

LESSON 9:

HARMONIOUS HARMONICS

SUPPLIES

PENCIL BOX

- Scissors

MAIN BIN

- Large popsicle sticks (30)
- Large rubber band (20)
- Small rubber bands (40)
- Straws (15)

OBJECTIVES

- Learn about the science of sound vibrations
- Create harmonicas to experiment making distinct sounds

HOOK

🕒 2-3 min

Ask students if they have ever played a musical instrument. If so, what instrument? How did they play the instrument? What did it sound like?

Now ask: have they ever made a musical instrument? That's what we will be doing today!

INTRODUCTION

🕒 2-3 min

What instruments use air to create sound? Can you think of any? Instruments like flutes, recorders, tubas, trumpets, kazoos, bagpipes, and many more require the movement of air--usually from our lungs--into the instrument. In this activity, we will explore the science of sound vibrations by creating our own harmonicas that produce sound when we blow air through them.

The harmonica's origins can be traced back to ancient civilizations, as early as 3000 years ago in China. However, the harmonica as we know it today was developed in Europe in the early 19th century. The harmonica gained popularity in the 20th century, especially in blues, folk, and country music. Have you ever heard a harmonica? What does it sound like?

COLOR FACTOR


Even though we hear music and see color, our brains often connect the two in amazing ways!

For example, high sounds (like a whistle or a flute) feel light and bright, like yellow or sky blue, while low sounds (like a drum or tuba) feel deep and dark--like purple or navy blue. Songs that are fast and happy might remind you of red, orange, or bright green. Songs that are slow and calm might feel like soft pink, blue, or gray.

Some people might even see music as a color! This is called **synesthesia**. Some people's brains mix senses, so they can see colors when they hear music.



DISCUSSION


 3-5 min

Sound is all around us, from birds chirping to music playing. But have you ever wondered how vibrations produce sound? The answer is sound waves!

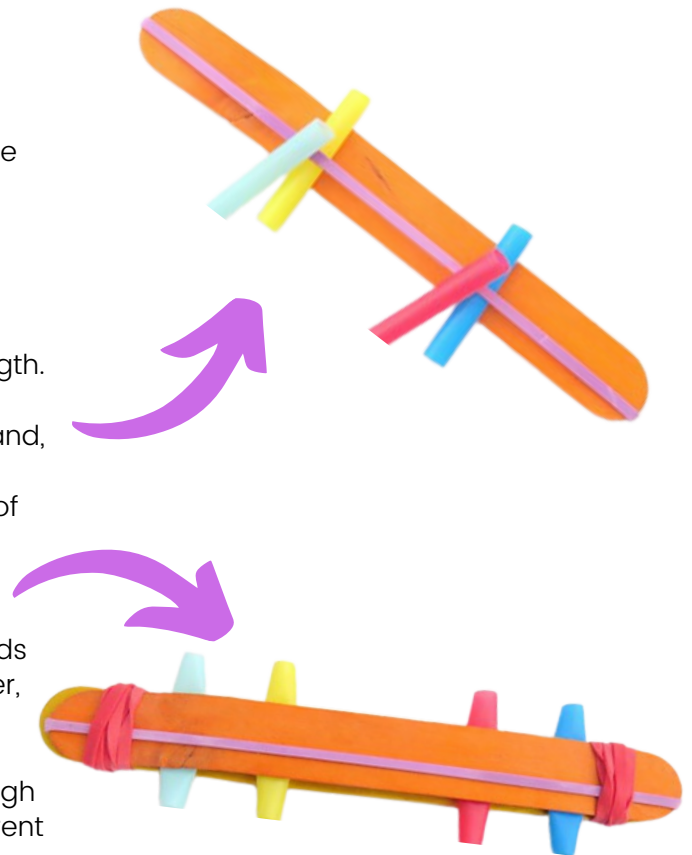
When an object vibrates, it moves back and forth very quickly. These vibrations create sound waves that travel through the air to our ears. For example, when you pluck a guitar string, it vibrates rapidly, creating sound waves that we hear as music.

