

# 3<sup>rd</sup>

## Topic 13: Perimeter

### Lessons 1-5

## Math Intervention Resources

### MDIS:

13-1 D44

13-2

13-3 D44

13-4

13-5 E24

### Reinforce

Envision Math Games:

Topic Game: NA

envision Online Games

Measurement

Perimeter

Chicken corral

Symbaloo

### Guided Practice

Students experiencing difficulty in counting units or adding side lengths to find perimeter will benefit from marking their models.

- Demonstrate how to mark a model as you count units or add sides to find the perimeter of a polygon. Guide students to see that the marks can help them keep track of the units they have counted or the side they have added.

### Assessments

# 3rd

## Topic 13: Perimeter

### Lesson 13-1

## Understanding Perimeter

### Quick and Easy

#### Lesson Overview



Objective	Essential Understanding	Vocabulary	Materials
Students will use standard units to find the perimeter of a shape.	The distance around a figure is its perimeter. To find the perimeter of a polygon, add the lengths of the sides.	<b>perimeter</b>	Centimeter grid paper (Teaching Tool 11)



### Math Background

The distance around a plane (flat) shape is called its **perimeter**. If the shape is a polygon, then its perimeter is the sum of the lengths of all its sides.

Although polygons are two-dimensional shapes, perimeter is a one-dimensional measure. This means that the perimeter of a polygon is measured in *linear units*, such as inches and feet in the customary system and centimeters and meters in the metric system.

Some of the polygons in this lesson are drawn on grids. For these polygons, students find

the perimeter by counting unit segments. A scale on the drawing indicates which unit of length each unit segment represents. Finding perimeters in this manner reinforces the concept of perimeter as a measure of length. Other polygons in this lesson are not drawn on grids; instead, the lengths of all sides are labeled. In these cases, students need only add the given lengths to find the perimeter.

## 2 Guided Practice



Remind students to include the appropriate unit of length— inches, meters, and so on—when giving their answers.

### Exercise 2

#### Error Intervention

**If** students give a perimeter that is less than 48 feet,

**then** they might have omitted the length of a side when they added.

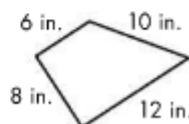
*How many sides does this polygon have?* [5 sides] *So how many lengths must you add in order to find the perimeter?* [5 lengths]

*What are the 5 lengths?* [7 feet, 8 feet, 8 feet, 9 feet, and 16 feet]

**Reteaching** Guide students to find the perimeter of each polygon at the right. For another example and more practice, assign **Reteaching Set A** on p. 334.



scale:  $\text{—|—} = 1$  meter



## Common Core

### 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.

### Mathematical Practices

- Make sense of problems and persevere in solving them.
- Reason abstractly and quantitatively.
- Construct viable arguments and critique the reasoning of others.
- Model with mathematics.
- Use appropriate tools strategically.
- Attend to precision.
- Look for and make use of structure.
- Look for and express regularity in repeated reasoning.

# 3rd

## Topic 13: Perimeter

### Lesson 13-2

## Tools and Units for Perimeter

### Quick and Easy

#### Lesson Overview



Objective	Essential Understanding	Vocabulary	Materials
Students will select appropriate tools and units to find perimeter.	In a given measurement situation, the type of measuring tool and the measurement units it contains determine the appropriateness of the tool.	<b>mile</b>	Drawing paper, inch ruler, yardstick (or Teaching Tool 24), measuring tape or string



PROFESSIONAL DEVELOPMENT

### Math Background

Selecting the appropriate tool and unit of length to measure perimeter in a given situation involves recognizing the relative size of the unit and tool compared to the size of the item or distance to be measured.

For example, students decide that a short length is best measured in inches using a ruler, rather than in feet or yards using a

yardstick. Students also find that measuring a mile with a ruler or a yardstick is impractical and would take a long time because the ruler or yardstick would need to be moved many times. They find that it is difficult to measure a curve using a yardstick or ruler, and that a measuring tape or piece of string is a better choice.

2

### Guided Practice



MATHEMATICAL PRACTICES

Remind students to look at the distance or length of the object being measured to help them choose a tool and unit.

Exercises 1 and 2

### Error Intervention

**If** students are having difficulty choosing a tool and unit to measure a perimeter,

**then** have students review and make a list of objects in each of the following categories: short distances, medium distances, and longer distances. Ask: *What other objects involve measuring short distances?* [Sample answers: the length of a television, a bulletin board, a chair] *What tool and unit would be good choices?* [Ruler, inches] Repeat for medium distances and longer distances.

**Reteaching** For another example and more practice, assign **Reteaching** Set B on p. 334.



### Common Core

#### 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.

#### Mathematical Practices

- Make sense of problems and persevere in solving them.
- Reason abstractly and quantitatively.
- Construct viable arguments and critique the reasoning of others.
- Model with mathematics.
- Use appropriate tools strategically.
- Attend to precision.
- Look for and make use of structure.
- Look for and express regularity in repeated reasoning.

# 3rd

## Topic 13: Perimeter

### Lesson 13-3

## Perimeter of Common Shapes

### Quick and Easy

#### Lesson Overview



Objective	Essential Understanding	Vocabulary	Materials
Students will use standard units to find the perimeter of a common shape.	To find the perimeter of a polygon, add the lengths of the sides.		Teaching Tool 46, inch ruler (or Teaching Tool 24) (1 per group)



### Math Background

So far, students have found perimeters of polygons that were either drawn on a grid or had all side lengths labeled.

In this lesson, students will see that often it is possible to find a perimeter even when some side lengths seem to be missing. This can be done by applying definitions and properties of certain polygons, such as the following.

