Eureka Math

3rd Grade
Module 7
Lesson 20

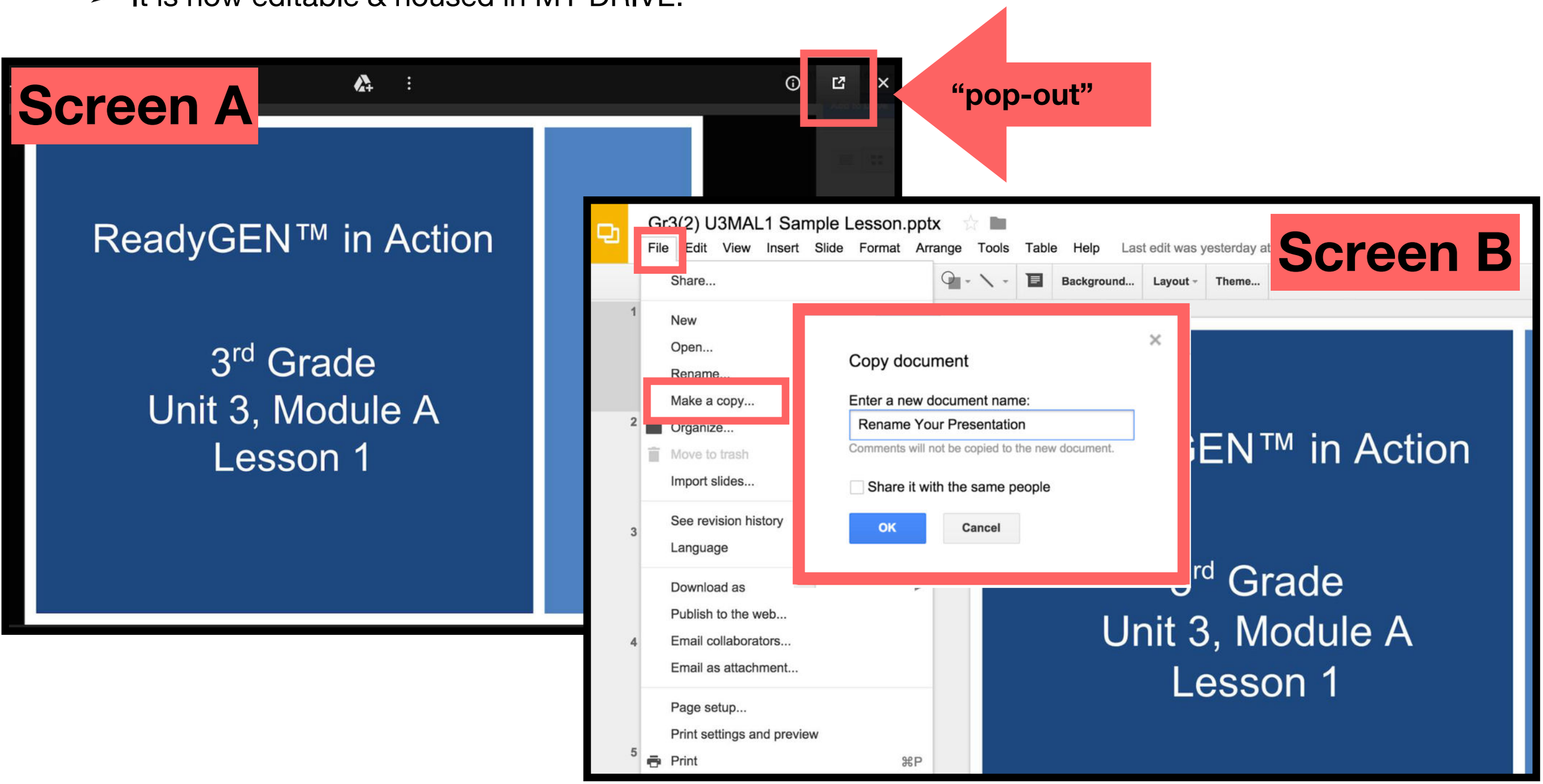
At the request of elementary teachers, a team of Bethel & Sumner educators met as a committee to create Eureka slideshow presentations. These presentations are not meant as a script, nor are they required to be used. Please customize as needed. Thank you to the many educators who contributed to this project!

