Unit 2
Lesson
7

This is a **hands-on lesson.**

There is an Amplify Desmos Math **digital version** of this lesson available.

Teacher slides and other resources are available online or in print.

Disappearing Grids

Finding the Area of Rectangles Without a Grid

Let's use what we know about areas of rectangles with missing information.

Focus and Coherence

Today's Goals

1. **Language Goal:** Describe the area of a rectangle as equal numbers of squares in rows or equal number of squares in columns. **(Writing, Speaking and Listening)**
2. **Goal:** Determine the area of a rectangle showing only partial tiling or side length measures represented by tick marks or numerical labels.
3. **Goal:** Represent the area of a rectangle with a multiplication expression that represents the measures of its two side lengths.

Students work with rectangles where the individual unit squares are replaced with tick marks and side length labels to encourage using multiplication to determine the area. They see diagrams of rectangles that are described with standard units, such as square feet and square meters, to understand that an image or drawing represents an object when the actual size cannot be shown. **(MP1, MP7)**

Prior Learning

In Lesson 6, students saw how expressions are represented with rectangles on a grid, similar to an array, with which they worked in Unit 1.

Future Learning

In Lesson 8, students will use a ruler to measure the side lengths of rectangles and use that information to determine area.

Rigor and Balance

- Students strengthen their **conceptual understanding** relating multiplication to area of rectangles.
- Students continue to build their **fluency** with multiplication facts.

Vocabulary

Review Vocabulary

- *centimeter*
- *foot*
- *inch*
- *meter*

Standards

Addressing

3.MD.C.7.A

Find the area of a rectangle with whole-number side lengths by tiling it, and show that the area is the same as would be found by multiplying the side lengths.

Also addressing: **3.MD.C.7.B**, **3.OA.B.5**

I can be all of me in math class.
What can you do if you have a question about what someone said in math class?

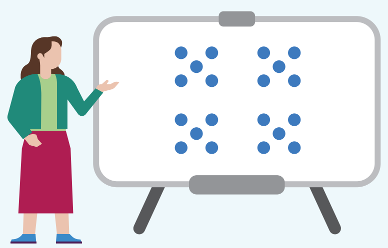
Support students in building their ***mathematical identity*** by asking them to reflect on this question as they complete this lesson.

Lesson at a Glance 60 min

Warm-up Fluency

Whole Class | 10 min

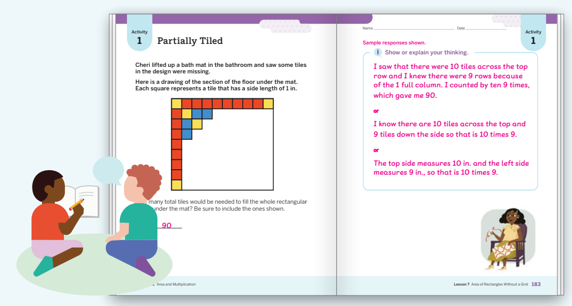
Students use the *How Many Do You See?* routine, in which they develop fluency by looking at and describing the different ways they see different arrangements of dots grouped in 5, 6, and then 4. **(MP7)**



Activity 1

Pairs | 15 min

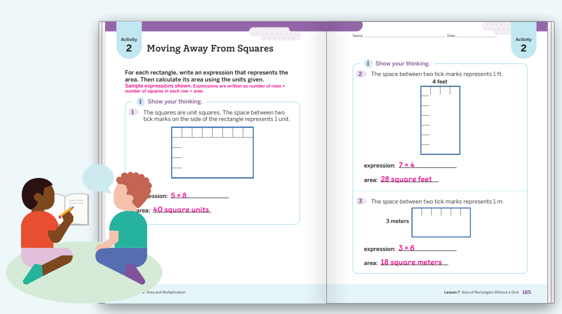
Students are given a partially tiled rectangle. They need to consider strategies to determine the area, including multiplying side lengths. **(MP1)**



Activity 2

Pairs | 20 min

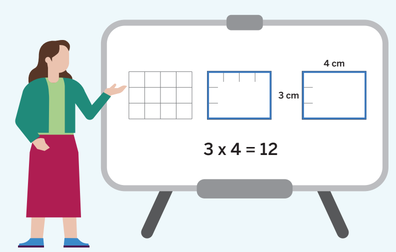
Students determine the area of rectangles that are not tiled, but whose sides are marked with equally spaced tick marks, to transition to using only side lengths to find area. **(MP1)**



Summary

Whole Class | 10 min

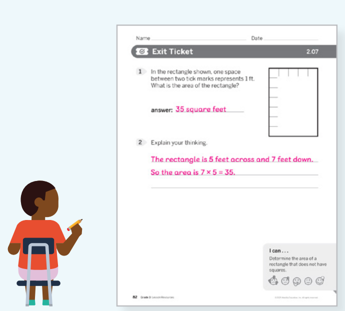
Students review and reflect on the gradual removal of grid lines transitioning to the labeling of side lengths.



