

Just in Time Quick Check

Standard of Learning 3.MG.2

Strand: Measurement and Geometry

Standard of Learning 3.MG.2

The student will use multiple representations to estimate and solve problems, including those in context, involving area and perimeter (in both U.S. Customary and metric units).

Students will demonstrate the following Knowledge and Skills:

- a) Solve problems, including those in context, involving area:
 - i) describe and give examples of area as a measurement in contextual situations; and
 - ii) estimate and determine the area of a given surface by counting the number of square units, describe the measurement (using the number and unit) and justify the measurement.
- b) Solve problems, including those in context, involving perimeter:
 - i) describe and give examples of perimeter as a measurement in contextual situations;
 - ii) estimate and measure the distance around a polygon (with no more than six sides) to determine the perimeter and justify the measurement; and
 - iii) given the lengths of all sides of a polygon (with no more than six sides), determine its perimeter and justify the measurement.

Just in Time Quick Check

Just in Time Quick Check Teacher Notes

Supporting and Prerequisite SOL: 2.MG.1, 3.MG.1

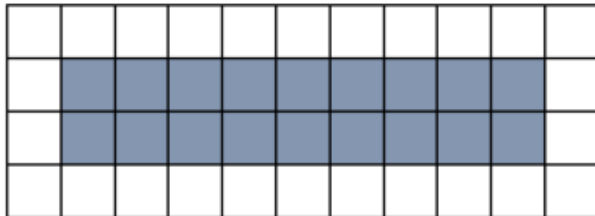
Just in Time Quick Check 3.MG.2


*Note to teacher - Students will need the following materials to complete this quick check: inch ruler, centimeter ruler, one-inch tiles.

1. Determine whether each situation represents area or perimeter.

Situation	Area or Perimeter
Putting a fence around a garden	
Covering the bedroom floor with carpet	
Putting paper on a bulletin board	
Walking around the outside of the school	

2. What is the area of the figure shaded on the grid?



 = 1 square unit

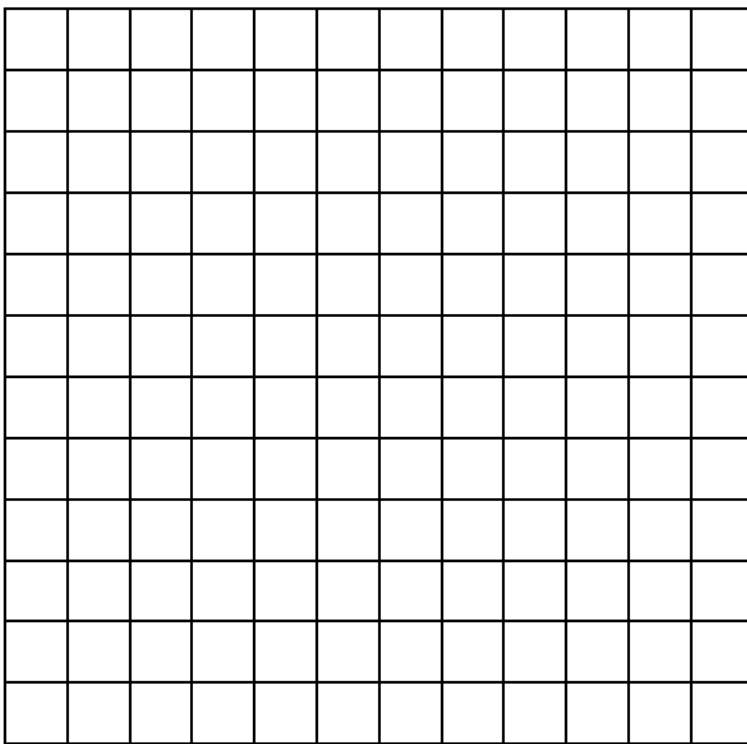
3. Use the figure below and one-inch tiles to answer the following questions.




a) Estimate the area of this figure in square inches. _____

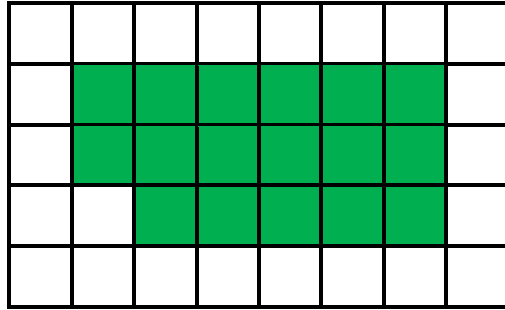
b) Use one-inch tiles to find the area of this figure. _____

