



# High Touch High Tech<sup>®</sup>

Science Experiences That Come To You

## Roaring Cup

### Supplies & Materials:

- 16 oz. red plastic cup
- 20" piece of cotton string
- ½" hex nut
- water
- *adult scissors*

### Instructions:

You can make your own musical instrument – a ROARING CUP! You will need a 16 oz red plastic cup, a 20" piece of cotton string, 1 hex nut and some water. Ask an adult for help to prepare your materials.

*Adult needed:* Tie a ½" hex nut to one end of a 20" piece of cotton string.

Carefully punch a hole through the bottom of a 16 oz. red plastic cup. Turn the cup up-side-down and put the string through this hole. The hex nut will serve as an anchor to keep the string from falling through the hole. Dip the string in water.

Hold the cup up-side-down in one hand. With your other hand, hold the string hanging through the mouth of the cup and pull down sliding the string through your thumb and index finger – LISTEN TO ME ROAR!!

### The Science Behind It:

What is *sound*? Talking, humming, music, noise are all examples of sound. Sound is actually vibrations that travel through the air to reach one's ear. What are *vibrations*? Think of a diving board that moves up and down. This motion creates *vibrations*. There are fast vibrations and slow vibrations. The speed of a vibration is called *pitch*. In other words, pitch is how fast or slow something vibrates. This creates sound.

It is thanks to sound and our sense of hearing that we can appreciate music.

*Resonance* is important in creating music. Resonance is the bouncing back and forth of sound waves. If vibrations occur inside a tunnel, for example, the sound waves that bounce back and forth are reinforced, and the sound lingers. A string instrument, such as a guitar, depends on *resonance*. When a musician plucks the strings, they vibrate and the resonance continues and lingers.



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The cup acts as a cavity, which increases sound. It helps amplify and prolong the sound because the sound bounces back and forth and is reinforced. This is called *resonance*. Musical instruments such as bells and violins have cavities or sound boxes. Inside the cavity, waves vibrate at the same frequency as the source of the sound (the strings of the violin).

Just as humans have eyes for the detection of light and color, we are also equipped with ears for the detection of sound. In fact, the ear lobe actually helps direct sound waves into your ear. Behind the earlobe is the ear canal. Beyond the ear canal is the *tympanic membrane*, also called the *eardrum*. This thin, cone-shaped membrane receives the waves and vibrations and converts them to sound. The *auditory nerve* helps the brain to distinguish the noise so that we can tell the difference between a dog bark and doorbell. Finally, don't forget earwax! This seemingly gross substance actually protects our eardrum and auditory nerve from very loud noises or high frequency sounds.

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