Directions for customizing presentations are available on the next slide.

Customize this Slideshow

Reflecting your Teaching Style and Learning Needs of Your Students

- ➢ When the Google Slides presentation is opened, it will look like Screen A.
- ➢ Click on the “pop-out” button in the upper right hand corner to change the view.
- ➢ The view now looks like Screen B.
- ➢ Within Google Slides (not Chrome), choose FILE.
- ➢ Choose MAKE A COPY and rename your presentation.
- ➢ Google Slides will open your renamed presentation.
- ➢ It is now editable & housed in MY DRIVE.



Icons

Read, Draw, Write

Learning Target

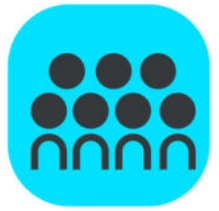
Personal White Board

Problem Set

Manipulatives Needed

Fluency

Think Pair Share



Whole Class

Individual

Partner

Small Group

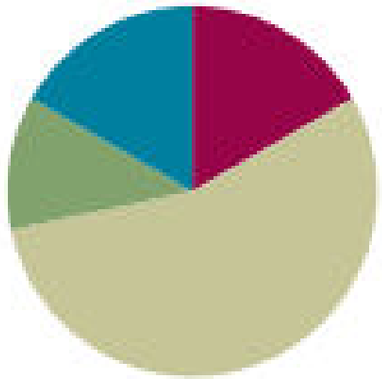
Small Group Time

Lesson 20

Objective: Construct rectangles with a given perimeter using unit squares and determine their areas.

Suggested Lesson Structure

Fluency Practice	(10 minutes)
Application Problem	(7 minutes)
Concept Development	(33 minutes)
Student Debrief	(10 minutes)
Total Time	**(60 minutes)**



I can construct rectangles with a given perimeter using unit squares and determine their areas.

Fluency Practice

Multiply or Divide by 2 (10 minutes)

A

Number Correct: _____

Multiply or Divide by 2

1.	2 × 2 =	
2.	3 × 2 =	
3.	4 × 2 =	
4.	5 × 2 =	
5.	1 × 2 =	
6.	4 ÷ 2 =	

23.	___ × 2 = 20	
24.	___ × 2 = 4	
25.	___ × 2 = 6	
26.	20 ÷ 2 =	
27.	10 ÷ 2 =	
28.	2 ÷ 1 =	

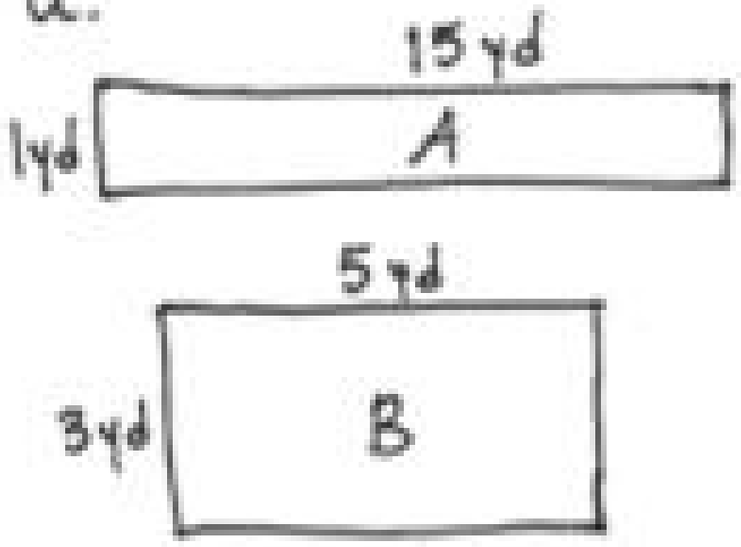
Application Problem

Molly builds a rectangular playpen for her pet rabbit. The playpen has an area of 15 square yards.

a. Estimate to draw and label as many possibilities as you can for the playpen.
b. Find the perimeters of the rectangles in part (a)
c. What other information do you need in order to recreate Molly's playpen?

Application Problem

a.



b.