4. Create two different figures that each have an area of 12 square centimeters on the grid.

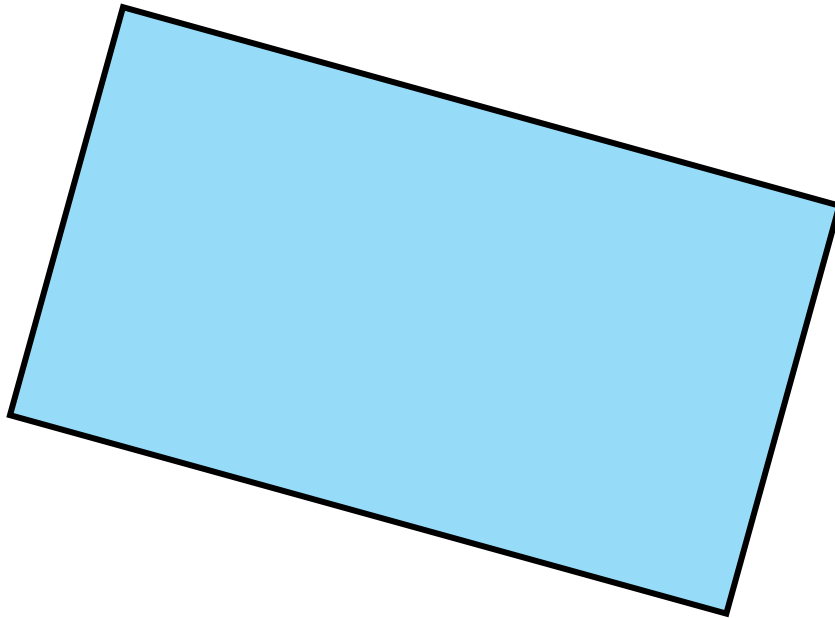


 = 1 square
centimeter

5. Find the perimeter of the figure shaded on the grid. Each square in the grid is one square unit. Perimeter: _____



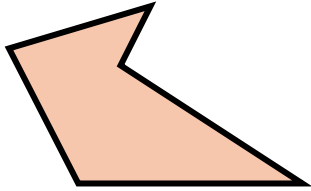
6. Estimate the perimeter of this figure using inches as the unit.
Estimated perimeter (inches): _____



Use a ruler to find the perimeter, in inches, of this figure.
Actual perimeter (inches): _____

7. Use centimeters to estimate the perimeter of this figure.

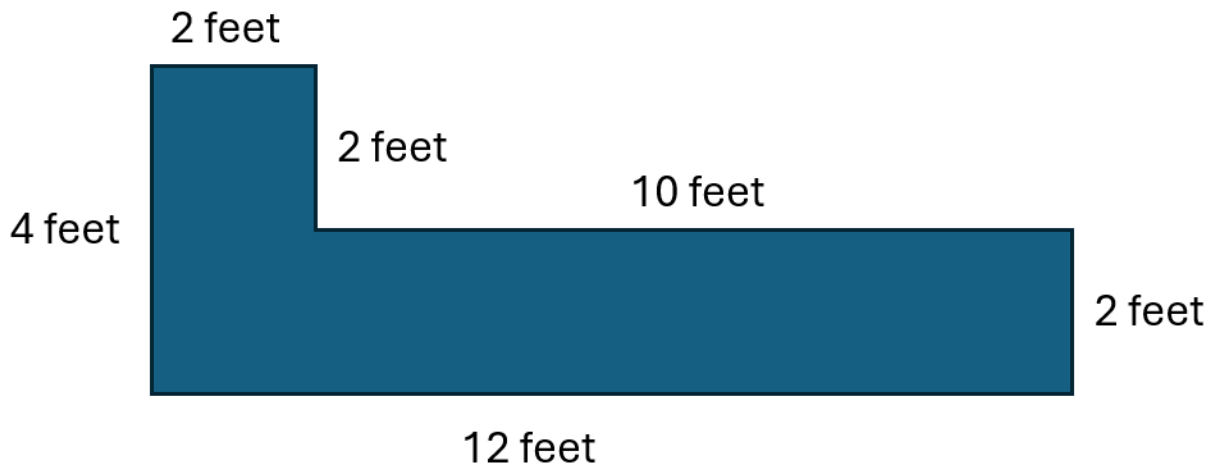
Estimated perimeter (centimeters): _____



Use a centimeter ruler to find the perimeter of this figure.

