► ACTIVITY 4.4

Developing Concepts

GROUP ACTIVITY
Work with a partner.

MATERIALS
- several books
- two metric rulers

Investigating Slope

► **QUESTION** **How can you use numbers to describe the steepness of a ramp?**

The *slope* of a ramp describes its steepness. For the ramp at the right:

$$\text{slope} = \frac{\text{rise}}{\text{run}} = \frac{2 \text{ m}}{5 \text{ m}} = \frac{2}{5}$$

rise 2 m
run 5 m
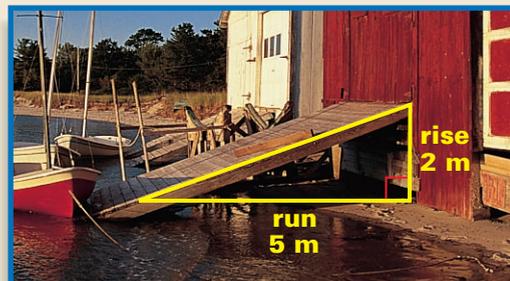
Height of books	Distance between ruler and books	Rise	Run	Slope
7 cm	12 cm	7	12	$\frac{7}{12}$
11 cm	5.5 cm	?	?	?

► **EXPLORING THE CONCEPT**

1 Copy and complete the table at the left.

2 Make a pile of three books. Measure the height of the pile of books. Use one ruler to create a ramp. Measure the distance from the bottom of the ruler to the books. Use this information to add a row to your table.

3 Without changing the rise, create at least four ramps that have different runs. Record information about these ramps in your table.

4 Place a piece of paper under the edge of your pile of books and make a mark on it that is 15 cm away from the books. Place the end of your ramp on the mark. Add this ramp to your table.

5 Change the rise by adding or removing books. Without changing the run, create at least four ramps that have different rises. Add them to your table.

► **DRAWING CONCLUSIONS**

In Exercises 1 and 2, give examples to support your answer.

1. If the run of a ramp increases and the rise stays the same, how does the slope of the ramp change?

2. If the rise of a ramp increases and the run stays the same, how does the slope of the ramp change?

In Exercises 3–5, you will summarize what you have learned about slope.

3. If a ramp has a slope of 1, what is the relationship between its rise and run?

4. If a ramp has a slope greater than 1, is it steeper than a ramp with a slope of 1? Describe the relationship between its rise and run.

5. If a ramp has a slope less than 1, is it steeper than a ramp with a slope of 1? Describe the relationship between its rise and run.