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**Unit 24 Standards**

(Student pages 145–150)

**Common Core Standards for Mathematics:** 3.MD.D.8**Domain** Measurement and Data**Cluster** Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures.**Standard** 3.MD.D.8

Solve real-world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, and exhibiting rectangles with the same perimeter and different areas or with the same area and different perimeters.

**Other Standards Addressed in this Unit**

3.MD.C.6, 3.MD.C.7

**Standards for Mathematical Practice Addressed in this Unit**

- MP.1 Make sense of problems and persevere in solving them.
- MP.4 Model with mathematics.
- MP.5 Use appropriate tools strategically.
- MP.6 Attend to precision.
- MP.7 Look for and make use of structure.

**Unpacking the Standards**

In grade 2, students investigated and used linear measures, estimating and measuring with inches, feet, centimeters, and meters. In grade 3, students understand perimeter as the distance around an object. Students may be expected to find perimeters by measuring and adding the side lengths or by finding the perimeter when given the side lengths. Students also find an unknown side length given the perimeters and other needed information. Students make observations about rectangles that have the same perimeters but different areas and also investigate rectangles that have the same areas but different perimeters.

**Unit 24**

Standard 3.MD.D.8

*Solve Problems with Perimeter*

**Getting Started**

**Introduction Activity**

Students work in groups of 4 using cotton string (not yarn), rulers, scissors, and a variety of polygons (e.g., polygonal shapes from attribute blocks, pattern blocks, foam cutouts). The teacher explains that the word “perimeter” means “the measure around.” To find the measure around, students wrap string around the perimeter of each shape and cut the string to match this length. Then, students straighten the string and measure its length with a ruler. The teacher emphasizes that this length is the perimeter, a linear measure. Students trace around each polygon on paper and label the perimeter value.

*(DOK 1, Bloom’s Level: Application/Apply)*

**Suggested Formative Assessment**

The teacher asks probing questions to determine students’ understanding of perimeter.

- *How can you find the perimeter of a rectangle?*
- *How is the perimeter of a figure different from the area of a figure?*
- *What is a general rule you can use for finding the perimeter of a figure?*
- *What are some examples of situations in real life when you might need to find the perimeter of something?*

The teacher notes student responses and understanding of perimeter and adjusts instruction accordingly.

*(DOK 2, Bloom’s Level: Analysis/Analyze)*

**Children’s Literature Connections**

*Perimeter and Area at the Amusement Park* – Dianne Irving

*Racing Around: Perimeter* – Stuart J. Murphy

*Sir Cumference and the Isle of Immeter* – Cindy Neuschwander

*Spaghetti and Meatballs for All!: A Mathematical Story* – Marilyn Burns

**Vocabulary Focus**

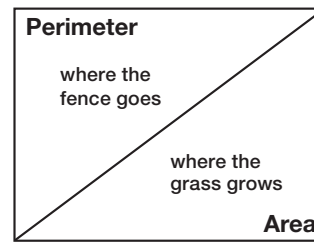
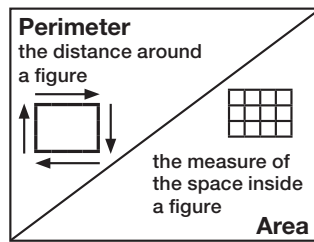
The following are essential vocabulary terms for this unit.

- |                |              |
|----------------|--------------|
| area           | perimeter    |
| attribute      | plane figure |
| length         | polygon      |
| linear measure | width        |

**Vocabulary Activity**

***Diagonal Definitions***

The teacher provides each student with a sheet of unlined paper. Students divide the paper by drawing a diagonal line as shown. Students write “perimeter” on the top half and “area” on the bottom half. Students use words, pictures, and numbers to show the meanings of the two words. Students share and display the posters.



*(DOK 2, Bloom’s Level: Application/Apply)*

**Suggested Formative Vocabulary Assessment**

The teacher evaluates evidence of learning as demonstrated by student responses. The teacher uses the evidence to clarify misconceptions and plan further vocabulary instruction or interventions.

*(DOK 2, Bloom’s Level: Application/Apply)*

**Unit 24**

Standard 3.MD.D.8

*Solve Problems with Perimeter*

**Suggested Instructional Activities**

1. Students work with partners to build polygonal shapes with square tiles and find the perimeters. Students record shapes by shading grid paper, labeling the side lengths, and writing equations to find the perimeters.