- Opposite sides of a parallelogram (and, therefore, of a rectangle) are the same length.
- All four sides of a square are the same length.

- All three sides of an equilateral triangle are the same length.

So, for example, if it is known that a polygon is a square, and if the length of one side is given, the definition of a square leads to the conclusion that the other three sides have the same length. This means it is possible to find the perimeter of a square given the length of just one side.

In later courses, students will learn how to find the perimeter of certain shapes by using *formulas*, such as  $P = 2\ell + 2w$  for a rectangle and  $P = 4s$  for a square.

### 2 Guided Practice



Remind students that opposite sides of a rectangle are the same length, and all four sides of a square are the same length.

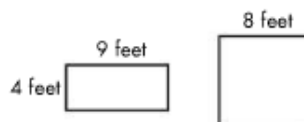
#### Exercise 1

#### Error Intervention

**If** students answer that the perimeter is 12 feet,

**then** they probably did not include the lengths of the two unmarked sides. *How many sides does the rectangle have?* [4 sides] *So how many side lengths do you need to use to find the perimeter?* [4 lengths] *Only two lengths are marked. How do you know what the other two lengths must be?* [Opposite sides of a rectangle are the same length. So one of the unmarked lengths is 8 feet, and the other is 4 feet.]

**Reteaching** Guide students to find the perimeter of the rectangle and square at the right. For another example and more practice, assign **Reteaching Set C** on p. 335.



### Common Core

#### 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.

#### Mathematical Practices

- Make sense of problems and persevere in solving them.
- Reason abstractly and quantitatively.
- Construct viable arguments and critique the reasoning of others.
- Model with mathematics.
- Use appropriate tools strategically.
- Attend to precision.
- Look for and make use of structure.
- Look for and express regularity in repeated reasoning.



# 3rd

## Topic 13: Perimeter

### Lesson 13-4

## Different Shapes with the Same Perimeter

**Quick and Easy**

Lesson Overview



Objective	Essential Understanding	Vocabulary	Materials
Students will match shapes to a given perimeter and learn that different shapes can have the same perimeter.	Shapes can be made with a given perimeter. Different shapes can have the same perimeter.		Centimeter grid paper (Teaching Tool 11); straws, craft sticks, or tooth picks



### Math Background

In this lesson, students will learn how to make shapes to match a given perimeter. They will learn that different shapes can have the same perimeter.

To make a shape with a given perimeter, students find that they can use the exact number of straws to match the perimeter length to build a shape, or they can draw a picture on grid paper. They describe the shape made,

including the length of the sides, and check the perimeter by adding the lengths.

Students' work with making shapes of a given perimeter reinforces and builds on their understanding that perimeter is the distance around a figure. As students work, they gain experience in perimeter by actually forming the sides of a figure, while paying attention to the lengths of the sides.

2

### Guided Practice



Remind students to check that their completed figures have the given perimeter by adding the side lengths.

Exercise 4

#### Error Intervention

**If** students are having difficulty designing a shape with the given perimeter,

**then** ask: *What perimeter does your shape need to have?*

[18 meters] *What length can you start with for one side?* [Answers may vary.] *How can you use that length to decide on the length for another side?* [Add on.] *How do you know when to stop?* [When you have made all the lengths add up to 18.]

**Reteaching** Martin wants to design a shape for his garden. He wants to use exactly 12 meters of fencing. What shape can he make? Have students use straws or draw on grid paper to show their shapes. For another example and more practice, assign **Reteaching Set D**, on p. 335.



### Common Core

#### 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.

#### Mathematical Practices

- Make sense of problems and persevere in solving them.
- Reason abstractly and quantitatively.
- Construct viable arguments and critique the reasoning of others.
- Model with mathematics.
- Use appropriate tools strategically.
- Attend to precision.
- Look for and make use of structure.
- Look for and express regularity in repeated reasoning.

# 3rd

## Topic 13: Perimeter

### Lesson 13-5

## Problem Solving: Try, Check, and Revise

### Quick and Easy Lesson Overview



Objective	Essential Understanding	Vocabulary	Materials
Students will solve a problem through the process of try, check, and revise.	Some problems can be solved by making a reasoned first try for what the answer might be and then, through additional reasoning, arrive at the correct answer.		Colored chalk



#### Math Background

Solving problems using the **Try, Check, and Revise** strategy is based on multiple attempts at finding a solution. Once students understand the problem, they make a reasonable first attempt to find the solution.

If this attempt is unsuccessful, students revise and make a second attempt to solve the problem, based on the information they obtained during their first attempt.

#### 2 Guided Practice



The problem-solving strategy *Try, Check, and Revise* is a way to use the information from the problem, along with reasoning, to try to solve the problem.

#### Exercise 1

##### Error Intervention

**If** students are having difficulty trying to solve the problem, **then** help students by discussing the information that they know. *How many crayons in all do Peg and Pat have?* [64 crayons] *What do you know about the number of crayons Pat has?* [She has 10 more than Peg.] *How can you find how many crayons Pat has?* [You can try an amount for Peg's crayons, add 10 for Pat's crayons, and compare the total to 64.] Encourage students to continue computing, using the information as they make additional attempts.

**Reteaching** For another example and more practice, assign **Reteaching** Set E on p. 335.



#### Common Core

##### 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.

##### Mathematical Practices

- ✓ Make sense of problems and persevere in solving them.
- ✓ Reason abstractly and quantitatively.
- ✓ Construct viable arguments and critique the reasoning of others.
- Model with mathematics.
- Use appropriate tools strategically.
- Attend to precision.
- Look for and make use of structure.
- Look for and express regularity in repeated reasoning.