

Let's Make Some Noise!

Some background:

On a field trip with my fifth grade students to a local science museum, we saw a science instructor conduct a lesson on sound. It was such a simple idea, with easy-to-find materials, that I brought it home to do with my Girl Scout troop the following week. Since then, I have modified and expanded the lesson so it would fit any elementary or middle school grade lesson plan on sound.

Materials:

For each student, you will need:

- 12-inch piece of yarn
- Paper cup
- Paper clip
- Pencil
- Clean, empty aluminum cans (assorted sizes) with holes punched into the bottom of each
- Water

Introduction:

The first thing students must understand is the simple concept that vibrations create sound. Even very young children can grasp this concept.

You can conduct a number of activities using tuning forks and such, but the easiest demonstration is to have students touch the front of their throats and hum.

Once they understand that the vibration of the molecules in an object creates sound, they find it easier to understand that sound cannot travel through a vacuum (an area devoid of matter).



Procedure:

1. Pass out 12-inch lengths of yarn to all students and ask them to make a sound with the yarn. Don't give them any further guidance—just observe their efforts.

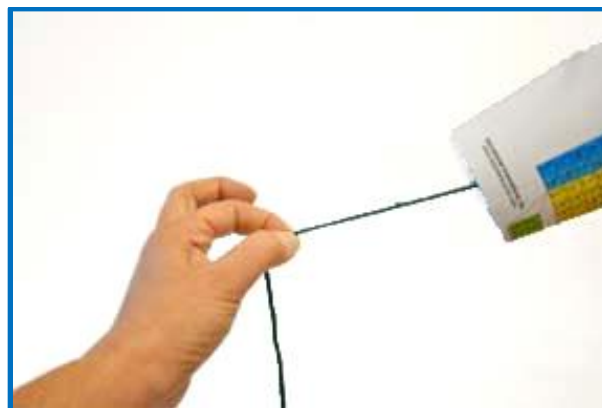
Generally speaking, very few of my students were successful. Some realized that—by holding one end of the yarn in one hand and then running the yarn between the nail of their thumb and pointer finger of the other hand—they were able to produce a faint sound. This was a good beginning!

2. To each student, hand out a paper cup, a paper clip, and a pencil.
3. Instruct students to punch a small hole in the bottom of the cup with the point of the pencil.
4. Next, they should thread the yarn through the hole in the cup and knot the end of the yarn *inside the cup* to the paper clip.
5. Tell students to pull the paper clip to the bottom of the cup. The paper clip should be flush with the bottom of the cup, and the yarn should extend from the bottom of the cup, like an animal's tail.



While doing this, many students realized that, when they inadvertently ran their hand along the yarn, a sound emanated from the cup. Without any additional instruction, the children began to discover on their own.

6. Allow time for students to experiment with making a sound with their yarn.



7. After a short time, distribute cups of water to each set of students.
8. Invite students to wet their yarn in the water—without wetting the cup.

As students ran their hand (or, better yet, their thumbnail) down the yarn, it was clear that the sound became significantly louder.

The science behind this activity:

The friction between the yarn and students' fingers caused the yarn to vibrate. Because there was no way initially to amplify the sound, it remained faint. As soon as students attached the yarn to the cup, however, the sound became much louder.



This is because the sound waves resonated within the cup and were amplified. This is the principle at work when children play “telephone” by stringing two cups across a distance. The cups amplify the vibrations carried by the string to the listener’s ear.

Similarly, students can change the pitch of the sound by changing the size of their mouth. This leads to the next step of the lesson.

Procedure:

- 9.** Distribute empty aluminum cans of various sizes to students. (You should have prepared the cans with a hole in the center of each before class.)
- 10.** Instruct them to attach the yarn to the bottoms of the cans in the same way they did with the cups.
- 11.** Invite students to test the sounds they are able to make with the different cans. How does the sound change with respect to the size of the can? Which size emits a higher pitch? Which size emits a lower pitch? (The smaller cans produced a higher pitch while the larger cans produced a deeper and richer sound.)