Perimeter of A = 1yd + 1yd + 15yd + 15yd

= 2yd + 30yd

= 32 yd

Perimeter of B: 5yd + 5yd + 3yd + 3yd

= 10yd + 6yd

= 16 yd

c. I would need to know one of the side lengths to know which playpen Molly built. Or, I could use my answers to part (b) to figure out which playpen she built if she told me the playpen's perimeter.

Concept Development

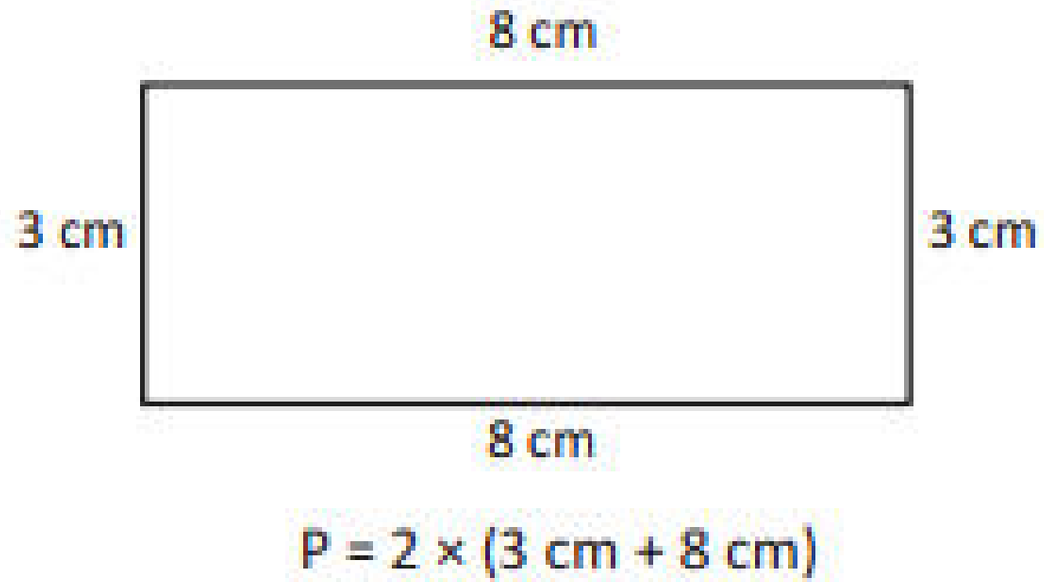
Use your square unit tiles to build as many rectangles as you can with a perimeter of 12 units.

When we knew the area, we used pairs of factors to help us find length and width. What strategy might we use to help us when we know the perimeter?

Let’s see what we can figure out.

Concept Development

Discuss with a partner how this equation represents the perimeter of the rectangle.



$P = 2 \times (3 \text{ cm} + 8 \text{ cm})$

Solve the addition fact, and rewrite the equation using the sum.

