

Same Area, Different Perimeter; Same Perimeter, Different Area

Math Focus Points

- Using tiles to find the area and perimeter of a rectangle
- Understanding that rectangles can have the same perimeter and different areas or the same area and different perimeters

Vocabulary

row
column
square inches

Today's Plan		Materials
1 ACTIVITY Using Tiles to Find the Area of Rectangles	 30 MIN  INDIVIDUALS  CLASS	<ul style="list-style-type: none"> <i>Student Activity Book</i>, pp. 33A–33B or C14–C15, What's the Area? Make copies. (as needed) C13, Rectangle Make 1 copy. Color tiles
2 DISCUSSION Finding the Area of Rectangles	 15 MIN  CLASS	<ul style="list-style-type: none"> Students' completed copies of <i>Student Activity Book</i>, p. 33B or C15 (from Activity 1) Color tiles
3 ACTIVITY Finding the Perimeter of Rectangles	 15 MIN  INDIVIDUALS	<ul style="list-style-type: none"> <i>Student Activity Book</i>, p. 33C or C16, Find the Area Make copies. (as needed)
4 SESSION FOLLOW-UP Daily Practice		<ul style="list-style-type: none"> <i>Student Activity Book</i>, pp. 33D–33E or C17–C18, Area and Perimeter Make copies. (as needed)

Ten-Minute Math

Practicing Place Value Say “seven hundred seventy-four” and ask students to write the number. Make sure that all students can read, write, and say this number correctly. Ask students to write this number in expanded form. Then ask students to solve these problems mentally, if possible:

- What is $774 + 20$? $774 - 50$? $774 + 100$? $774 + 200$? $774 - 300$?

Write each answer on the board. Have students compare each sum or difference with 774. Ask students:

- Which places have the same digits? Which do not? Why?

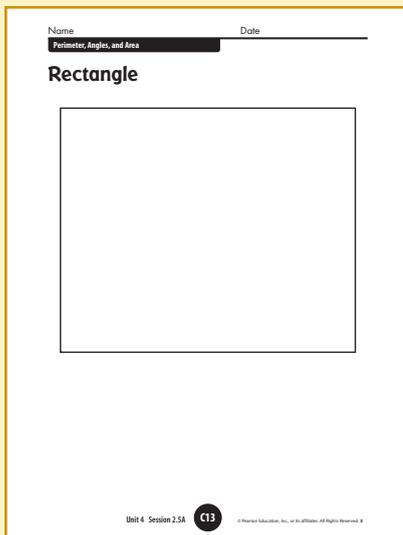
If time remains, pose additional similar problems using 747.

Teaching Note

- 1 **Terminology** Use this opportunity to introduce and review the language for rows and columns, which students revisit in the multiplication and division unit as they work with rectangular arrays.

Math Note

- 2 **Multiplying to Find the Area** Another way to find the area is to multiply the dimensions of the rectangle. Because multiplication and division are not covered until Unit 5, most students will approach this problem as a counting or addition problem. Unit 5 helps students develop an understanding of this important idea.



▲ Resource Masters, C13



ACTIVITY

Using Tiles to Find the Area of Rectangles



30 MIN



INDIVIDUALS



CLASS

You've been finding the area of different shapes, and making shapes with a particular area, using paper squares and triangles. Today we're going to work with another unit—color tiles.

Show students a color tile and explain that some people call them inch tiles because each side is one inch long. Show students the 5-inch \times 6-inch rectangle on C13.

Look at this rectangle. Turn and talk to a partner. How could you use color tiles to find the area of this rectangle?

Once students have had a chance to talk, introduce the idea of using tiles to find the area of the rectangle.

One way to find the area is to put as many tiles as will fit in the rectangle, and then count them. When using this method, there can't be any white space inside the rectangle, and none of the tiles can stick out from the rectangle. Let's try it. I'm going to work **row** by row. 1

Once you've filled the rectangle with color tiles, ask students to help you determine the area. Try each strategy that students suggest. Strategies might include counting each tile, adding the number of tiles in each row or **column**, or counting by the number of tiles in each row or column. 2 Be sure to discuss and demonstrate how to label your answer as square units or **square inches**.