This activity can be varied by giving the students the length of one side of a rectangle and the perimeter of the rectangle. Students use tiles to build a rectangle that meets the criteria and to find the length of the unknown side.

*(DOK 2, Bloom's Level: Application/Apply)*

2. Working with partners, students use 12 square tiles to form rectangles using all 12 tiles. Students find the perimeters of the rectangles and record the structures by shading rectangles on inch grid paper, labeling each perimeter. Students then use an additional 12 tiles to see if they can build rectangles with dimensions different from the first rectangle. The process continues until all possible rectangles have been created and recorded. Students should be able to determine that the area of each rectangle is 12 square inches. Students then make a generalization about the perimeters. (When the areas of two rectangles are the same, the perimeters are not necessarily the same.) This activity is repeated with 24, 30, or 36 square tiles.

*(DOK 3, Bloom's Level: Analysis/Analyze)*

3. Students work with partners. The partners use square tiles to build two rectangles with different dimensions but the same perimeters. Students determine how the areas of the two rectangles compare. Students record their work by shading grid paper. Student pairs share results with the class.

*(DOK 2, Bloom's Level: Application/Apply)*

4. Students work in groups of 3 and find the perimeters of classroom items such as doors, windows, book covers, the top surface of desks, etc.

*(DOK 1, Bloom's Level: Comprehension/Understand)*

**Suggested Formative Assessment**

The teacher conducts a misconception check with the students. After the teacher reads each statement, students show a thumbs-up signal if the statement is true and a thumbs-down signal if the statement is false. The teacher adjusts instruction as needed based on the responses.

- *One way to find the perimeter of a figure is to add the lengths of all sides. (true)*
- *The perimeter is the distance around a two-dimensional figure. (true)*
- *The area is a measure in square units of the region inside a two-dimensional figure. (true)*
- *If two figures have the same perimeter, they must also have the same area. (false)*
- *If two figures have the same area, they must also have the same perimeter. (false)*

*(DOK 2, Bloom's Level: Analysis/Analyze)*

**Suggested Reflection/Closure Activity**

Students work with partners to complete the Motivation Station activity, "Pattern Block Perimeters," on page 150 of the student edition.

*(DOK 2, Bloom's Level: Application/Apply)*

**Suggested Formative Assessment**

Students summarize what they have learned about perimeter using a 3-2-1 prompt.

- 3 things I learned about perimeter . . .
- 2 things I find interesting . . .
- 1 question I still have . . .

The teacher reviews the responses and plans additional instruction or interventions as needed.

*(DOK 2, Bloom's Level: Application/Apply)*

**Interventions**

1. The teacher provides each student with a geoboard and rubber bands. Students use rubber bands to enclose the smallest possible square. The teacher defines the distance from one peg to the next as one unit and shows students how to find the perimeter of the square by counting the distance around the square. Students create larger rectangles and find the perimeters. Students record findings on dot paper.  
*(DOK 1, Bloom's Level: Comprehension/Understand)*
2. Student pairs work with Pattern Blocks®. Students measure the sides of each block in inches and find the perimeter. Students discuss findings with the group. As an extension, students build shapes composed of multiple Pattern Blocks and find the perimeters.  
*(DOK 1, Bloom's Level: Comprehension/Understand)*
3. Students work with partners. Each partner has a sheet of grid paper and a pencil. The teacher states a number such as 18. Each partner shades a rectangle comprised of 18 square units on his/her paper. The partners then find the perimeters of the rectangles. The partner with the greater perimeter receives one point. If the partners tie, both receive a point. The activity is repeated using different numbers. Play continues until one player reaches 5 points.  
*(DOK 2, Bloom's Level: Application/Apply)*

**Unit 24**

Standard 3.MD.D.8

*Solve Problems with Perimeter*

**Suggested Formative Assessment**

As students work with the Intervention activities, the teacher engages in one-on-one conversations with each student in the group to determine his/her level of understanding of the concept of perimeter. Based on the conversations, the teacher plans additional interventions as needed.

