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**Unit 24 Standards**

(Student pages 145–150)

**Michigan Standards for Mathematics:** 3.MD.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.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.6, 3.MD.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.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**

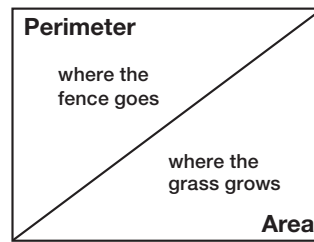
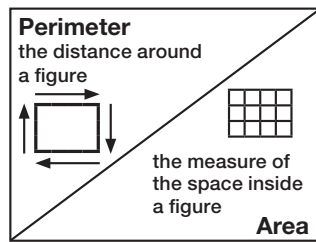
The following are essential vocabulary terms for this unit.

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.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.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.



**Answer Key and Codings**

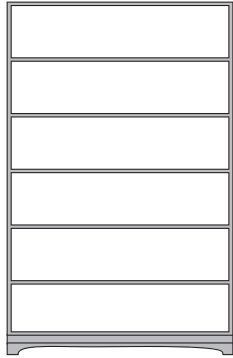
Page	Question	Answer	DOK Level	Bloom's Original/Revised
145	1	12 units	1	Comprehension/Understand
	2	$26 - 10 = 16$ ; $16 \div 2 = 8$ cm	1	Application/Apply
	3	42 ft	1	Application/Apply
	4	$4 + 8 + 5 + 11 = 28$ cm	2	Application/Apply
	5	Box 1 and Box 2 each have a perimeter of 36 units. Box 2 has the 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.OA.4

Unit 4 Introduction 

1. Lydia places 42 books on a bookshelf with six shelves. She puts the same number of books on each shelf. Complete the picture to show how many books Lydia places on each shelf.



Complete the equation to describe your picture.

$$6 \times \square = 42$$

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

2. Four girls and three boys share 35 quarters equally. Draw a picture to show how many quarters each person receives. Then complete the equation beneath your picture.

$$35 \div 7 = ?$$

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

3. Nine students in Ms. Hunter's room buy lunch every day. This equation can be used to find the number of lunches the cafeteria must prepare for Ms. Hunter's class each week.

$$\square = 9 \times 5$$

What is the missing number?

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

4. Maria's teacher assigns a 15-page report. Maria has 5 days to complete the assignment. She can use this equation to determine how many pages to complete each day.

$$? \times 5 = 15$$

What number makes Maria's multiplication equation true?

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

5. The Johnson family plans a vacation to Hawaii. Mr. Johnson, Mrs. Johnson, and their four children can each pack three bags. The total amount of luggage they bring is the missing number in this equation.

$$\star \div 6 = 3$$

Find  $\star$ , the total number of bags the Johnson family takes to Hawaii.

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

**Words for the Wise**

divide

equation

factor

product

equal (=)

fact family

multiply

quotient

whole number

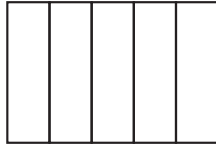


## Unit 4 Partner Practice

Name \_\_\_\_\_

Standard 3.OA.4

1. Demarius has a rectangular cake. He needs to cut the cake into 30 equal slices. His mom cuts the cake into five sections as shown.



Then his mom asks Demarius to finish cutting the cake. Demarius uses this equation to decide how to divide each section.

$$? \times 5 = 30$$

Which number makes the equation true?

- A 4                      C 25  
B 6                      D 35
2. Don mows 12 yards each week. He mows every day except Sunday. Don uses this equation to determine how many yards to mow each day.

$$\square = 12 \div 6$$

Which number makes Don's equation correct?

- A 24                      C 6  
B 12                      D 2
3. A used car lot has 10 cars. Johnna uses this equation to find the number of tires on all the cars in the lot.

$$10 \times 4 = \star$$

Which number makes Johnna's equation true?

- A 6                      C 24  
B 14                      D 40

4. Darren buys some bags of erasers. Each bag contains six erasers.

Study these equations. Does replacing the unknown number with 6 make each equation true? Check Yes or No for each equation.