Students complete *Student Activity Book* pages 33A and 33B or C14 and C15.

ONGOING ASSESSMENT: Observing Students at Work



Students use color tiles to find the area of rectangles.

- **Can students use tiles to cover the area of the rectangle?** Do they completely fill the rectangle, without straying outside the edges of the rectangle?
- **How do students determine the area?** Do they count the tiles individually? Do they add the number of tiles in each row or column? Do they count by the number of tiles in each row or column?
- **Do students record the area of each rectangle correctly?**

DIFFERENTIATION: Supporting the Range of Learners



Intervention Work with students who are counting the tiles individually to help them find more efficient strategies for finding the total number of tiles. For example, point out to the student that in the 4×3 rectangle, each row has 3 tiles in it. Then count by 3s while pointing at each column to show that the area is 12 square inches.

Extension Challenge students who accurately complete the activity to use the color tiles to make shapes with given areas. For example, ask students to make rectangles with areas of 14 square inches, 9 square inches, and 20 square inches.

2

DISCUSSION

Finding the Area of Rectangles



15 MIN CLASS

Math Focus Points for Discussion

- Using tiles to find the area and perimeter of a rectangle

Gather students to discuss the problems on *Student Activity Book*, page 33B or C15. Have a copy of the page with the tiles arranged on it for display during the discussion.

What did you find for the area of the first rectangle? Does everyone agree? What about the second rectangle?

Establish that both rectangles have an area of 16 square inches.

We've talked before about shapes that had the same area, but looked different. It seems like we've found another example of that. The area of both of these shapes is 16 square inches.

What if we measured the perimeter, the distance around the edge, of these shapes? Talk to a partner and make a prediction about the perimeter of these two shapes. Do you think they are the same? Or do you think that one has a greater perimeter than the other?

Name _____ Date _____
Perimeter, Angles, and Area

What's the Area?

 (page 1 of 2)
Use color tiles to find the area of the rectangles.

1. Area: _____ square inches



2. Area: _____ square inches



3. Area: _____ square inches



Session 2.5A Unit 4 33A

▲ Student Activity Book, Unit 4, p. 33A; Resource Masters, C14

Name _____ Date _____
Perimeter, Angles, and Area

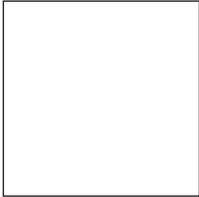
What's the Area?

 (page 2 of 2)
Use color tiles to find the area of the rectangles.

4. Area: _____ square inches



5. Area: _____ square inches



33B Unit 4 Session 2.5A

▲ Student Activity Book, Unit 4, p. 33B; Resource Masters, C15

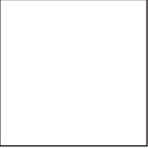
Name _____ Date _____

Perimeter, Angles, and Area

Find the Area

Each rectangle has a perimeter of 12 inches. Find the area.

1. Area: _____ square inches



2. Area: _____ square inches



3. Area: _____ square inches



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▲ Student Activity Book, Unit 4, p. 33C; Resource Masters, C16

Give students time to talk, and then collect predictions.

Students might say:



“I think if they have the same area, they will have the same perimeter too.”

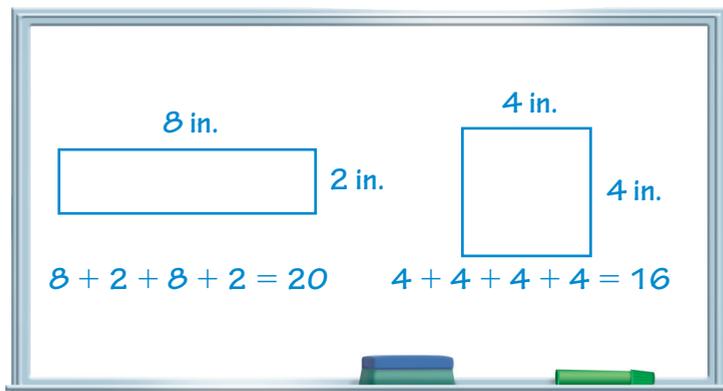


“I think the longer one will have a greater perimeter because it’s so much longer.”