Actual perimeter (centimeters): _____

8. What is the perimeter of this figure?



3.MG.2 Just in Time Quick Check Teacher Notes

Common Errors/Misconceptions and their Possible Indications

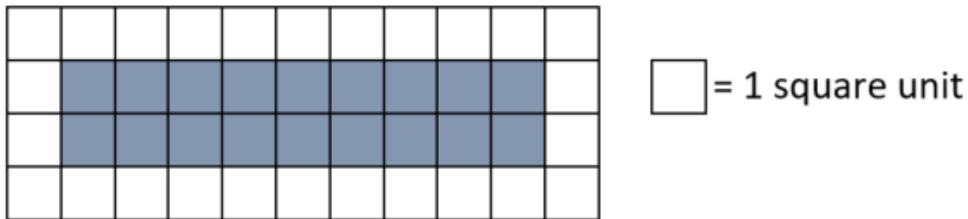
*Note to teacher - Students will need the following materials to complete this quick check: inch ruler, centimeter ruler, one-inch tiles.

1. Determine whether each situation represents area or perimeter.

Situation	Area or Perimeter
Putting a fence around a garden	
Covering the bedroom floor with carpet	
Putting paper on a bulletin board	
Walking around the outside of the school	

Some students may have difficulty determining whether each scenario represents area or perimeter due to a lack of vocabulary exposure or misconceptions about the application of each term. If students are familiar with the terms, they may still confuse the meaning of the perimeter and area. For example, students may say that putting paper on a bulletin board represents an application of perimeter, indicating that they may be thinking of a border that would go around the bulletin board. It may be beneficial for students to draw a quick sketch of each situation to provide a visual that may help them determine whether the situation represents an application of perimeter or area. Additionally, teachers may wish to post or create visuals such as vocabulary cards, anchor charts, or Frayer models as a reference for students. It may also be beneficial for students to complete a sorting activity that includes various perimeter and area situations and requires students to comprehend and differentiate among the practical situations.

2. What is the area of the figure shaded on the grid?



A common error is for students to confuse area and perimeter and to state that the area of the shaded figure is 22 units. Another common error is for students to count all the square units on the grid and state that the area is 44 square units. Students who confuse area and perimeter will benefit from experiences that make meaning of area. Activities in which students physically cover a space with square units to find its area will help to build conceptual understanding for area. Hands-on activities in which area is determined in non-standard units may also be helpful. For example, students can find the number of square sticky notes that are needed to cover the top of a desk to determine the area of the desktop in square sticky notes. (As a connection to perimeter, students could then use one side of the square sticky note to find the perimeter of the same desktop.)

3. Use the figure below and one-inch tiles to answer the following questions.



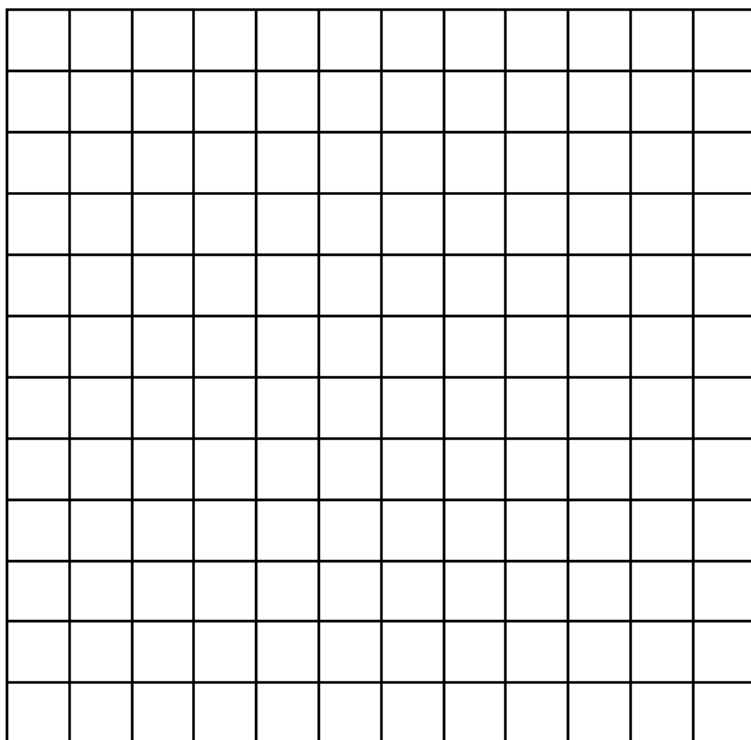
a) Estimate the area of this figure in square inches. _____


