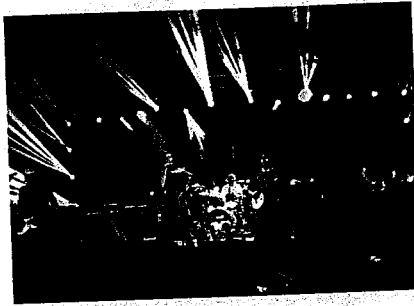


The ray model of light explains that light travels in straight lines.

## Activity

### Evidence That Light Travels in Straight Lines

The photo demonstrates that light travels in straight lines. Consider your own experiences with light. What evidence have you seen that light travels in straight lines? How could you demonstrate that it does?



Fernie-based band Shred Kelly in concert.

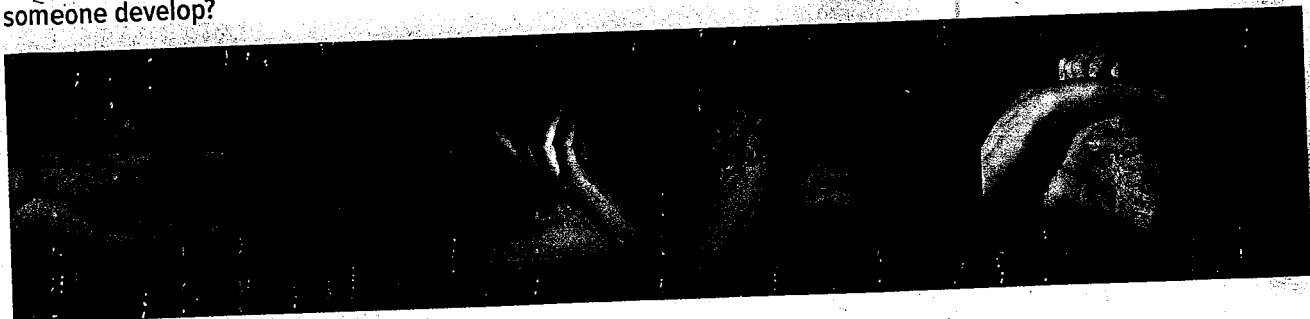


It has taken thousands of years for people all over the world to develop an understanding of light. For example, more than 2000 years ago, a Greek mathematician named Euclid suggested that light travels in straight lines. You can use this idea to understand how shadows like those in **Figure 3.8** form.

## Understanding the Ray Model of Light

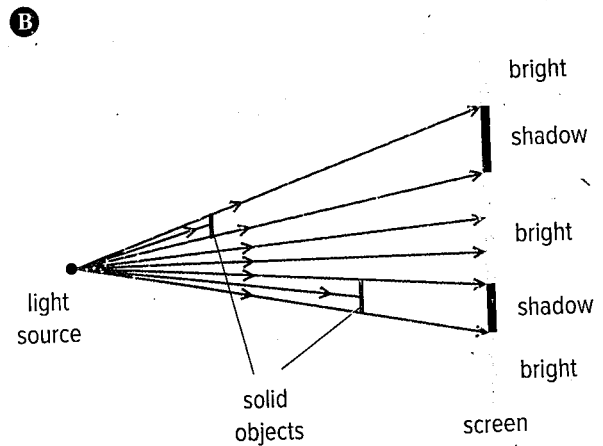
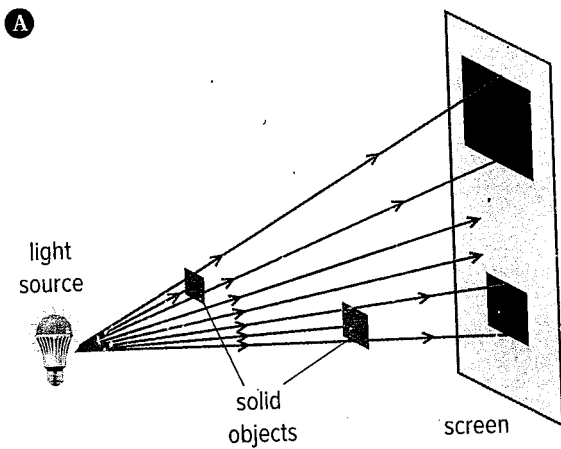
Look at **Figure 3.8** again. In each photo, light from the light source cannot bend around the person's hands. The hands block the light and cast a sharp-edged shadow on the wall. This tells you that light must travel in straight lines. This idea is now referred to as the **ray model of light**. A *ray* is an arrow that is used to show the direction of the straight-line path of light.

**Figure 3.8** Hand shadow games like this were used by many First Peoples, not only for play, but also to develop various kinds of skills of benefit to the community. **What kinds of skills could hand shadow games help someone develop?**



**Connect to Investigation**  
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**ray model of light** the idea that light travels in straight lines.



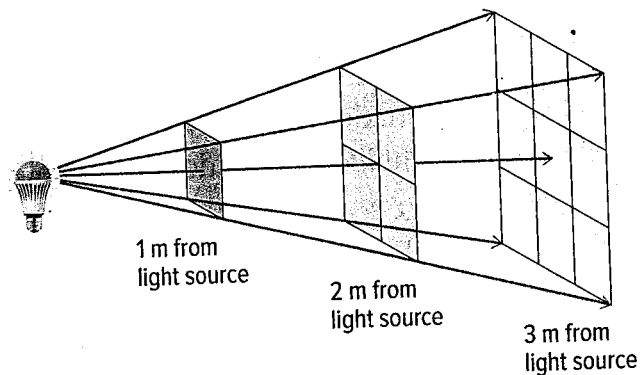
**Figure 3.9** **A** You can use ray diagrams to predict the location, size, and shape of shadows. Notice that the distance between an object and the light source affects the size of its shadow. **B** Ray diagrams are easier to draw if you view the object from the side. The light source can also be represented as a dot.

### Using Ray Diagrams to Model Visible Light

Diagrams that involve rays are called *ray diagrams*. Ray diagrams are used to study and predict how light behaves. **Figure 3.9** shows how rays can be used to predict the location, size, and shape of shadows. The source of light is a small light bulb. It sends out rays in every direction. However, with a ray diagram, only a few of the rays travelling toward the objects need to be drawn.

Did you notice that the rays spread out in **Figure 3.9**? Light rays spread out as they travel from a light source. Because the rays spread out, light also gets dimmer as it travels. This effect is shown in **Figure 3.10**.

**Figure 3.10** Light rays spread out from a source and dim with distance. At 2 m from the light source, the light is  $\frac{1}{4}$  as bright as it was at 1 m from the source. At 3 m, it is  $\frac{1}{9}$  as bright.



#### Before you leave this page . . .

1. Like visible light, microwaves spread out from a source. How might this affect cell phone use?
2. In **Figure 3.9**, why does the smaller object cast the bigger shadow?