

Science Lab: Creating a Harmonica to Demonstrate Sound Production

Grade Level: 5th Grade

Objective: Students will explore how vibrations create sound by constructing a simple harmonica. They will investigate how changing components affect pitch and transmit sound energy through different media.

Materials Needed:

- 1 thick popsicle stick
- 1 thick rubber band
- 2 thin rubber bands
- 2 one-inch pieces of straws

Safety Considerations: Ensure students handle materials carefully, especially cutting straws and handling rubber bands to avoid snapping. Follow school policies on lab safety.

Procedure:

1. Prepare the Popsicle Stick:

- Stretch the thick rubber band lengthwise around the popsicle stick.

2. Insert Straw Pieces:

- Place one straw piece under the rubber band at one end of the popsicle stick.
- Place the second straw piece over the rubber band at the opposite end of the popsicle stick.

3. Secure the Rubber Bands:

- Use a thin rubber band to wrap around each end of the popsicle stick. This holds the straw pieces in place and keeps the thick rubber band tight.

4. Test Your Harmonica:

- Blow air through the gap between the popsicle stick and the rubber band. Observe the sound produced.

5. Experiment with Pitch:

- Adjust the position of the straws or change the tension of the rubber band to produce different pitches. Record your observations.

Reflection Questions:

1. What happens to the sound when you adjust the straws or rubber band tension?
2. How does the vibration of the rubber band create sound?
3. In what ways did the changes you made to the harmonica affect the sound produced?

Assessment:

- **Data Collection:** Students should document the pitch changes observed with each adjustment.
- **Discussion:** Facilitate a group discussion on how sound is transmitted through the popsicle stick and into the air.
- **Written Report:** Have students write a brief report on their findings, including how different materials and adjustments affected sound production and transmission.

Standards Addressed:

- **5.5 a:** Explain how sounds are formed.
- **5.5 b:** Collaborative investigation of sound production via vibrating materials.
- **5.5 c:** Compare sound traveling through solid (popsicle stick) and air.
- **5.5 d:** Design and construct a simple instrument that produces different pitches; communicate results.

Extensions:

- Analyze how different musical instruments produce sound and apply this understanding to enhance the harmonica design.
- Investigate the use of sound in the home and community, such as doorbells and musical instruments.

Note for Educators: Review all safety procedures and ensure students understand the lab's objectives and methods before starting. Adjust materials and instructions as needed to fit your classroom environment.