*(DOK 2, Bloom's Level: Analysis/Analyze)*

**Extending Student Thinking**

Students write an original acrostic poem for each of the words "Area" and "Perimeter." The acrostic should communicate the meanings of the respective words by incorporating critical attributes. When complete, students create illustrated posters showcasing the acrostics. Student posters are displayed in the classroom.

*(DOK 3, Bloom's Level: Synthesis/Create)*

**Skillful Thinking**

*Skillful Thinking = Deeper Learning through Revised Bloom's Taxonomy, Depth of Knowledge, and 9 Traits of Critical Thinking*

The 9 *Traits of Critical Thinking*<sup>™</sup> include *adapt, collaborate, communicate, create, examine, inquire, link, reflect, and strive*. These traits foster high-quality thinkers. On the Skillful Thinking page in each unit of the student edition, traits are selected and identified in each questioning prompt to reinforce student use of the traits in the context of mathematics. The labeling of the traits assists students in recognizing that the application of a focus trait is needed to complete the questioning prompt. The educator should note that each questioning prompt in the student edition is not limited to the identified trait since multiple critical thinking traits may be utilized by the student to successfully respond to the prompt.



**Examine** – I use a variety of methods to explore and to analyze.

- ✓ Engagement Indicator – Students use analytical skills to make inferences, interpret data, integrate or organize ideas, and make connections.
- ✓ Strategy to Facilitate the **Examine** Trait – Challenge students to organize information to deepen insight by discovering patterns, trends, and connections to form conclusions.



**Reflect** – I review my thoughts and experiences to guide my actions.

- ✓ Engagement Indicator – Students show continuous learning during and beyond the task.
- ✓ Strategy to Facilitate the **Reflect** Trait – Observe students to ensure they routinely monitor strategies and behaviors used to make decisions and solve problems.



Solve Problems with Perimeter

Unit 24  
Standard 3.MD.D.8

**Answer Key and Codings**

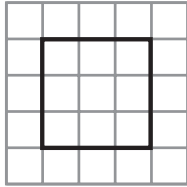
Page	Question	Answer	DOK Level	Bloom's Original/Revised
145	1	12 units	1	Comprehension/Understand
	2	$26 - 10 = 16$ ; $16 \div 2 = 8$ cm	1	Application/Apply
	3	42 ft	1	Application/Apply
	4	$4 + 8 + 5 + 11 = 28$ cm	2	Application/Apply
	5	Box 1 and Box 2 each have a perimeter of 36 units. Box 2 has the greater area.	2	Application/Apply
146	1	A	1	Comprehension/Understand
	2	A – False B – True C – False D – False E – False	2	Application/Apply
	3	D	2	Application/Apply
	4	B	1	Application/Apply
	5	D	2	Application/Apply
147	1	C	2	Application/Apply
	2	A, B, C, and E	2	Analysis/Analyze
	3	B	1	Application/Apply
	4	B	2	Application/Apply
	5	A	1	Application/Apply
148	1	C	1	Application/Apply
	2	B	2	Application/Apply
	3	D	2	Analysis/Analyze
	4	C	2	Application/Apply
	5	$6 + 6 + 8 + 8 = 28$ cm; $38 - 28 = 10$ $10 \div 2 = 5$ cm for each missing side length	1	Analysis/Analyze
149	1	42 feet Answers may vary.	2	Analysis/Analyze
	2	Answers may vary. Students may explain that figures with the same perimeters may have different areas.	3	Analysis/Analyze
	Journal	Answers may vary.	2	Application/Apply
150	Motivation Station	Results may vary.	2	Application/Apply

Name \_\_\_\_\_

Standard 3.MD.D.8

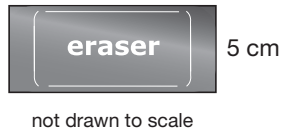
**Unit 24** Introduction 

1. What is the perimeter of the figure outlined on this grid?



Answer: \_\_\_\_\_

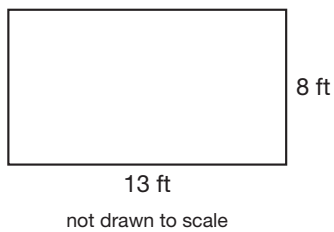
2. The perimeter of this eraser is 26 centimeters.



