

Lesson 9: Connecting Perimeter and Area

Getting Started

? Big Ideas

- How are perimeter and area related?

⊙ Skills

- Apply the area and perimeter formulas for rectangles in real world and mathematical problems
- Use area to determine perimeter and vice versa

✂ Materials

- ✓ fine point dry-erase markers (kit)
- ✓ laminated grid (kit)
- ✓ whiteboard (kit)

Introduction

Give your child the laminated grid and dry-erase markers, and ask him to draw three rectangles that have an area of 16 square centimeters. As needed, remind him that a square is a rectangle (though it's a special one). He should draw the following rectangles:

- 1 cm × 16 cm
- 2 cm × 8 cm
- 4 cm × 4 cm

Now, tell him to find the perimeter of each one. He should find the following perimeters:

- 1 cm × 16 cm = 34 cm
- 2 cm × 8 cm = 20 cm
- 4 cm × 4 cm = 16 cm

Ask, "How does the perimeter of the square compare to the other perimeters?" He should note that it's the smallest. Now, ask, "Do you think it's always true that a square has the smallest perimeter when compared with other rectangles with the same area?" Provide time for him to prove whether this is true by creating three or four rectangles, including a square, with an area of 36 and then finding their perimeters. He should find that the square does have the smallest perimeter.

Next, ask your child to create three different rectangles, including a square, that have a perimeter of 16 centimeters. Possible rectangles include:

- 4 cm × 4 cm
- 5 cm × 3 cm
- 6 cm × 2 cm
- 7 cm × 1 cm

Now, tell him to find the area of each rectangle. He should find the following areas:

- 4 cm × 4 cm = 16 square cm
- 5 cm × 3 cm = 15 square cm
- 6 cm × 2 cm = 12 square cm
- 7 cm × 1 cm = 7 square cm

Ask him what he notices about the areas of the rectangles. He should note that the square has the greatest area. Invite him

to test whether this is always true by creating rectangles having a perimeter of 12 centimeters. He should find that the square will have the greatest area when the perimeters are the same.

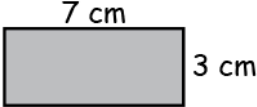
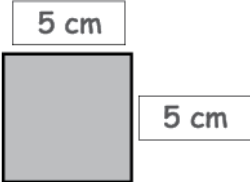

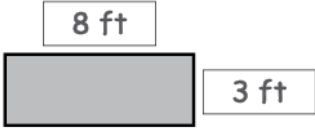
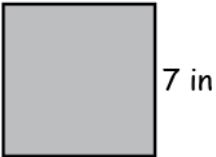

Explain that during this lesson, your child will be using what he knows about the relationship between perimeter and area to solve problems.

Activities

Activity 1: Applying Perimeter and Area to Solve Problems

Provide time for your child to work through the problems on the "Perimeter and Area Problem Solving" sheets. Make sure that he has access to scratch paper or the whiteboard and dry-erase markers.

"Perimeter and Area Problem Solving" Answer Key

| | | |
|----|---|--|
| 1) |  |  |
| 2) |  |  |
| 3) |  |  |

Activity 2: Playing With Perimeter and Area

Give your child the laminated grid and the "Playing With Perimeter and Area" page. For each problem, tell him to draw and label both rectangles on the grid and then record the answers on the activity page. The answer key gives typical responses, but some answers may vary.

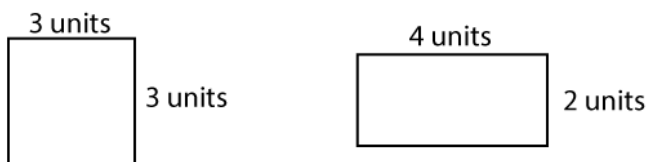
"Playing With Perimeter and Area" Answer Key

- Answers may vary -

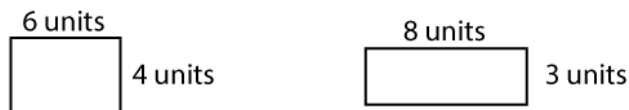
- 1) Draw a rectangle that has a length of 5 and a width of 2. Draw a different rectangle that has the same perimeter. What is the area of the rectangle you drew? 6 square units



- 2) Draw a square has an area of 9. Draw a rectangle that has the same perimeter as the square. What is the rectangle's area? 8 square units



- 3) Draw rectangle that has a length of 6 and an area of 24. Draw a different rectangle with the same area. What is its perimeter? 22 units



- 4) Draw a rectangle that has a length of 7 and a width of 4. Draw a different rectangle with the same area. What is its perimeter? 32 units



Wrapping Up

Provide time for your child to play the game at the following web link. This game requires problem solving and trial and error and will reinforce the relationship between perimeter and area.

While your child plays this game, check his work for this lesson, and be ready to address any mistakes.

Area Blocks

www.movingbeyondthepage.com/link/8216

https://www.mathplayground.com/area_blocks/index.htm

Perimeter and Area Problem Solving

Instructions: Fill in the missing side lengths. Be sure to include the correct unit of measure.

Example: These rectangles have the same perimeter. If the area of the rectangle on the right is 6 square inches, what are the lengths of its sides?



1. Find the perimeter of the rectangle on the left.
2. The area of the rectangle on the right is 6 square inches. Find the factors of 6 (sets of 2 numbers multiplied together to get 6)
3. Determine which set of numbers results in a perimeter of 14 in

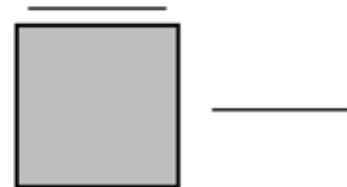
$$5+2+5+2=14 \text{ in}$$

$$2 \text{ and } 3; 1 \text{ and } 6$$

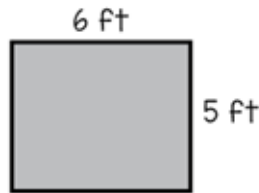
$$2+3+2+3 = 10 \text{ in } \times$$

$$1+6+1+6 = 14 \text{ in } \checkmark$$

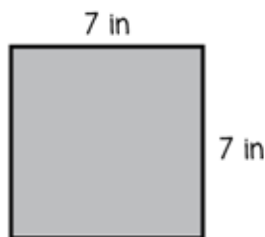
- 1) These rectangles have the same perimeter. If the area of the rectangle on the right is 25 square cm, what are the lengths of its sides?



- 2) These rectangles have the same perimeter. If the area of the rectangle on the right is 24 square feet, what are the lengths of its sides?



- 3) These rectangles have the same perimeter. If the area of the rectangle on the right is 40 square inches, what are the lengths of its sides?



Playing With Perimeter and Area

Instructions: For each problem, draw both shapes on your laminated grid and label them. Then answer the questions. Be sure to read each problem carefully!

1) Draw a rectangle that has a length of 5 and a width of 2. Draw a different rectangle that has the same perimeter. What is the area of the rectangle you drew?

_____ square units

2) Draw a square has an area of 9. Draw a rectangle that has the same perimeter as the square. What is the rectangle's area?

_____ square units

3) Draw rectangle that has a length of 6 and an area of 24. Draw a different rectangle with the same area. What is its perimeter?

_____ units

4) Draw a rectangle that has a length of 7 and a width of 4. Draw a different rectangle with the same area. What is its perimeter?

_____ units

