Project Exploration creates transformative learning opportunities for youth underrepresented in the sciences --particularly students of color and girls -- by equipping them with the skills, practices, and mindset needed for a lifelong pursuit of learning. STEM@Home makes activities around science, technology, engineering, and math accessible and fun to do at home. This STEMbook activity, resources, and more are available at www.projectexploration.org/stemathome.

In this activity, you will:

Explore the science of sound, measure lengths of material for different pitch, learn how music affects our mood and make your own pan flute.

Supplies Required:

- 8 plastic straws
- Cardboard or cardstock
- Tape
- Scissors
- Ruler
- Pen or Pencil
- Stickers/Markers/Decorating materials

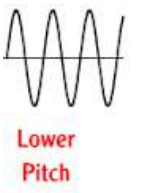
Video

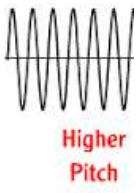
Listen to Meet the Orchestra and follow along as it's read to you: https://tinyurl.com/yd4hmgm2

Learn how to make your own pan flute: https://tinyurl.com/ybkhqy4h

Overview

Sound is all around us. Sound is made of waves or vibrations that we can hear. These sound waves are formed by objects vibrating or shaking back and forth. Sound waves travel through air, water and solid objects as vibrations. The sound travels from the ear to the brain in the form of waves. In the story you learned about different types of orchestral instruments and the sounds they make. In wind instruments, like the flute and trumpet, vibrating air makes the sound. The air particles move back and forth creating sound waves. Blowing across a flute blow hole sets up Slinky-like waves in the tube. In the clarinet, a vibrating reed (a thin piece of wood set in the mouthpiece) gets the waves started. Different pitches are played by pressing keys that open or close holes in the tube making the air column inside the tube longer or shorter. Longer air columns produce lower pitches. Stringed instruments are played by pressing the fingers down on the strings. This pressure changes the strings' length, causing them to vibrate at different frequencies and making different sounds. Shortening a string makes it sound higher. Strings produce different sounds depending on their thickness.





Instructions

1. Watch the video as your guide, grab 5 straws and ruler
2. Your flute will be designed for notes **Do, Re, Mi, Fa, So, La, Ti, Do**
3. Ask for help with scissors if needed, and cut each straw one at a time into the following lengths:

   17.5 cm, 15.5cm , 13.5cm, 12.5cm, 11 cm, 10 cm, 9cm, 8.5 cm
4. Line up the straws as shown in the video, use ruler to make sure they're at equal level on one side
5. Cut 2 strips of cardstock/cardboard just about 7 to 7 1/2 inches x 1.5 inch wide, decorate if you have stickers or markers
6. Place a 7 inch strip of tape (making your own is easy if you don't have any) onto the inside of one piece of cardstock strip
7. Place the longest straw on the tape first, near the left edge
8. Continue to place the straws in order, with each straw getting shorter
9. Place the tape onto the other strip of cardstock and place it on top of your straws, press down firmly and test your flute
10. Rest the top of the straws on your lower lip and blow across them! You can also make sound blowing directly into the straws.

Additional Resources

Think About It! What happens when you change the angle of your breath going into the straws? As the straw/pipe gets shorter/smaller, the vibration of air blowing through the straw moves quicker which produces a higher frequency and higher pitch. What would produce a lower pitch? What do you think would happen if the straws/pipes are a different width or length knowing that a shorter and smaller straw produces a high note? What does it do to the sound? Listen to the story of *Peter and the Wolf*-- what did you think of the instruments representing the characters? Have you ever written your own music? What instruments do you like and why?

1. Learn more about the science of sound: https://tinyurl.com/y6vl98vm
2. Learn about sound waves with Ducksters: https://tinyurl.com/yc9fashw
3. Find our more about the parts of a flute: https://tinyurl.com/yaffda22
4. Listen to *Peter and the Wolf,* a story that is told using instruments: https://tinyurl.com/kuojzep

Share It Out

Take a video of yourself playing the flute and explain the science behind sound. Can you recreate your own *Peter and the Wolf* using a different story and assigning a note to each character? Share with your family and friends on social media using the hashtags:

#PanFluteReadAlong
#ProjectExploration
#StemAtHome

Share via PE's website: Students who complete STEM@home activities and share what they learned with the PE team via our website will earn points which can be traded in for cash prizes at the Explore Store. Your project number is 112. Learn more at www.projectexploration.org/explore-store

Join PE's character contest!
Design a STEM character who will lead kids through activities and be featured on our website and in our STEMbooks. Cash prizes will be awarded to the top 3 finalists. Learn more at: www.projectexploration.org/character-contest.

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