Sound Science

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Here are some simple experiments and a game that are all about the science of making noise—and what girl doesn't love that! Try these activities as part of the Brownie Key to STEM, or the Spark Exploring and Experimenting Keeper. The "More to Try" suggestions can be used for girls who want to investigate a little further, or to adapt the activities for older girls.

1. The Science of Sound

What you need:

- Your voice

What to do: Have the girls place one hand lightly on the front of their throats and say their name. Do they feel the vibration?

What is happening? Your vocal cords are kind of like rubber bands in your throat. When you speak, they vibrate just like a rubber band does when you stretch it tight and pluck it. Air passing through your throat past your vocal cords picks up the vibration and carries it out to the air around you. The vibration travels through the air, much like ripples travel through water when you drop a pebble into a puddle.

When the ripples from your vibrating vocal cords reach your friend's ear they hit her eardrum, a thin piece of skin that is stretched tight like the top of a drum. Her eardrum vibrates too, and her brain interprets that vibration as a sound.

More to try: Have the girls experiment with other ways to make sounds, using whatever materials and objects are in your meeting space. Can they figure out what is vibrating in each case?

2. Music Box

Everyone's vocal cords work the same way, so why do we all have different voices? Try this experiment to see how different types of vocal cords make different sounds. This experiment works best if the girls work in small groups.

What you need: (for each girl or small group of girls)

- A sturdy box that is open on one side, like a shoebox without the lid.
- Several rubber bands in different sizes

What to do: Stretch the rubber bands around the box, so that they are stretched over the open side. Some rubber bands will be stretched tighter than others.

Pluck each rubber band. Do they make different sounds? Which one makes the highest note, or the lowest note?

What is happening? Each rubber band has a different "voice," depending on its shape and how tightly it is stretched. Skinny rubber bands that are tightly stretched vibrate very quickly, and they have a higher voice than big, fat rubber bands that vibrate slowly. It is the same with our vocal cords—we all have different voices because our vocal cords are different sizes and shapes.

More to try: Challenge the girls to play a simple tune on their rubber-band boxes. Can the other girls recognize it?

3. Spoon Bells

This experiment works best if each girl gets to try it. Have the girls work individually or in small groups.

What you need: (for each girl or small group of girls)

- A metal spoon
- A piece of string about 1m long

What to do: Tie the spoon to the middle of the string. Hold one end of the string in each hand, and swing the spoon so it taps against the side of a table or desk. Listen to the sound it makes.

While still holding the string in your hands, put your fingers in your ears and swing the spoon against the table again. Does it sound different this time?

What is happening? When the spoon hits the table it vibrates, and that makes a sound in just the same way as your vibrating vocal cords. But why does it sound so different when you have your fingers in your ears?

Sound doesn't travel only through the air—it can also travel through objects. In this case, the sound from the spoon hitting the table travels through the string directly into your ears. The string conducts sound better than the air does, so the spoon sounds much louder and more bell-like when you hold the string and put your fingers in your ears.

More to try: Try this experiment with different-sized spoons. Do they make different sounds?