		Yes	No
A	$4 \times \square = 24$	<input type="checkbox"/>	<input type="checkbox"/>
B	$7 \times \square = 56$	<input type="checkbox"/>	<input type="checkbox"/>
C	$48 \div \square = 6$	<input type="checkbox"/>	<input type="checkbox"/>
D	$56 \div \square = 9$	<input type="checkbox"/>	<input type="checkbox"/>
E	$42 \div \square = 7$	<input type="checkbox"/>	<input type="checkbox"/>

5. Dylan sorted 24 sheets of paper. He put the paper in stacks of red, blue, and yellow. Each stack contained the same number of sheets. Dylan used this equation to calculate the number of sheets in each stack.

$$24 = 3 \times \square$$

Which is the correct number of sheets in each stack?

- A 8                      C 12  
B 10                      D 16
6. Jerri wrote this equation.

$$5 \times ? = 45$$

Which of these statements does **not** describe the equation in words?

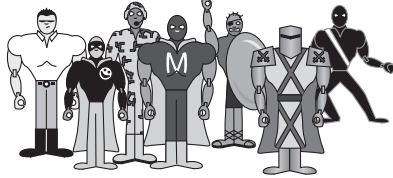
- A Five groups of some number is the same as 45.  
B Five groups of 45 is the same as the product.  
C Five times some number is the same as 45.  
D Multiplying 5 and a missing factor gives a product of 45.

Name \_\_\_\_\_

Standard 3.OA.4

## Unit 4 Independent Practice

1. Trevor buys these seven action figures for \$56.



Each action figure costs the same amount. Trevor uses this equation to find the cost of each figure.

$$\$56 \div ? = 7$$

What was the cost of each action figure?

- A \$8                      C \$49  
B \$9                      D \$63
2. Pencils are sold in packages of eight. Ryan needs a total of 72 pencils. He uses this equation to find the number of packages he needs to purchase.

$$8 \times \square = 72$$

How many packages of pencils does Ryan need to purchase?

- A 6                      C 9  
B 7                      D 80
3. The race car ride at an amusement park has nine cars. Each car holds four people. The park manager uses this equation to find the total number of people who can ride the race car ride at one time.

$$\square \div 9 = 4$$

Which number makes the equation true?

- A 5                      C 36  
B 13                    D 54

4. Becky separates 40 vocabulary flash cards into equal groups of five so she can study the same number of words each night. Becky uses this equation to find how many words to study each night.

$$\square = 40 \div 5$$

Which number correctly completes the equation?

- A 200                    C 10  
B 20                    D 8
5. Allison's mother bakes a dozen cookies for Allison and three friends to share equally. She uses this equation to find the number of cookies each of them should receive.

$$12 = ? \times 4$$

Which number makes the equation true?

- A 3                      C 9  
B 5                      D 36
6. Maxwell wants to explain this equation to his sister.

$$8 \times \square = 56$$

Which of these is **not** a correct description?

- A Eight groups of some number is the same as 56.  
B Eight times a number is the same as 56.  
C Fifty-six times an unknown number is equal to 8.  
D Multiplying 8 and a missing factor gives a product of 56.



Unit 4 Assessment

Name \_\_\_\_\_

Standard 3.OA.4

1. Mr. Hughes sets up chairs in the auditorium for the school program. There are nine rows of chairs with six chairs in each row. The total number of chairs in the auditorium can be determined by this equation.

$$\star = 9 \times 6$$

How many chairs are in the auditorium?

- A 27                      C 45  
B 36                      D 54

2. Mrs. Oliver wants to give pencils to the nine students in her math group. She wants to give each student the same number of pencils.

Study these equations. If replacing the unknown number with 9 makes the equation true, check True. If not, check False.