b) Use one-inch tiles to find the area of this figure. _____

Students whose estimates are unreasonable will benefit from hearing peers' strategies for estimation, which might include drawing squares that are approximately one-inch by one-inch on the given figure before covering or measuring to determine the actual area. Students may not cover the entire figure, which may indicate confusion and lack of experience with concave polygons and determining area. Students need many opportunities to determine the

area of various polygons by covering polygons with tiles and counting the squares to find the area. Students benefit from real-world experiences finding the area of different surfaces in the classroom (e.g., name tag, top of desk, notebooks, erasers) by covering the surface with square tiles or one-inch grid paper. Students who may confuse the unit as linear will benefit from more experience using the vocabulary to describe area (e.g., square units, square inches, square centimeters).

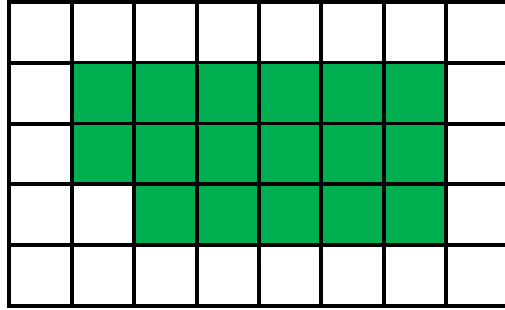
4. Create two different figures that each have an area of 12 square centimeters on the grid.



 = 1 square centimeter

A common error is for students to create figures that have perimeters of 12 centimeters, indicating confusion between area and perimeter. Students may color the entire grid, creating one 12 by 12 figure. For both errors, students will benefit from more experience creating figures with a given area (as well as figures with a given perimeter). These experiences help students build understanding that figures can have the same area even if their shapes or spatial orientations are different. Classroom discussions during which students compare figures and their measurements are encouraged.

5. Find the perimeter of the figure shaded on the grid. Each square in the grid is one square unit. Perimeter: _____

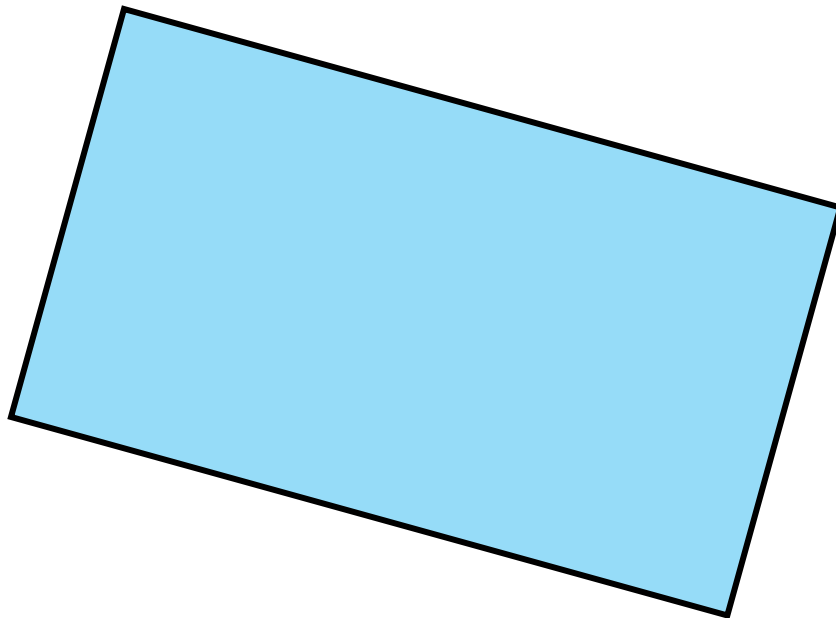


Students may confuse perimeter with area. Students who have confused these concepts would benefit from more experience finding the area and perimeter of given figures. Connecting these concepts to everyday life (e.g., If you want to make a frame for a picture you painted in art class, is it more helpful to know the perimeter or the area of the picture?) may help students conceptualize each type of measurement.

