



5. Make It Louder!

BUILD KNOWLEDGE

INTRODUCTION

What Students Do in this Activity

In this activity, students examine the example instrument to see the different types of materials used to construct the bodies. They experiment with different materials to see how they affect the volume of the sound produced by a tuning fork.

Objectives

Students will:

- Explore how different materials conduct sound
- Explore the notion of a fair test

Time

60–80 minutes

Materials

for the teacher:

- Slinky
- Styrofoam cup
- chart paper
- markers

for the class:

- “*Sleeping Soundly at Beaver’s Inn*” book

for each team:

- a tuning fork
- 1 tuning fork mallet
- digital sound level meter
- 3 blocks (plastic cubes, Styrofoam and wood)

for each student:

- Page 9 in their science journal

A-Ha

The larger the volume that vibrates, the louder the sound produced. Some materials vibrate better than others, providing better amplification.



You may want to mark an “X” on the center of each block prior to lesson to save time (see Master 9).

Preparation for the Activity

Have the book and the example musical instruments available for students to consult, as needed.

CLASSROOM ACTIVITY

Presenting the Activity

1. Review with students what they found out about strings from the last lesson.
2. Hold up a Slinky. Allow the end of the Slinky to fall to the floor and shake the Slinky up and down (causing longitudinal waves).

Ask students, "What do you hear when I move the Slinky?"

3. Place the Styrofoam cup in the top coils of the Slinky and again shake the Slinky up and down.

Again, ask students, "What do you hear when I move the Slinky?"

Students should note a marked difference in the volume of the sound.

4. Discuss why students think the sound might be louder when the Styrofoam cup is used.

- Make sure that students recognize that the Slinky makes the sound whether or not the cup is used. It may be necessary for you to allow individual students to stand near the Slinky to hear the sound without the cup.
- Remind students that a sound is produced by something vibrating. Explain that the cup helps to amplify the sound because it is a large surface that holds air in it.



5. Show students some of the instruments used in prior lessons. Ask students, "What part of the instruments you explored is like the cup?"

Students should recognize that the bodies of the instruments are similar to the cup and help to amplify the sounds made.

6. Point out to students that the Slinky has to touch the cup to provide the amplification, just like the strings or keys have to touch the sound box (or be connected to it by a bridge).

This will be very important when students are creating their own instruments.

Facilitating Student Exploration

7. Begin the exploration by having students break into their teams and give each team an area in which to work. Pass out the cubes of materials, tuning forks, tuning fork mallets, and digital sound level meters to each team.

Explain that they will be exploring which materials produce the best amplification.

8. Have student turn to page 9 in their science journals.

Read the instructions aloud to students. Teams will strike the tuning forks and place them atop the different materials samples, and then measure the sound level produced using the digital sound level meter.

Remind students to be careful to follow the instructions precisely and to conduct multiple trials.

Making It Louder



My name: _____

You're going to explore which materials seem to produce the best amplification for a musical instrument.

Materials

- *3 material cubes(plastic, wood and styrofoam)*
- *1 tuning fork*
- *1 tuning fork mallet*
- *1 digital sound level meter*



Procedure

- 1. Draw an X as close to the center of each cube top as you can.*
- 2. Choose one team member to be the tuning fork holder and another to be the sound meter holder.*
- 3. Turn on the digital sound meter.*
- 4. Strike your tuning fork with a rubber mallet and hold the end of it on the X on one of the cubes.*
- 5. Have one team member hold the sound meter and push the MAX button on the meter. Hold it about 3 cm away from the cube and tuning fork. Record the reading in the table.*
- 6. Repeat three times with each cube.*
- 7. Record your results.*

Sound Level Reading			
	<i>Trials</i>		
<i>Material</i>	<i>1</i>	<i>2</i>	<i>3</i>

Which material amplifies the tuning fork the best?