Exit Ticket

Independent | 5 min

Students demonstrate their understanding by calculating the area of a rectangle when only tick marks are given on two sides.



Prep Checklist

All resources are available online or in print.

This lesson includes:

- Exit Ticket PDF
- Teacher slides*

* The Warm-up and Summary are intended to be projected.

Additional required materials:

Activity 1	☐ Activity 1 PDF, *Tiled Subway Stops* (for display) **(Lesson Resources)**
Activity 2	☐ inch tiles (as needed) **(Manipulative Kit)** ☐ centimeter grid paper (as needed) **(Lesson Resources)**

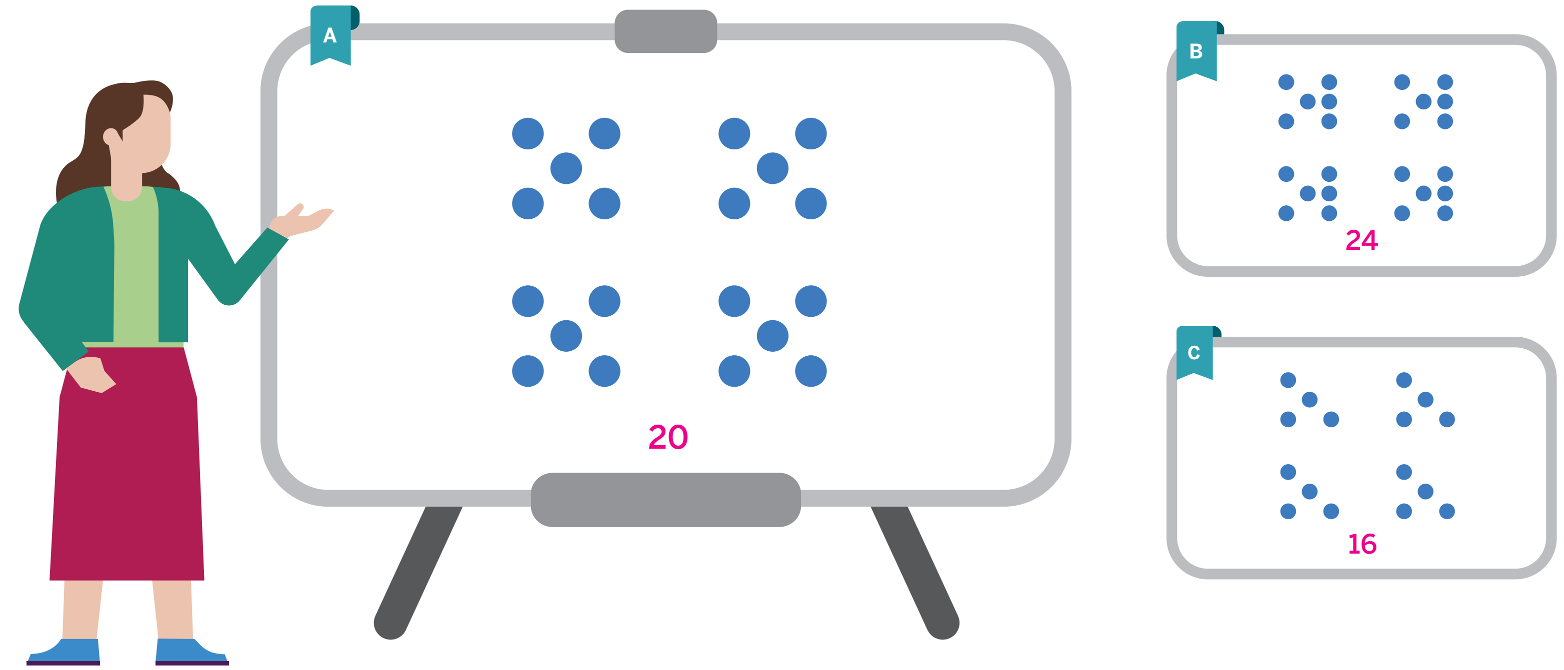
Warm-up How Many Do You See? Fluency

Whole Class 10 min

3.OA.B.5
MP7

Purpose: Students determine the number of dots to build on their understanding of the relationship between equal groups and multiplication.

