



Squawking Soundboards

The vibrating motion of a plucked guitar string alone produces a very quiet sound. However, when a string is attached to the body of a guitar, the instrument produces a much louder sound! Scientists call this phenomenon “forced vibration” because the vibrating motion of the string forces the body of the guitar to vibrate as well. This is why stringed instruments utilize soundboards, like the body of the guitar, to amplify vibrations from the string and increase instrument volume.

In this activity, the “instrument” is made by threading a piece of string through the bottom of a paper cup then dampening the string. To play the instrument, tightly grip the string between two fingers and pull down in short bursts. The friction you create between your fingers and the string produces vibrations. The vibrations travel up the string to the cup soundboard, which vibrates and amplifies those frequencies—allowing us to hear the loud squawking sounds!

Materials needed:

- Small paper cup
- Paper clip
- 12 to 14 inches of cotton string or yarn
- Water

Step-by-step instructions:

1. Punch a hole in the bottom of the cup.
2. Tie one end of the string to the paper clip.
3. Pull the string through the hole in the cup so the paper clip is on the outside.
4. Get the string slightly wet.
5. Pinching the string tightly, move your fingers down the damp string in short bursts. What do you hear?

Additional explorations:

- Try the same activity with a string and no cup. What do you hear?
- What happens when you use a larger or smaller cup?

Discussion questions:

- What is causing the string to make the squawking sounds?
- Can you identify the soundboard in other instruments?
- What are some different ways we create sound with instruments? How does a guitar make sound differently than a flute? Or a drum?

Additional resources:

PBS Interactive Lesson: Sound Waves

<https://opb.pbslearningmedia.org/resource/ilunctv18-sci-ilsoundwaves/sound-waves/>

PBS Interactive Lesson: Seeing Sound

<https://opb.pbslearningmedia.org/resource/reach-with-stem-seeing-sounds/seeing-sounds/>