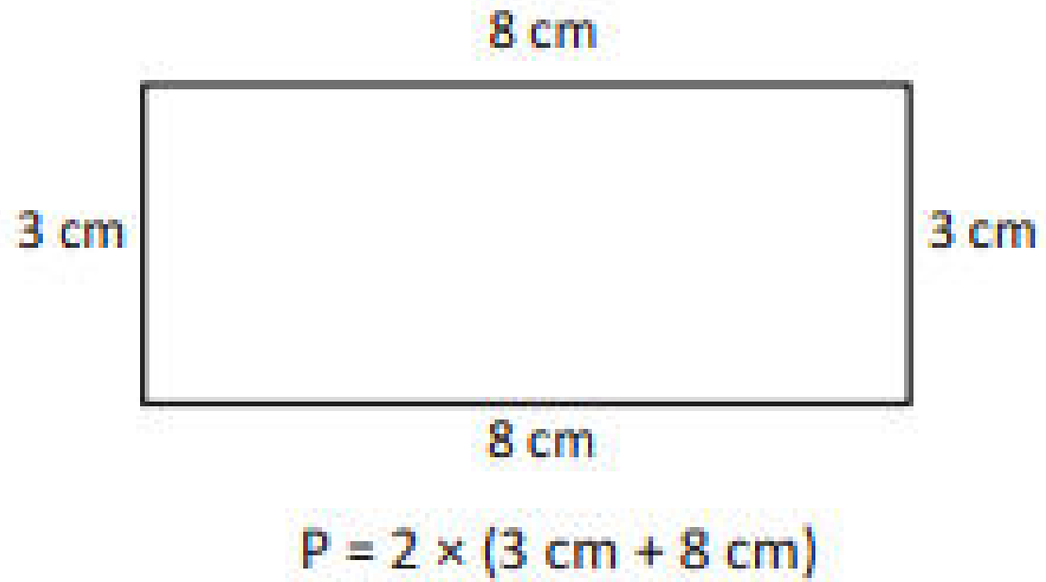
$$P = 2 \times 11 \text{ cm}$$

When we multiply a number by 2, what are we doing to that number?

Doubling it!

Concept Development

Discuss with a partner how this equation represents the perimeter of the rectangle.



$P = 2 \times (3 \text{ cm} + 8 \text{ cm})$

So, this equation shows perimeter as double the sum of the width and length. Talk to a partner. Can the perimeter of all rectangles be written as double the sum of the width and length?

Yes, because all rectangles have opposite sides that are equal.

Concept Development

Let’s see how knowing that helps with Problem 1. It asks us to use unit squares to build as many rectangles as we can that have a perimeter of 12 units.

We know that the perimeter, 12 units, is double the sum of the width and length. What is the opposite of doubling a number?

Dividing a number by 2. Halving a number.

Concept Development

$$12 \div 2 = 6$$

What does the 6 in this equation represent in relation to a rectangle with a perimeter of 12?

6 is the sum of the width and length.

Now that we know the sum of the width and length, we can find pairs of numbers that add up to 6.

Work with a partner to write number sentences that have a sum of 6. You only need to include a combination once.

Concept Development

1 + 5 = 6

2 + 4 = 6

3 + 3 = 6

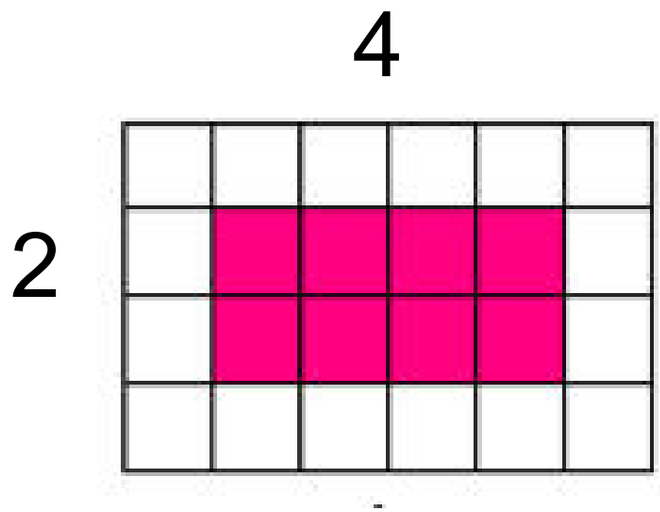
Check your work with mine, and make changes, if necessary. What do these combinations represent?

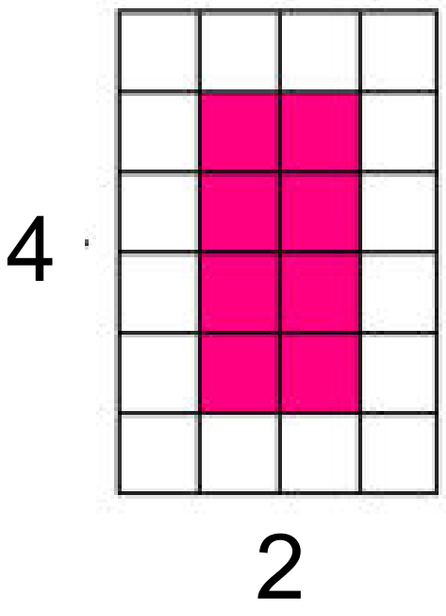
They’re the possible widths and lengths for a rectangle with a perimeter of 12 units!

Concept Development

1 + 5 = 6 2 + 4 = 6 3 + 3 = 6

Wait. How do we know which is width and which is length?