Warm-up Teacher slides



Why these images? These images lend themselves to students using the structure of 5 dots to describe the same number of groups of 6 dots and 4 dots.

1 Launch

Flash the first image for 2–5 seconds, and ask, "How many do you see?"

Say, "Give me a signal when you have an answer."

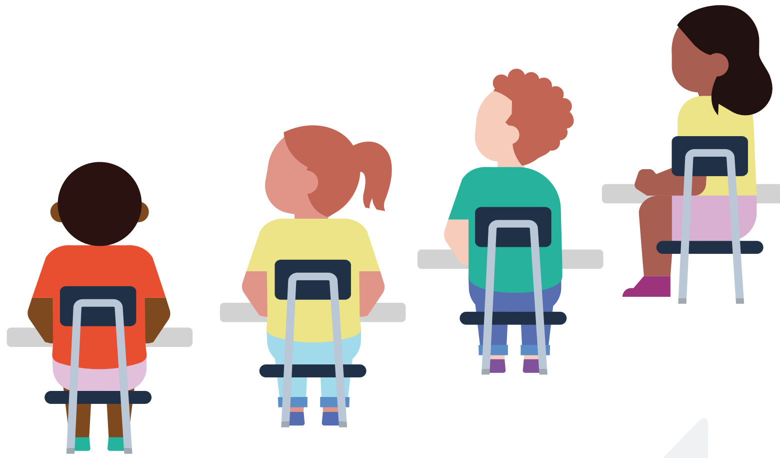
Display the image again, leaving it displayed to discuss.

2 Connect

Record two or three students' responses, and ask, "How did you see them?"

Repeat for each image, spending the most time discussing Images B and C.

Ask, "How did the first image help you determine the number of dots in the next two images?"



Students might say . . .

A: *I see 4 groups of 5, so I counted by 5 four times I know that 4 times 5 is 20.*

B: *It was like the first problem, but there was 1 more dot in each group. So I added 4 to 20 to get 24.*

C: *It was like the first problem, but each group was missing a dot so I subtracted 4 from 20 to get 16.*

Keep it moving!

The Warm-up is intended to be a brief part of today's lesson. Consider students' responses as invitational. They do not necessitate an evaluative response from you or a lengthy class discussion at this time.

Activity 1 Partially Tiled

Purpose: Students determine a relatively large number of total tiles needed to cover a partially tiled rectangular area, encouraging them to use multiplication instead of counting.

Pairs | 15 min

Materials

- Activity 1 PDF, *Tiled Subway Stops* (for display) **(Lesson Resources)**

Teacher's Choice

Short on time? Consider making this activity a whole class discussion.

3.MD.C.7.A, 3.MD.C.7.B
MP1

1 Launch

Display the Activity 1 PDF, *Tiled Subway Stops*.

Use the *Notice and Wonder* routine.

Say:

- "These are examples of tiled subway station signs in New York City. Some are more decorative than others, but they all help a few million people move around a city every day."
- "This problem involves determining the area of a floor design in Cheri's bathroom. Many of the square tiles have been lost or damaged. Think about how many tiles would be needed to tile the whole area under the mat."

D Differentiation **Accessibility:** Provide students with a rectangle with a more accessible value. For example, display a partially tiled rectangle with fewer rows. **(Memory and attention)**

2 Monitor

While students complete the activity, refer to the D **Differentiation | Teacher Moves** table on the following page.

If students need help getting started . . .

- Ask, "What is this problem asking you to do? What information is given to you?"
- Ask, "What else do you need to know in order to determine the area?"

3 Connect

Have students share strategies for how they determined how many tiles it would take to cover the area of the rectangle. Select and sequence their responses in the order shown in the *Differentiation* table.

Ask:

- "How did you know how many tiles would be in each row or column? How did you use that information to calculate the total number of tiles needed?"
- How could multiplication help determine the total number of tiles needed?
- "What is the area of 1 square tile? What is the area of the design?"
- "Do the tiles on the page here actually have a side length of 1 in.?"

