

Determining Perimeter

Strand:	Measurement and Geometry
Topic:	Measuring distance to determine perimeter
Primary SOL:	3.8 The student will estimate and a) measure the distance around a polygon in order to determine perimeter using U.S. Customary and metric units
Related SOL:	3.7a, 3.8b

Materials

- Foam board or other thick material
- Polygon cutouts (one per student)
- Scissors
- String
- Inch and/or centimeter rulers

Vocabulary

centimeter, distance, estimate, inch, measure, perimeter, polygon, ruler

Student/Teacher Actions: What should students be doing? What should teachers be doing?

Note: Before undertaking this activity, cut out various polygons from foam board or other thick material. Size the polygons so that their perimeters are slightly less than 12 inches with no more than six sides.

1. Demonstrate measuring the distance around a polygon by wrapping a piece of string around a polygon cut from foam board. Once the length of string needed to go around the polygon has been determined, model measuring the length in centimeters or inches on a ruler in order to determine the polygon's perimeter.
2. Distribute a polygon cutout to each student. Ask students to estimate the lengths of sides on their polygon in inches or centimeters. Have students record their estimates.
3. Next, have students wrap a piece of string around the outside of their polygon and cut it to the length that matches the distance around the edge of the polygon. (It may be a good idea to cut several pieces of string for each student that are approximately 12 inches in length before the lesson.)
4. Distribute rulers. Have students use their rulers to measure the exact length of the string in inches or centimeters and record the measurement with the correct unit of measure. Emphasize that these lengths are the perimeter of the polygon. How close was their estimate to the actual measurement?
5. Have students swap polygons with another student and repeat steps 2 and 3.

Assessment

- **Questions**
 - What are the benefits to using string to measure the distance around a polygon?

- How could you complete the same activity using only a ruler?
- **Journal/writing prompts**
 - Identify examples of shapes found in everyday life for which you might want/need to measure their perimeters. Explain why knowing how to do this is important.
 - Identify a profession in which workers must know how to accurately determine the perimeter of a shape. Discuss why it is important for the workers to accurately determine perimeter and some of the consequences that would happen if they could not do this.
- **Other Assessments**
 - Have students draw their own polygons and exchange them with classmates to estimate and measure their perimeters.
 - Have students estimate and measure the perimeters of some shapes found in the classroom and around the school.

Extensions and Connections (for all students)

- Display two or three large U.S. maps of different scales. Divide students into small groups of three or four, and assign each group a state. (*Note: The more regularly shaped states will work best.*) Have each group use string to measure the perimeter of the assigned state on each map. Then, have students in each group compare their various perimeter measurements of the same state, discussing why they are so different. Use their findings to lead into a class discussion of map scale—how it plays a vital role in map design and why it is important to pay close attention to the scale of a map.
- Give students graph paper and have them design a fence that has a perimeter of 20 units. Can they make more than one design using 20 units?

Strategies for Differentiation

- Provide students with cloth measuring tapes, instead of string, to use for wrapping.
- Provide students with string cut to the exact length of the perimeter of each polygon.
- Provide students with a variety of rulers to use.
- Provide students with one-inch or two-inch paper clips instead of sting.
- Provide students with polygons that have more than six sides and have them estimate and find the perimeter.
- Create a paper ruler using a 1" x 12" strip of construction paper and two colors of 1" x 1" squares. Each student will need one strip, six squares of one color, and six squares of another color. Create an AB pattern with the color squares on the strip and glue them on. Label each square with the corresponding number to represent the 12 inches on the ruler. Use the measuring tool to find the length of each side of the polygon.

Note: The following pages are intended for classroom use for students as a visual aid to learning.