

String Vibrations: Classroom Activity

ACTIVITY SUMMARY

Through a science experiment, students will explore how string instruments produce sound and how vibration causes sound.



STUDENTS WILL BE ABLE TO

- ✓ plan and carry out tests in which variables are controlled (*NGSS ETS-1*)
- ✓ demonstrate the ability to follow simple instructions (*CACCSS SL 1*)
- ✓ distinguish between high sounds and low sounds created by a vibrating string (*CA VAPA Music 1.0 Artistic Perception*)



VOCABULARY

vibration

When something moves back and forth very fast



MATERIALS

A piece of string, approximately 30 inches in length. One string per student.



PROCEDURE

1. Begin with a discussion about vibration. Ask students to define vibration and share examples of vibration. Explain that string instruments—such as the harp, violin, viola, cello, and double bass—create sound through vibrating strings.
2. Provide each student with a piece of string for an experiment. Students will be wrapping the string around the back of their heads and holding it tautly in front of their faces, so that the string crosses their ears.

A Fun Experiment with String

Follow the steps on the next page to demonstrate to the students how to properly hold the string for this activity:

How to Hold the String Around Your Head!

- a. Find the middle point of the string.
- b. Place the middle point of the string on the back of your head.
- c. Wrap the string along the back of your head and across your ears.
- d. Pull both ends of the string in front of your face.
- e. Hold the string together with one hand about 2 inches from your face.
- f. Make sure the string is tight, but not too tight! Do not hurt your ears!
- g. Use your free hand to make a quick pull on one side of the string, causing it to vibrate.
- h. Listen! What do you hear?

3. Explain to students that when they pull (pluck) the string, it vibrates and creates a sound. The vibration from the string creates sound waves that travel into their ears.

Tell students that the harp produces sound the same way. When the harpist's fingers pluck or brush the strings, it causes the strings to vibrate. The vibrations create the harp's sounds.

EXTENSION: Have students experiment further with the string by pulling it tighter or loosening it, and by allowing longer or shorter lengths of the string to vibrate.

Ask students the following question: *How does the sound change on a piece of string?* Have students respond **Higher** or to **Lower** the following statements:

When I pull the string **tighter**, the sounds goes _____ Answer: higher _____.

When I **loosen** the string, the sounds goes _____ Answer: lower _____.

When I make a **bigger** circle around my head by moving my hand farther from my face, the sounds goes _____ Answer: lower _____.

When I make a **smaller** circle around my head by moving my hand closer to my face, the sound goes _____ Answer: higher _____.