



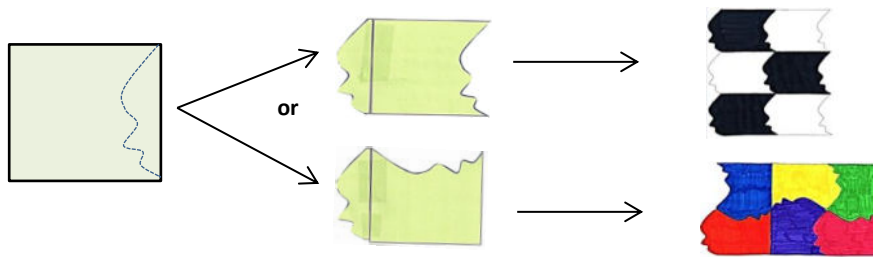
Topic C

Problem Solving with Perimeter

3.MD.8, 3.G.1

Focus 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.
Instructional Days:	8	
Coherence -Links from:	G2–M6	Foundations of Multiplication and Division
	G3–M3	Multiplication and Division with Units of 0, 1, 6–9, and Multiples of 10
	G3–M4	Multiplication and Area
-Links to:	G4–M3	Multi-Digit Multiplication and Division

Students are introduced to perimeter in Topic C. Conceptual exploration begins by creating tessellations. In Lessons 10 and 11, students decompose a quadrilateral. They rearrange the parts to form a new shape. They then use the new shape to tile, tracing its perimeter until a new larger shape (the complete tessellation) is formed. Through this work, students define perimeter as the boundary of a two-dimensional shape and use their new vocabulary in context as they describe the process of tessellating. These lessons begin the study of perimeter with unusual shapes to encourage flexible thinking about perimeter and avoid the misconception that it is a property of rectangles alone.



Cut on the line. Then, slide the piece to the opposite side, or rotate it to an adjacent side to make a new shape.

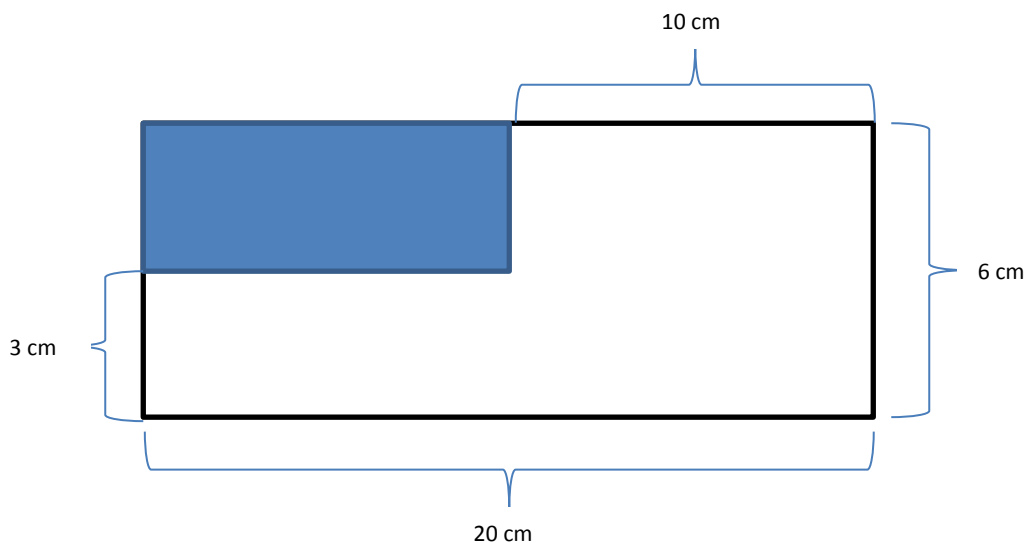
In Lesson 12, students measure side lengths and calculate perimeters. They measure the side lengths of polygons (in whole number units) using rulers and then use these side lengths to determine perimeter. Students attend to units as they solve and discuss the efficiency of strategies for adding side lengths. The complexity increases in Lesson 13 when students are given pictorial models, including the side lengths of polygons, from which they determine the perimeter.

Lesson 14 provides more complex problem solving; students determine the perimeter of a figure when whole number side length measurements are unknown. Students use their knowledge of attributes of shapes to fill in unknown information and then calculate the perimeter. For example, they may be told that a hexagon is regular and that one side length is 5 centimeters. Based on that information, students fill in the unknown side lengths and calculate the perimeter and discuss whether addition or multiplication is a more efficient strategy for solving the problem.

In Lesson 15, students apply their basic understanding of perimeter to real-world contexts. They explore how perimeter is used in everyday life and develop strategies for calculating perimeters using known information.

Lesson 16 extends students' knowledge of perimeter to circles. In this lesson, students wrap string around various circular objects, such as lids. Students measure their strings to the nearest quarter inch using rulers and record their measurements for comparison and discussion. This lesson reinforces that perimeter is a measurable attribute for any shape, not just polygons, and that those measurements can occur in both whole and fractional units.

Lesson 17 involves using all four operations to determine a perimeter and any unknown measurements. Students develop strategies for finding the perimeter of part of a larger shape, for example, the shaded rectangle in the figure below. In this example, students understand that they can subtract the known part of the length from the total length to find the unknown measurement. The unknown measurements may then be used to find the perimeter of the shaded rectangle.



What is the perimeter of the shaded rectangle?

A Teaching Sequence Toward Mastery of Problem Solving with Perimeter

- Objective 1:** Decompose quadrilaterals to understand perimeter as the boundary of a shape.
(Lesson 10)
- Objective 2:** Tessellate to understand perimeter as the boundary of a shape. (Optional.)
(Lesson 11)
- Objective 3:** Measure side lengths in whole number units to determine the perimeter of polygons.
(Lesson 12)
- Objective 4:** Explore perimeter as an attribute of plane figures and solve problems.
(Lesson 13)
- Objective 5:** Determine the perimeter of regular polygons and rectangles when whole number measurements are unknown.
(Lesson 14)
- Objective 6:** Solve word problems to determine perimeter with given side lengths.
(Lesson 15)
- Objective 7:** Use string to measure the perimeter of various circles to the nearest quarter inch.
(Lesson 16)
- Objective 8:** Use all four operations to solve problems involving perimeter and unknown measurements.
(Lesson 17)