

**CHAPTER**  
**9** **Project**  
**Measures Up**

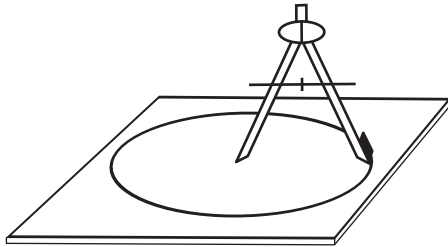
**Activity 1: Making a Trundle Wheel** *Use after Lesson 9-2*

A *trundle wheel* is a tool for measuring long distances. As the wheel rolls along the ground, each complete rotation represents a known length.

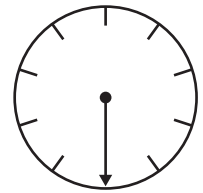
Follow these directions to make a trundle wheel that measures one meter with each rotation.

1. The circumference of the wheel will be exactly 1 meter or 100 centimeters. To the nearest tenth of a centimeter, what will be the radius of the wheel?

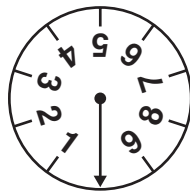
2. Open a compass to the length you calculated in Step 1. Then use this setting to draw a circle on a piece of corrugated cardboard. Cut out the circle.



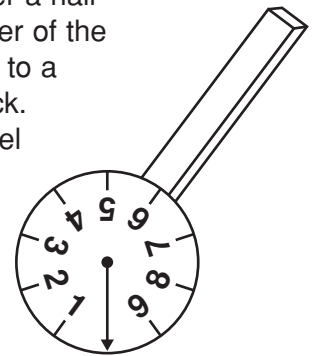
3. Draw an arrow that is a radius of the circle, as shown. Then cut out a piece of string that is 10 cm long and place it against the edge of the circle. Make marks every 10 cm around the circumference.



4. Number the marks as shown. The numbers indicate tenths of a meter around the circumference.

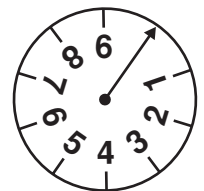


5. Carefully hammer a nail through the center of the circle to attach it to a long wooden stick. Be sure the wheel rotates freely.



6. Try using your trundle wheel to measure a distance along the ground. When you begin, the arrow should point straight down. As you walk forward, watch the arrow and count the number of complete rotations the wheel makes. Each rotation corresponds to a distance of 1 meter.

7. Suppose you measure the length of a room with the trundle wheel. The wheel makes 5 complete rotations and ends up in the position shown. What is the length of the room?



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**Activity 2: Finding a Perimeter and Area** *Use after Lesson 9-3*

In this activity you will use your trundle wheel to help you find the perimeter and area of a plot of land.

1. Choose a plot of land near your school that is a composite figure. You might choose a lawn, a parking lot, or a courtyard. Sketch its shape below.

2. Use your trundle wheel to measure the dimensions of the plot to the nearest tenth of a meter. Be sure to measure all the dimensions you will need in order to calculate the perimeter and area of the plot. Record the dimensions in your sketch.
3. What is the perimeter of the plot? \_\_\_\_\_
4. What is the area of the plot? \_\_\_\_\_
5. The degree of accuracy of any measurement depends on the *precision* of the measurement tool. When you use the trundle wheel you must round lengths to the nearest tenth of a meter. This means the true value of each measurement could be as much as 0.05 m (or 5 cm) greater than or less than the measured value. You can say that your measurements are *accurate to within*  $\pm 0.05$  m. Suppose you made a more precise trundle wheel with marks every centimeter instead of every 10 centimeters. What degree of accuracy could you achieve in this case?  
  
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6. Explain how the accuracy of your measurements might have affected the perimeter and area that you calculated.