What is the length of the eraser? Show your work.

Answer: \_\_\_\_\_

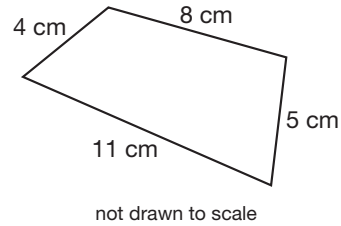
3. Mr. Trevino draws this diagram of his garden.



How many feet of fencing does Mr. Trevino need to fence his garden?

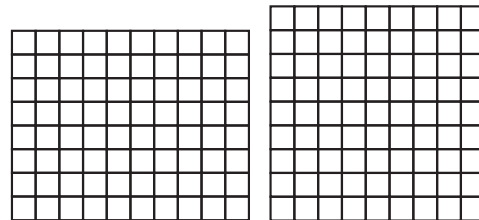
Answer: \_\_\_\_\_

4. This figure is a quadrilateral with sides measured in centimeters. Write an equation that shows the perimeter of the quadrilateral.



Answer: \_\_\_\_\_

5. Ye Olde Cake Shoppe uses two different boxes for packing cookies. The outline of the bottom of each box is shown.



Cookie Box 1

Cookie Box 2

Which box has the greater perimeter?

Answer: \_\_\_\_\_

Which box has the greater area?

Answer: \_\_\_\_\_

**Words for the Wise**

area

length

perimeter

polygon

attribute

linear measure

plane figure

width



## Unit 24 Partner Practice

Name \_\_\_\_\_

Standard 3.MD.D.8

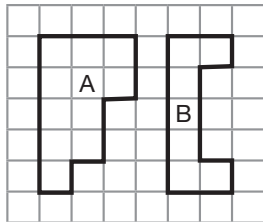
1. Use a ruler to measure the perimeter of this polygon to the nearest centimeter.



What is the perimeter of the polygon?

- A 24 cm                      C 8 cm  
B 12 cm                      D 4 cm

2. Two figures are outlined on this grid.



Check True or False for each statement about the figures on the grid.

	True	False
A The two figures have the same areas and perimeters.	<input type="checkbox"/>	<input type="checkbox"/>
B The two figures have the same perimeters but different areas.	<input type="checkbox"/>	<input type="checkbox"/>
C The two figures have the same areas but different perimeters.	<input type="checkbox"/>	<input type="checkbox"/>
D Neither the areas nor the perimeters of the two figures is the same.	<input type="checkbox"/>	<input type="checkbox"/>
E If two figures have the same perimeter, they must also have the same area.	<input type="checkbox"/>	<input type="checkbox"/>

3. The base of Pam's bug container is shaped like a rectangle.



not drawn to scale

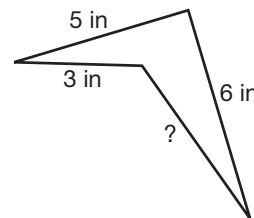
The length of the container is twice the width. What is the perimeter, in centimeters, of the bug container base?

- A 28 cm                      C 56 cm  
B 42 cm                      D 84 cm

4. The top of the teacher's desk has the shape of a rectangle. It is 36 inches wide and 48 inches long. What is the perimeter of the desktop?

- A 186 in                      C 84 in  
B 168 in                      D 48 in

5. This figure has a perimeter of 19 inches.



not drawn to scale

What is the missing side length?

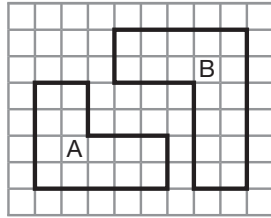
- A 8 in                      C 6 in  
B 7 in                      D 5 in

Name \_\_\_\_\_

Standard 3.MD.D.8

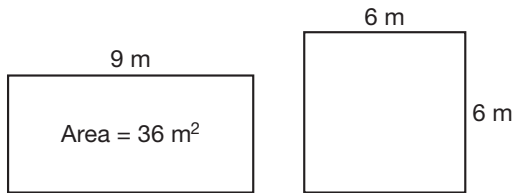
**Unit 24** Independent Practice

1. This grid shows Figure A and Figure B.



What is the difference between the perimeters of Figure A and Figure B?

