

# Collecting and Organizing Data



Model with mathematics.

**MATERIALS** • metric ruler

**QUESTION** How can you make a prediction using a line of fit?

**EXPLORE** Make a prediction using a line of fit

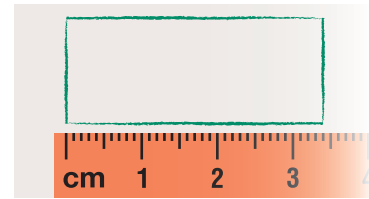
A student in your class draws a rectangle with a short side that is 4 centimeters in length. Predict the length of the long side of the rectangle.

**STEP 1** Collect data

Ask each of 10 people to draw a rectangle. Do not let anyone drawing a rectangle see a rectangle drawn by someone else.

**STEP 2** Organize data

Measure the lengths (in centimeters) of the short and long sides of the rectangles you collected. Create a table like the one shown.



Short side (cm)	2.7	2.7	1.8	2.6	1.4	1.5	1.2	0.8	3.8
Long side (cm)	4.4	6.5	3.4	6	3.4	3	2.8	1.6	6.5

**STEP 3** Graph data

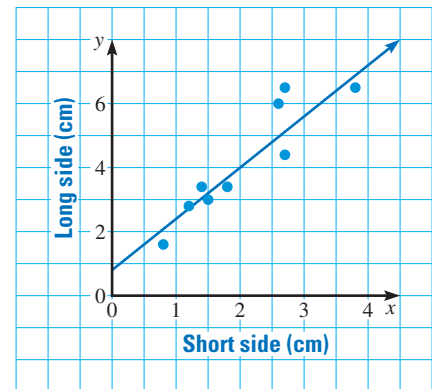
Make a scatter plot of the data where each point represents a rectangle that you collected. Let  $x$  represent the length of the short side of the rectangle, and let  $y$  represent the length of the long side.

**STEP 4** Model data

Draw a line of fit.

**STEP 5** Predict

Use the line of fit to find the length of the long side that corresponds to a short side with a length of 4 centimeters. In this case, the long side length predicted by the line of fit has a length of about 7 centimeters.



**DRAW CONCLUSIONS** Use your observations to complete these exercises

- COMPARE** What is the slope of your line of fit? How does this slope compare with the slope of the line shown above?
- PREDICT** Suppose a student in your class draws a rectangle that has a long side with a length of 5 centimeters. Predict the length of the shorter side. *Explain* how you made your prediction.
- EXTEND** The *golden ratio* appears frequently in architectural structures, paintings, sculptures, and even in nature. This ratio of the long side of a rectangle to its short side is approximately 1.618. How does this ratio compare with the slopes of the lines you compared in Exercise 1?