Students may understand that perimeter is the distance around the outside of the figure but have difficulty determining the perimeter of the given figure. Because one of the corners is “cut off” in the figure, students may neglect to count the two 1-unit edges in the figure, resulting in a perimeter of 16 units. Students should be encouraged to trace around the figure and count each unit as they do so.

6. Estimate the perimeter of this figure using inches as the unit.

Estimated perimeter (inches): _____



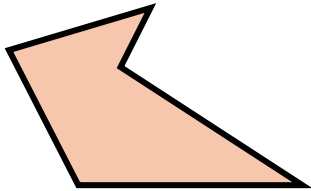
Use a ruler to find the perimeter, in inches, of this figure.

Actual perimeter (inches): _____

Students may confuse perimeter and area; however, students are less likely to confuse these when directed to use a ruler to determine perimeter. Some students may measure before coming up with an estimate. Encourage students to use personal benchmarks when estimating with inches (e.g., the second knuckle on your index finger is about an inch), which may help students' estimates become more reasonable. When measuring perimeter, students may misalign the ruler, neglect to measure all four sides of the figure, or have difficulty adding the lengths of the sides. At this grade level it is important that figures provided have side lengths that are close to whole inches (or whole centimeters) when perimeter is being determined.

7. Use centimeters to estimate the perimeter of this figure.

Estimated perimeter (centimeters): _____



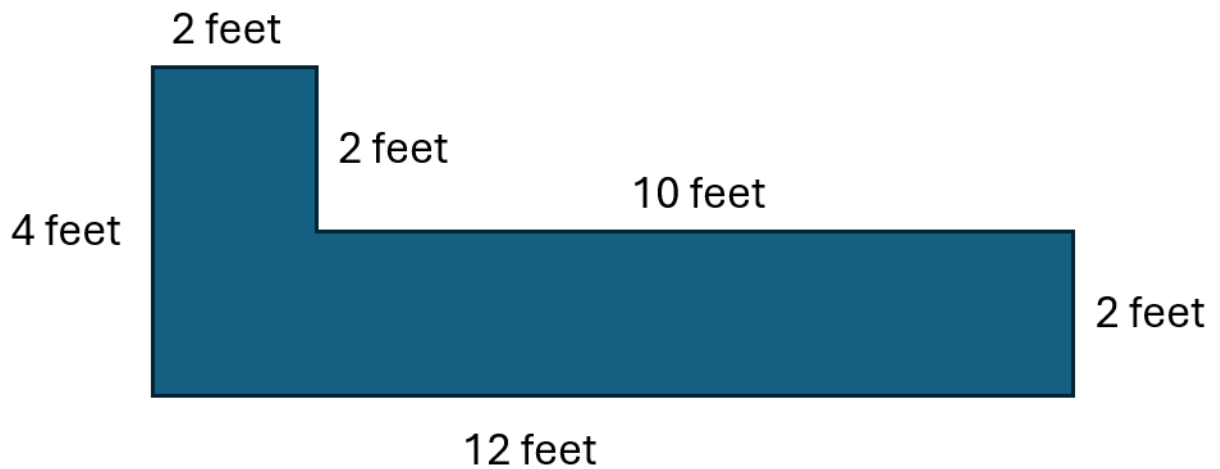
Use a centimeter ruler to find the perimeter of this figure.

Actual perimeter (centimeters): _____

Students typically have more difficulty estimating when centimeters are the unit of measure, which indicates students need more experience measuring with this unit to develop a sense of its magnitude. Opportunities to estimate, measure, and then compare the measurement to the estimate help students develop this understanding.

Students may not include the smallest side, especially if they have not had enough work with concave figures. Students need experience estimating and determining the perimeter of a variety of polygons, including concave polygons, to develop strategies for keeping track of what has been measured and what needs to be combined. Students will benefit from opportunities to consider and try out peers' approaches to problems involving perimeter.

8. What is the perimeter of this figure?



Two common errors when measuring a figure are to neglect to add all the sides together and/or to add a side more than once. It may be helpful for students to put a dot at one vertex of the figure and then trace around the figure, creating an expression as they trace (e.g., $2 + 2 + 10 + 2 + 12 + 4$). This will also help students know where they began, so they do not forget to include a side or add a side more than once. Providing students with opportunities to determine the perimeter of various figures, including those in traditional and those in non-traditional configurations, will help develop students' understanding of perimeter.