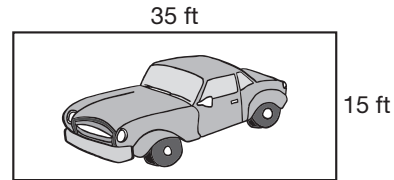
- A 22 units                      C 4 units  
B 18 units                      D 2 units
2. Mrs. Jones and Mr. Reese each have a garden. The gardens, measured in meters, are shown in this diagram.



**Mrs. Jones' Garden**    **Mr. Reese's Garden**  
not drawn to scale

Select **all** statements about the two gardens that are true.

- A Mrs. Jones' garden has a width of 4 meters.  
B Mr. Reese's garden has a perimeter of 24 meters.  
C The two gardens have the same areas but different perimeters.  
D The two gardens have the same areas and perimeters.  
E The difference between the perimeters of the two gardens is 2 meters.
3. The floor of Mr. Ables' garage is a rectangle.



not drawn to scale

What is the perimeter, in feet, of the garage floor?

- A 50 ft                              C 140 ft  
B 100 ft                            D 150 ft

4. Hector puts chalk lines around the soccer field. Hector knows the perimeter of the rectangular field is 300 yards.

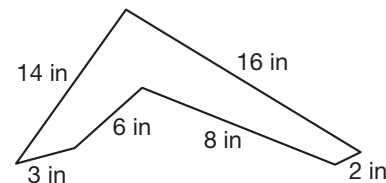


not drawn to scale

What is the length of the soccer field?

- A 200 yd                            C 50 yd  
B 100 yd                            D 25 yd

5. What is the perimeter, in inches, of this figure?



not drawn to scale

- A 49 in                              C 38 in  
B 45 in                              D 22 in



Unit 24 Assessment

Name \_\_\_\_\_

Standard 3.MD.D.8

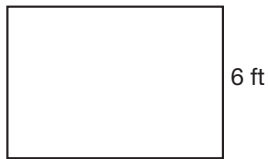
1. Use a ruler to measure the sides of this quadrilateral to the nearest centimeter.



What is the perimeter of the quadrilateral?

- A 30 cm                      C 22 cm  
B 24 cm                      D 11 cm

2. Mr. Martin strings lights around a rectangular window of his house. He uses 32 feet of lights.

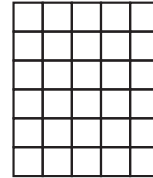


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What is the length of Mr. Martin's window?

- A 5 ft                          C 12 ft  
B 10 ft                        D 20 ft

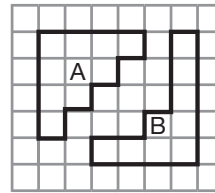
3. Cyndi has a sheet of 1-inch square stickers. Her sheet of stickers has 6 rows of 5 stickers as shown. Cyndi tears off the bottom 2 rows of stickers and gives them to her brother. What is the new perimeter of Cyndi's sheet of stickers?



not drawn to scale

- A 24 in                        C 20 in  
B 22 in                        D 18 in

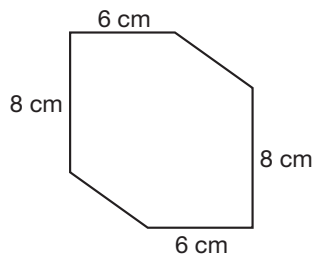
4. Figure A and Figure B are shown on this grid.



How much longer is the perimeter of Figure B than Figure A?

- A 18 units                    C 2 units  
B 16 units                    D 1 unit

5. The perimeter of this figure is 38 centimeters. The missing lengths of two sides are the same.



not drawn to scale

What is the missing length of each side that is not labeled? Show your work.

Answer: \_\_\_\_\_

Name \_\_\_\_\_

Standard 3.MD.D.8

**Unit 24 Skillful Thinking**



1. Sally and Jon plant a flower garden in the backyard. The garden is shown in this diagram. They want to put a fence around the garden. How many feet of fencing do Sally and Jon need to purchase?

**Answer:** \_\_\_\_\_

Explain how you found your answer.

