

Explore

Activity 1

Materials

For each student

- science notebook
- pencil

For student groups

- 20 toothpicks
- 9" x 13" aluminum pan (optional)
- tape (optional)

Content Builder

Students should come to understand that sound is made when something moves or vibrates. During the Explore activity, monitor student conversations but refrain from telling them about sound and sound waves.

Teacher Note

Students can work in small groups at several tables. Any small material, such as centimeter cubes or paper clips, can be substituted for the toothpicks. If you have heavy, sturdy tables in your lab or classroom, it may be difficult to observe the effects of tapping on the tables. As an option, you can place a 9" x 13" aluminum pan upside down on each table. Tape each pan in place and put the toothpicks on top of them.

Teacher Instruction

- Place 20 toothpicks in the middle of each table.
- Ask the following: What do you observe? What do you hear? What do you see?
- Instruct students to draw a picture of the setup and record their observations in their science notebooks. Remind students to include illustrations and labels.
- Instruct students to lightly tap the edge of their table with their fingertips.
- Ask the following: What do you observe? What do you hear? What do you see?
- Instruct students to tap the edge of their table with their hands. Students should begin softly and gradually to increase intensity.
- Ask the following: What do you observe? What do you hear? What do you see?
- Instruct students to record in their science notebooks their observations.

Energy

Facilitation Questions

- What happened when you lightly tapped the table with your fingertips? *My fingertips hit the table and made a soft sound.*
- What happened when you tapped the edge of the table with your hands and increased intensity? *The sound was louder than when I used my fingertips, and the table vibrated, which caused the toothpicks to move. The harder I tapped the table, the louder the sound and the more the toothpicks moved.*
- What happened when you stopped tapping the table? *The toothpicks stopped moving and the sound stopped.*
- How does the motion of the toothpicks compare to the amount of sound? *The more sound we created, the more the toothpicks moved.*

Activity 2

Teacher Note

You will need a variety of light sources ranging in intensity to illustrate the concept of this activity. Tap lights can be purchased from home improvement stores. The materials listed will provide the variety but are suggested items only.

Because students will be using different light sources, you may want to remind students of appropriate ways to use the materials. Students should be advised to refrain from shining any of the lights into each other's eyes.

Advance Preparation

- Gather three dark-colored file folders and packaging tape to create one file folder tent.
- Open two file folders and lay them side by side so that two sides overlap. The distance between the fold of each file folder should be slightly wider than the width of a file folder. Tape the folders together, as shown in Figure 1.

Materials

For teacher

- Materials for file folder tents:
 - 3 dark-colored, letter-size file folders
 - packaging tape
 - 1 sheet of white paper

For each student

- science notebook
- pencil

For student groups

- flashlight, focused source suggested
- glow stick
- tap light
- pen light
- file folder tent
- small object, such as a plastic animal figure