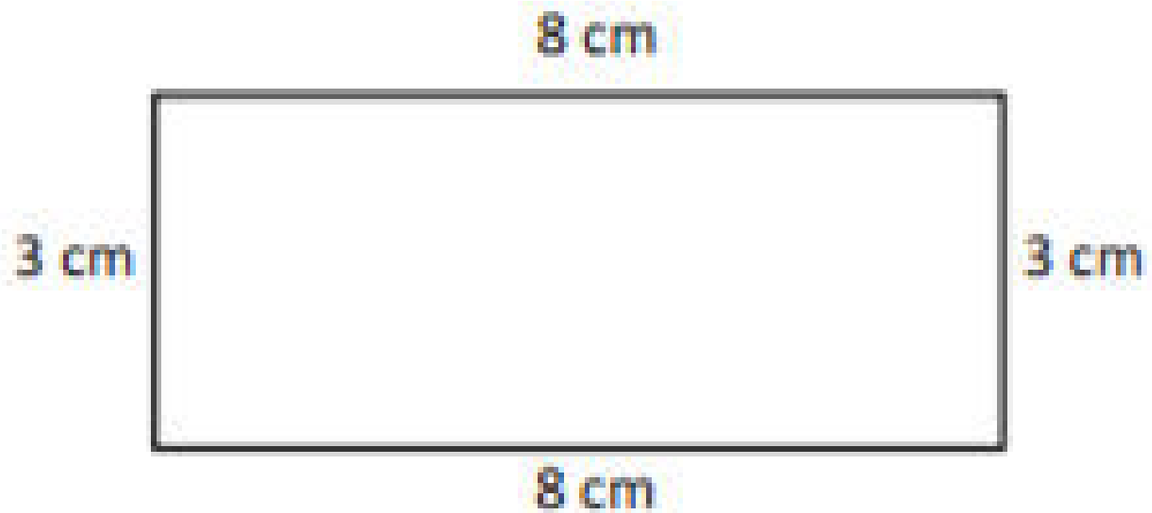


Oh! It's the same rectangle, just flipped. I guess it doesn't matter which is which for now.

Use your unit squares to build each rectangle with the widths and lengths that we found. Confirm that the perimeter is 12 units each time. Then, complete Problem 1 on the Problem Set.

Concept Development

P = (2 × 3 cm) + (2 × 8 cm).



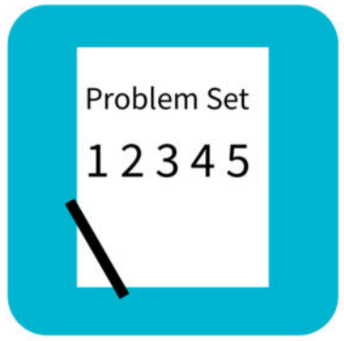
How does this equation represent the perimeter of the rectangle.

The perimeter is the sum of double the width and double the length.

Concept Development

For example, given a perimeter of 22 centimeters, students could find possible side lengths as shown below.

P = 22 cm	
Doubles: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22	
Pairs of Doubles That Add to 22:	Half of These Doubles:
2 + 20	w = 1, l = 10
4 + 18	w = 2, l = 9
6 + 16	w = 3, l = 8
8 + 14	w = 4, l = 7
10 + 12	w = 5, l = 6



Problem Set

Name _____ Date _____

1. Use your square unit tiles to build as many rectangles as you can with a perimeter of 12 units.

   a. Estimate to draw your rectangles below. Label the side lengths of each rectangle.

   b. Explain your strategy for finding rectangles with a perimeter of 12 units.

Debrief

- Share your answers to Problem 1 (c) and (d). Why are the areas of the rectangles different, even though the perimeters are the same?
- What are the widths and lengths of the rectangles you drew in Problem 2(a)? Explain to a partner how you found the widths and lengths.
- Share your answer to Problem 2(c) with a partner. Why can’t you find the area of a rectangle when you only know the rectangle’s perimeter?
- Look at the rectangles you drew in Problems 1(a) and 2(a). Which perimeter allowed you to draw a square? How do you know?

Exit Ticket (3 minutes)

Name _____ Date _____

Use your square unit tiles to build as many rectangles as you can with a perimeter of 8 units.

a. Estimate to draw your rectangles below. Label the side lengths of each rectangle.