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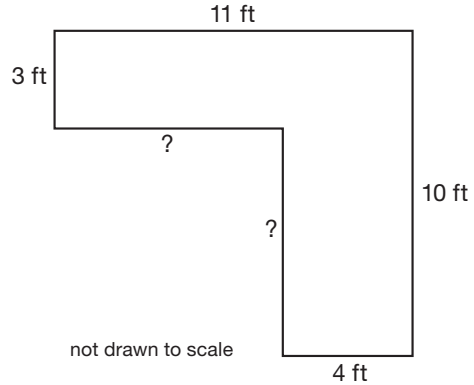
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2. Greg's painting is shaped like a rectangle and has a perimeter of 36 inches. In the space below, draw at least three different rectangles that could represent Greg's painting. Label the length and width of each rectangular painting. Record the area of each painting inside the rectangle.

What conclusion can you make about areas and perimeters? \_\_\_\_\_

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**Journal**

If you know the perimeter of a polygon but are missing the measure of one side, how can you find the missing measure?

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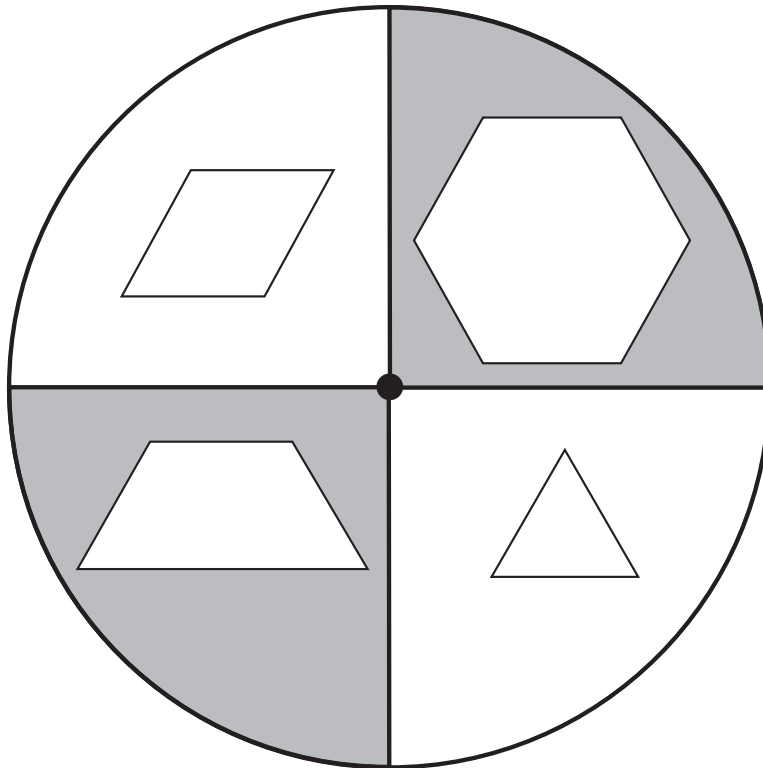


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**Pattern Block Perimeters**

Play “Pattern Block Perimeters” with a partner. Each pair needs a set of pattern blocks (only yellow hexagons, red trapezoids, blue rhombuses, and green triangles), a game sheet with the pattern block spinner, and a pencil and paper clip for the spinner. Before starting the game, players should look closely at the pattern blocks. Each side of the hexagon, the triangle, and the rhombus is 1 inch long. The long side of the trapezoid is 2 inches long, and the remaining sides of the trapezoid are 1 inch long. Player 1 spins the pattern block spinner, selects the pattern block shown, places it on the table, and states the perimeter of the block. If player 1 states the correct perimeter, he/she keeps the block for the next turn. If player 1 states an incorrect perimeter, the block goes back to the pile. Player 2 repeats these steps for his/her turn. In the second round, player 1 spins again, selects that pattern block, and adds it to the original pattern block with two sides touching to form a larger polygon. Player 1 states the perimeter of the combined structure of blocks. If correct, player 1 keeps both blocks but cannot move the position of either block. If incorrect, the block from round 2 is returned to the pile. Play continues in this manner until one player’s structure reaches a perimeter of 30 inches or more, and the player is declared the winner.



**Parent Activities**

1. Help your child find the perimeter of a flower bed, patio, or floor of a room by measuring around the space and finding the sum of the measurements.
2. Talk to your child about situations that might require finding perimeter, such as building a fence or framing a picture.