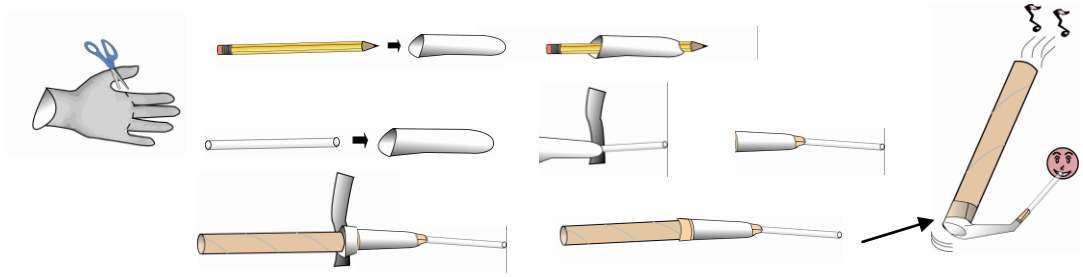
Finger-Phone

Make surprising sounds with a mini membranophone



Create a musical instrument in minutes to explore the science of sound production!

Gloves may contain Natural Rubber Latex which may cause allergic reactions.

Assembly

1. Cut off the full length of a pointer, middle, or ring finger from a powder-free examination glove made of Nitrile or latex. (A thumb will work, but not as well.)
2. Insert the pencil, sharpened end first, into the cut off finger. Poke a hole in the tip and pull the pencil through.
3. Insert half a straw into the finger as shown above. Pull the straw through the hole until only about 2 cm (~1") of straw remains inside the finger. Tightly wrap masking tape around the point where the straw emerges creating an airtight seal.
4. Pull 1 cm (⅜") of the open end of the finger over the end of an appropriate sized tube and wrap the junction with masking tape to make an airtight seal - see above.

To Do and Notice (Point the open end of the tube away from any nearby ears!)

1. While holding the straw taped junction, gently pull and angle the flexible material to cover the tube end **completely** as shown at the top right of this page.
2. Blow through the straw to inflate the finger. What happens when there is sufficient air in the finger?
3. Experiment with the array of sounds produced by varying the force of the blowing and the tightness of the flexible material over the end of the tube.

The Science Behind the Activity

The flexible material of the finger is positioned to cover the end of the tube, closing off that end of the finger. The rest of the finger forms a chamber that inflates when air is blown into the straw. The air pressure in the chamber increases until a bulge is created that lifts the flexible material away from the edge of the tube. The air can then escape from the chamber, out through the tube, which causes the chamber to deflate. The chamber deflates until the flexible material again seals the end of the tube. As long as air is blown into the straw this pattern repeats, resulting in the material moving back and forth. These vibrations produce the loud sound. The sound created depends on how tightly the tube is sealed, the diameter of the sealed area, and the length of the tube. The frequency (**pitch**) produced is equal to the number of times per second (hertz) that the air molecules vibrate back and forth. The size of the sealed area and the tension of the material affect the pitch – more tension will cause the material to vibrate at a higher pitch, while a larger area or thicker material, at the same tension, will produce a lower pitch.

Taking it Further

Make a "finger phone" using a tube with a different length or diameter.

Web Resources (Visit www.raft.net/raft-idea?isid=338 for more resources!)

Based on an activity by Fran Holland
RAFT Idea Sheet written by RAFT Education Department