But how do these vibrations turn into the sounds we recognize? It all comes down to our ears. When sound waves reach our ears, they make our eardrums vibrate, too. These vibrations are then transformed into electrical signals that travel to our brain, where they turn into the sounds we hear. Different objects produce different sounds based on the speed and size of their vibrations. For instance, a small bell produces a high-pitched sound because its vibrations are fast and short. On the other hand, a large drum produces a low-pitched sound due to its slower and longer vibrations.

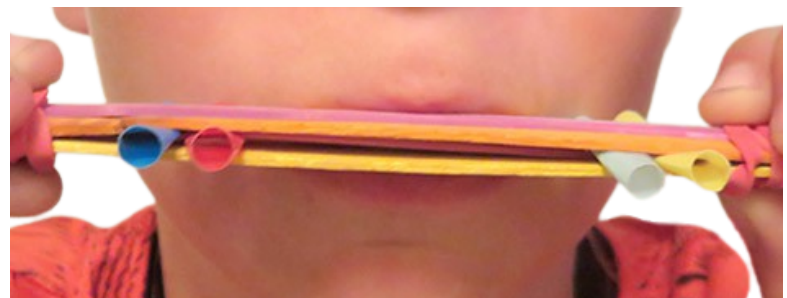
ACTIVITY

 20-25 min

1. Instruct students to take two popsicle sticks and lay them side by side.
2. Then, have them fasten the large rubber band lengthwise around one of the popsicle sticks.
3. Cut the straws into 4 small pieces, each about 2-3 cm in length.
4. Have students insert two pieces of straw under the rubber band, and then remaining two pieces of straw on top of the rubber band, making sure they are evenly spaced along the length of the harmonica. See photo!
5. Next, place the second craft stick on top. Secure the sticks together by wrapping the small rubber bands around the ends where they meet, but not too tight!
6. To play your harmonica, show students how to blow air through the adjusted gaps between the straws. Experiment with different placement of the straws to create a variety of melodies and sounds.



Try moving the straws closer together or farther apart to see how it affects the sound produced when blowing air through them. Closer straws will produce higher-pitched sounds, while farther apart straws will produce lower-pitched sounds.





OBSERVE & EXPLAIN 5-10 min

The harmonica consists of reed plates, reed chambers, a mouthpiece, cover plates, and the case. Each hole on the harmonica contains a reed, which is a thin strip of metal that vibrates to make sound when air is blown or drawn through the hole. When a player blows air into a hole, the reed vibrates, producing a specific note. Drawing air through the hole creates a different note. By combining blowing and drawing, players can produce a wide range of musical notes and create melodies.

The size and shape of the reeds, as well as the length of the reed chambers, change the pitch of the notes produced. Harmonicas come in various keys, allowing players to perform in different musical scales and genres.

Our harmonicas are different, of course! How do you think the vibrations produced by blowing air through the harmonica create sound? Can you describe what happened to the air inside the harmonica when you blow into it? Is the rubberband vibrating?

What role do you think the straws play in changing the sound vibrations in the harmonica? What happens when you change the straws by pushing them in and out?



EXTENSION

Divide students into small groups, ensuring that each group has at least one harmonica player. If necessary, provide additional harmonicas for students who may not have participated in the initial activity.

Challenge each group to work together to create a short musical composition using their harmonicas. They can experiment with different rhythms, melodies, and harmonies to craft an original piece of music.



Exit Ticket



Ask each student the following questions as they walk out the door.

- Q: How does a harmonica work?
 - A: When you blow into a harmonica, the air vibrates the reeds inside, causing a buzzing noise!
- Q: How are music and colors related?
 - Different kinds of music reminds our brains of different colors! High sounds feel light and bright, like yellow or sky blue, while low sounds feel deep and dark—like purple or navy blue. Songs that are fast and happy might remind you of red, orange, or bright green. Songs that are slow and calm might feel like soft pink, blue, or gray.