	True	False
A $\square \times 8 = 72$	<input type="checkbox"/>	<input type="checkbox"/>
B $\square \times 6 = 54$	<input type="checkbox"/>	<input type="checkbox"/>
C $28 \div \square = 3$	<input type="checkbox"/>	<input type="checkbox"/>
D $63 \div \square = 7$	<input type="checkbox"/>	<input type="checkbox"/>
E $4 \times \square = 36$	<input type="checkbox"/>	<input type="checkbox"/>
F $42 \div \square = 5$	<input type="checkbox"/>	<input type="checkbox"/>

3. Gina wants to make bracelets for two girls and one boy. She has 21 beads, and she wants to put an equal number of beads on each bracelet. Gina uses this equation to find how many beads to use on each bracelet.

$$3 = 21 \div ?$$

Which number makes Gina's division equation true?

- A 7                      C 18  
B 8                      D 21

4. Mrs. Waters writes this equation on the board.

$$9 \times \square = 72$$

Which of these statements does **not** describe the equation in words?

- A Nine groups of some number is the same as 72.  
B Multiplying 9 and a missing factor gives a product of 72.  
C Nine times some number is the same as 72.  
D Nine groups of 72 is the same as the unknown number.

5. Andrea and three friends went to the store to buy a snack. Each girl bought two red apples and two green apples. The total number of apples they bought is the missing number in this equation.

$$\square \div 4 = 4$$

What was the total number of apples the girls bought?

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

Name \_\_\_\_\_

Standard 3.OA.4

Unit 4 Skillful Thinking



1. Mr. Davidson took his wife and two children to see a movie last Saturday. He spent a total of \$20 for tickets. An adult ticket cost \$7. How much did a child's ticket cost?

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

Explain how you found your answer.

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2. Write a word problem that can be solved using this equation.

$$36 = ? \times 4$$

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**Journal**

Mrs. Jones wrote the numbers 6 and 3. She said, "These are two numbers in a fact family."  
Mrs. Jones asked the students to find the third number in the fact family.

Mathis said, "The third number is 2."

Tammy said, "The third number is 18."

Mrs. Jones said, "You are both correct."

Explain how this is possible.

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Unit 4 Motivation Station

Name \_\_\_\_\_

Standard 3.OA.4

## Cross Number Puzzle

Use the clues to solve the puzzle.

### Across

- 1.  $\square \div 3 = 7$
- 3.  $4 \times 8 = \square$
- 6.  $9 \times 9 = \square$
- 8.  $\square \div 5 = 9$
- 10.  $4 \times 4 = \square$
- 12.  $9 \times 6 = \square$
- 14.  $\square \div 7 = 6$
- 16.  $5 \times 5 = \square$
- 19.  $\square \div 9 = 9$
- 21.  $\square \div 8 = 8$
- 23.  $8 \times 6 = \square$
- 25.  $\square \div 4 = 6$
- 27.  $\square \div 3 = 6$
- 28.  $\square \div 4 = 5$

### Down

- 2.  $\square \div 3 = 6$
- 4.  $8 \times 3 = \square$
- 5.  $7 \times 3 = \square$
- 7.  $\square \div 3 = 5$
- 9.  $8 \times 7 = \square$
- 11.  $8 \times 8 = \square$
- 13.  $6 \times 7 = \square$
- 15.  $\square \div 7 = 4$
- 17.  $\square \div 8 = 7$
- 18.  $2 \times 7 = \square$
- 20.  $4 \times 3 = \square$
- 22.  $\square \div 8 = 6$
- 24.  $\square \div 9 = 9$
- 26.  $\square \div 7 = 6$

	1	2		3	4	
5		6	7		8	9
10	11		12	13		
	14	15		16	17	
18		19	20		21	22
23	24		25	26		
	27			28		

### Parent Activities

- Use a deck of cards with the face cards removed. The ace equals 1. Shuffle the cards and turn over the top two cards. Have your child multiply the two cards together and state the product. For example, if the top two cards are 7 and 4, your child states the product, 28. As a variation, turn over two more cards and put them together to make a 2-digit number, such as 56. Have your child tell you two numbers that could be multiplied to make that product.
- Give your child a total of 45 dry beans. Ask him/her to arrange the beans in nine equal groups. Then write the equation  $45 \div ? = 9$ . The number of beans per group is 5. Point out that  $45 \div 9 = 5$ , and also that  $45 \div 5 = 9$ . Repeat with other numbers of beans.