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

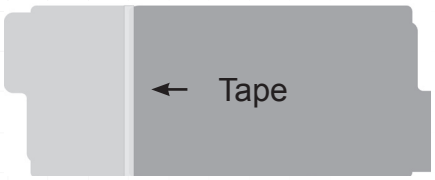
- science notebook
- pencil

For student groups

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

Energy

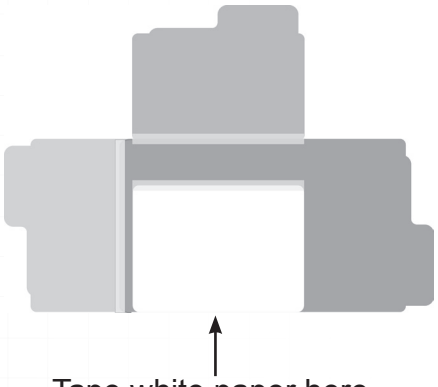
Figure 1.



Width of a file folder

- Open the third folder and lay it vertically across the two taped-together folders. Center the taped folders over the bottom half of the third folder, as shown in Figure 2.
- Tape the folders in place (front and back), making sure that when they stand, the top flap allows no light to filter into the work space, as shown in Figure 3. Tape a sheet of white paper on the area where the two folders overlap, as shown in Figure 2.

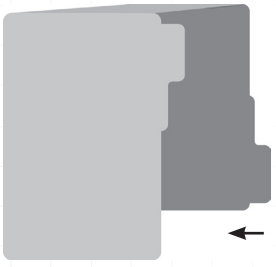
Figure 2.



Tape white paper here.

- To use the tent, stand the folder up so that it makes a U-shape, with the third folder providing a cover over the work space, as shown in Figure 3.

Figure 3.



Work area

Energy

Teacher Instruction

- Place the light sources on each table.
- Leave the lights on, and instruct students to explore each light source.
- Instruct students to point each light source at several objects in the classroom and share observations with their group.
- Ask the following: Which light source is brighter? Which light source helped you see the objects around the room more clearly? Did any of the objects appear to change when the light shined on them?
- Allow time for student discussion.
- Instruct students to turn on their flashlights.
- Turn the classroom lights off, and instruct students to explore each light source.
- Instruct students to point each light source at several objects in the classroom and share observations with their group.
- Ask the following: Which light source is brighter? Which light source helped you see the objects around the room more clearly? Did any of the objects appear to change when the light was shined on them?
- Allow time for student discussion.

Facilitation Questions

- How are the light sources different? *Some of the light sources are bright and some are dim. Some shine more brightly than others.*
- How did the amount of light in the room affect how you used each light source? *It was difficult to observe the light from each light source when the light was on in the room. When the light in the room decreased, it was easier to observe the light from each light source.*
- Which light source is the brightest? *Answers will vary depending on the light sources used.*

Energy

Teacher Instruction

- Pass a file folder tent and an object to each group of students.
- Instruct students to place the object inside the file folder tent and to make observations as they shine each light source on the object one at a time.
- Instruct students to sequence the light sources from brightest to dimmest and record the sequence in their science notebooks.

Facilitation Questions

- How does the object appear when the amount of light changes? *The object appears to change color depending on the amount of light.*
- Which light source helped you see the most details? *The brightest light helped me see more details than the dimmer lights.*
- Which light source is the brightest? Which light source is the dimmest? *Answers will vary depending on the brightness of each light source used.*
- How did the position of the light and object affect how well you could see? *Accept all reasonable answers.*
- What happened to the shadow when you moved the light closer? Farther? *The size of the shadow changes as the light is moved.*
- Which light creates the best shadow? Why? *Answers will vary depending on the brightness of each light source used. A brighter light creates a darker shadow.*
- What are other sources of light energy? *Answers may include the Sun, a lamp, an overhead light, and a night-light.*
- How is light energy important in your life? *Answers will vary but should include the following: I need light energy to help me see in the dark, to see things more clearly, and to be safe, such as knowing when to stop at an intersection.*
- Do you need to have electricity to have light energy? *No, the Sun does not have electricity and neither does a glow stick or a candle.*
- What would your life be like without light energy? *Accept all reasonable answers.*