WHAT'S THE PERIMETER?

GEOMETRY . MEASUREMENT

- Perimeter
- Comparing geometric shapes

Getting Ready

What You'll Need

Pattern Blocks, 6 each of red, green, yellow, and blue per pair

Pattern Block triangle paper, page 90 Scissors

Overhead Pattern Blocks (optional)

Overview

Children investigate the different perimeters of shapes that can be made using one set of six Pattern Blocks. In this activity, children have the opportunity to:

- determine the perimeters of various shapes
- build a variety of configurations using the same six shapes
- generalize about geometric shapes and their perimeters



The Activity

Introducing

- Review the concept of *perimeter* as the distance around a shape.
- Establish the length of one side of the green Pattern Block as one unit of perimeter.
- Have children compare the length of a side of the green triangle to the length of the sides of each of the other Pattern Blocks. Ask them to find the perimeter of each block.



- Now have children put two green triangles together so that they share a common side. Ask them to determine the perimeter of this new shape.
- Invite volunteers to share their results.

Teacher Talk

Where's the Mathematics?

As they explore with their Pattern Blocks and share their results with other groups, children come to realize that it is possible to make shapes having the same perimeter using different arrangements of the same blocks.



Perimeter = 13 units



Children also discover that the same perimeters can be obtained using different sets of blocks.



Perimeter = 13 units

Perimeter = 13 units

Examining their recordings, children can observe that the more closely they fit their blocks together—that is, the more sides the shapes share—the smaller the perimeter of their shape will be. Conversely, the more they stretch out their shapes, the greater the perimeter will be.



Perimeter = 13 units



Perimeter = 17 units

On Their Own

What are all the possible perimeters of shapes that can be made using a set of 6 Pattern Blocks?

- Working with a partner, choose a variety of 6 blocks. Place them together to form a shape so that each block shares at least 1 full unit of length with another block. A full unit of length is equal to a side of a green triangle.
- Make sure that the blocks in your shape do not surround any empty spaces.
- Color your shape on triangle paper. Then figure out and record its perimeter.
- Rearrange the same 6 blocks and repeat the process until you think you have found all the possible perimeters of shapes that can be made using these 6 blocks.
- Cut out all your shapes.
- Be ready to talk about your shapes and their perimeters.

The Bigger Picture

Thinking and Sharing

Ask one pair of partners to display their recordings and tell the perimeter of each of the shapes they made with their collection of blocks. If any other pairs used the same set of blocks, have them display their recordings also. If groups who have worked with the same blocks don't agree on what perimeters can be obtained, invite the entire class to work with those blocks to reach agreement. Post these shapes by perimeter from smallest to largest. Repeat this process until all pairs have posted and ordered their shapes.

Use prompts like these to promote class discussion:

- Did you get the same perimeter in more than one way with your blocks? Why is this possible?
- What are all the possible perimeters of shapes that can be made using your set of blocks? Do all sets of blocks have the same range of perimeters?
- Did some groups get the same perimeters using different blocks? How can you explain this?
- How would you describe the arrangements of blocks that have the smallest perimeter? the largest perimeter?
- How do the arrangements with the smallest perimeters differ from those with the largest perimeters?
- Why are fewer perimeters possible with some blocks than with others?

Extending the Activity

Give children a larger number of blocks, such as two yellow hexagons, three red trapezoids, three blue parallelograms, and two green triangles. Have children find and record all the different perimeters of shapes they can make and arrange them from smallest to largest. Ask children to explain how their earlier exploration helped them to make predictions about perimeters of shapes that could be made using these blocks.

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With some sets of six blocks, three or four different perimeters will be possible. With other sets, (for example, four green triangles and two blue parallelograms) only two different perimeters will be possible. Children may realize that the range of perimeters will vary, depending upon the blocks chosen and how these blocks can be fitted together.

Children may also discover that any set of blocks whose perimeters total an odd number will form shapes having only odd-numbered perimeters, and any set whose perimeters total an even number will form shapes having only even-numbered perimeters. They may also notice that it is possible to make shapes having perimeters of each of the odd (or even) numbers between the smallest and greatest perimeters they find. For example, the six blocks shown below have a total perimeter of 25 units and can be used to form shapes having perimeters 11 units, 13 units, and 15 units, respectively.





Perimeter = 11 units



Perimeter = 13 units