Now let’s find the perimeter of the two rectangles. There are two ways we can do this.

Show students the completed sheet, with tiles on it. Then draw a sketch of the rectangles on the board and label each dimension.

Demonstrate finding the perimeter of each rectangle by counting the sides of the actual tiles. Then demonstrate finding the perimeter of each rectangle by adding the dimensions.



8 in. 2 in. $8 + 2 + 8 + 2 = 20$

4 in. 4 in. $4 + 4 + 4 + 4 = 16$

Remind students that the rectangles had the same area, but have different perimeters.

3 ACTIVITY Finding the Perimeter of Rectangles

15 MIN INDIVIDUALS

We’ve been looking at two rectangles with the same area, and talking about the perimeter of those shapes. We found out that rectangles that have the same area don’t necessarily have the same perimeter. Now we’re going to look at the opposite situation.

Direct attention to Find the Area (*Student Activity Book* page 33C or C16).

Each of the rectangles on this sheet has a perimeter of 12 inches. If you filled each rectangle with tiles and counted the edges, you would get 12. Or, if you added each of the 4 numbers together like we did earlier, you would get 12. Or, if you used a ruler, you would find that the perimeter of each rectangle is 12 inches. Your job is to figure out the area of each of these rectangles.

See the Ongoing Assessment and Differentiation suggestions on pages CC24 and CC25 for support in observing and supporting students while they work. When they have finished, call them back for a brief discussion. Reach a consensus on the area of each rectangle.

What did you find for the area of the first rectangle? (9 square inches) Does everyone agree? What about the second rectangle? (8 square inches) The third one? (5 square inches)

Each of these rectangles has a perimeter of 12 inches, but each rectangle has a different area. Does this surprise you? Why or why not?

Discuss students' ideas, but keep in mind that the reason this is true is quite complicated for third graders to think about and explain. Students might mention how what they are counting is different: when they are finding area, they are counting whole tiles; when they are finding perimeter, they are counting the sides or edges of the color tiles. When finding perimeter, sometimes one tile is counted more than once (e.g., corner tiles). In other words, perimeter is a one-dimensional or linear measure, while area is a measure of two-dimensional space.

4 SESSION FOLLOW-UP Daily Practice

 **Daily Practice:** For reinforcement of this unit's content, have students complete *Student Activity Book* pages 33D–33E or C17–C18.

Name _____ Date _____

Perimeter, Angles, and Area Daily Practice 

Area and Perimeter (page 1 of 2) NOTE: Students find the area and perimeter of rectangles.
Pages 110–111, 114–115

1. Each rectangle has an area of 20 square units. Find the perimeter of each rectangle.

Perimeter: _____ units Perimeter: _____ units

2. Each rectangle has an area of 18 square units. Find the perimeter of each rectangle.

Perimeter: _____ units Perimeter: _____ units

3. What do you notice about the *perimeter* of shapes that have the same area?

33D Unit 4 Session 2.5A

▲ Student Activity Book, Unit 4, p. 33D; Resource Masters, C17

Name _____ Date _____

Perimeter, Angles, and Area Daily Practice 

Area and Perimeter (page 2 of 2)

4. Each rectangle has a perimeter of 16 units. Find the area of each rectangle.

Area: _____ square units Area: _____ square units

5. Each rectangle has a perimeter of 14 units. Find the area of each rectangle.

Area: _____ square units Area: _____ square units

6. What do you notice about the *area* of shapes that have the same perimeter?

33E Unit 4 Session 2.5A

▲ Student Activity Book, Unit 4, p. 33E; Resource Masters, C18