

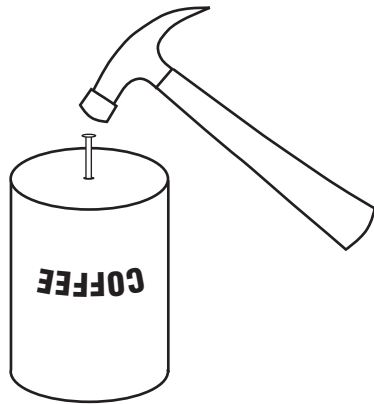
CHAPTER
7

Project
Close Encounters

Activity 1: Making a Pinhole Camera *Use after Lesson 7-2*

Like an ordinary camera, a *pinhole camera* collects light and produces an image. However, a pinhole camera doesn't require film. Instead, the image is projected onto a screen. Follow these instructions to make your own pinhole camera.

1. Place an empty coffee can on a table so that the metal end of the can is facing up. Use a hammer and nail to make a hole in the center of the can.
2. Tape a piece of cardboard over the hole. Then use a pin to make a small hole in the cardboard through the nail hole. (*Hint:* For best results, make the pinhole as small and as round as possible.)



3. Turn over the can. Cut out a piece of waxed paper that is large enough to fit over the opening of the can. Use a rubber band to hold it in place.
4. Now you are ready to use your pinhole camera. Point the pinhole toward a strong source of light, like a lightbulb. The pinhole camera will work best if the pinhole is about 2 feet from the lightbulb. You should see an image of the lightbulb projected onto the waxed paper.



5. What do you notice about the size and shape of the projected lightbulb as compared to the size and shape of the actual lightbulb?

6. What do you notice about the orientation of the projected lightbulb as compared to that of the actual lightbulb?

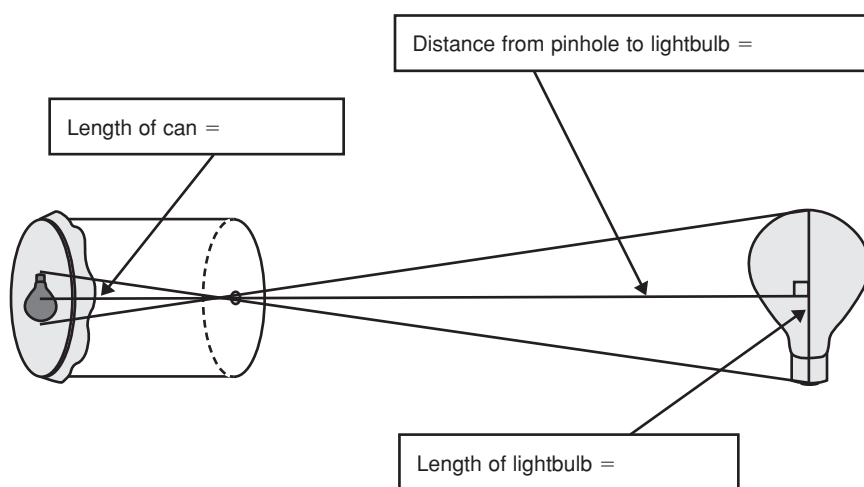
CHAPTER **Project**
7 **Close Encounters**

Activity 2: Understanding the Pinhole Camera *Use after Lesson 7-3*

How does a pinhole camera produce an image? Why is the image smaller than the actual object? Why is the image upside down? You can use the mathematics of similar triangles to answer these questions.

Work with a partner for this activity.

1. Use your pinhole camera to view a strong source of light, such as a lightbulb. The image on the waxed paper is produced by light traveling through the pinhole, as shown in the figure.



2. As you view the image, have your partner use a meterstick or tape measure to measure the distance from the pinhole to the lightbulb. Record this distance in the space provided in the figure. Also, measure the length of the coffee can and the length of the lightbulb, and record these in the figure.
3. Use similar triangles to calculate the length of the image of the lightbulb on the waxed paper. Record the length below.

4. Is the length you calculated close to the true length of the image? Find out by viewing the lightbulb from the same position as before and measuring the length of the image on the waxed paper.