MLR8 Discussion Supports — Revoicing

- Revoice student ideas to demonstrate and amplify mathematical language use. For example, revoice the student statement "I saw a complete row, and if I tiled all the rows, then they are all the same" as "I saw a complete row, and if I tiled the rest of the rows, each row would be an equal group."

Explicit Instruction

Say, "If you know how many unit squares are in one row and how many unit squares are in one column, the total number of unit squares needed to cover a rectangle can be represented by a multiplication expression, even without all the unit squares being shown. You can then use multiplication to determine the area."

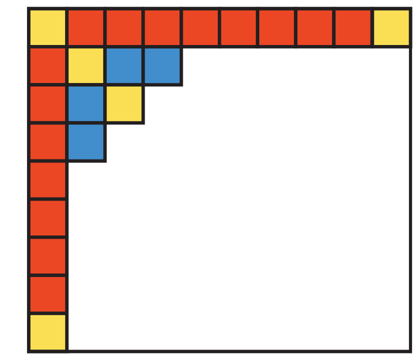
Activity 1 Teacher slides

Activity 1 Partially Tiled

Activity 1 **Partially Tiled**

Cheri lifted up a bath mat in the bathroom and saw some tiles in the design were missing.

Here is a drawing of the section of the floor under the mat. Each square represents a tile that has a side length of 1 in.



How many total tiles would be needed to fill the whole rectangular space under the mat? Be sure to include the ones shown.

tiles: 90

182 Unit 2 Area and Multiplication

Name Date

Sample responses shown.

Show or explain your thinking.

I saw that there were 10 tiles across the top row and I knew there were 9 rows because of the 1 full column. I counted by ten 9 times, which gave me 90.

or

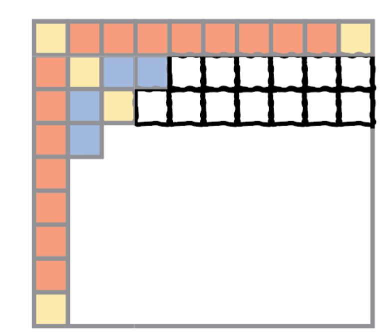
I know there are 10 tiles across the top and 9 tiles down the side so that is 10 times 9.

or

The top side measures 10 in. and the left side measures 9 in., so that is 10 times 9.

Lesson 7 Area of Rectangles Without a Grid 183

D Differentiation | Teacher Moves

Look for students who . . .	For example . . .	Provide support . . .
Almost there Draw squares or grid lines and count each tile.		Ask, "Is there a way that is more efficient than counting every tile one by one?"
Skip count by the number of tiles in each row or column.	There are 10 across the top, so I can continue counting by 10 for each row going down: 20, 30, 40, 50, 60, 70, 80, 90.	Ask, "What expression represents how you skip counted? How does that show how you determine the number of tiles?"
Multiply the side lengths to calculate the area.	I know that it's 10 across and 9 down and 10 x 9 = 90.	Extension Ask, "What would the total be if you added one more column? What if you added one more row?"

Activity 2 Moving Away From Squares

Purpose: Students determine the area of rectangles with less and less information shown pictorially, helping students transition to only need side lengths to calculate area using multiplication.

Pairs | 20 min

Materials

- inch tiles (as needed) **(Manipulative Kit)**
- centimeter grid paper (as needed) **(Lesson Resources)**

3.MD.C.7.A, 3.MD.C.7.B
MP1

1 Launch

Read aloud the directions and Problem 1. Have 2–3 students rephrase what they are being asked to determine.

Ask, "What will be the units for the area of the rectangle in Problem 1?"

Say:

- "Units are an important part of describing the area of a rectangle. For example, when you describe the area of an object, it makes a difference if you use square centimeters or square meters."
- "The side lengths will be labeled with cm, in., ft, and m. They are the abbreviations for centimeters, inches, feet, and meters."

D **Differentiation** **Accessibility:** Provide grid paper or inch tiles for students to recreate the rectangle in each problem. **(Visual-spatial processing)**

2 Monitor

After students have completed **Problem 3**, refer to the D Differentiation | Teacher Moves table on the following page.

If students need help getting started . . .

- Say, "Tell me what you know about determining area for a rectangle."
- Ask, "What is shown on this rectangle that can help you determine its area?"

3 Connect

Ask:

- "What happened to the tiles from Problem 1 to Problem 2? And then from Problem 2 to Problem 3?"
- "Problem 3 has 5 tick marks at the top of the rectangle. What is the length of that side in meters?"

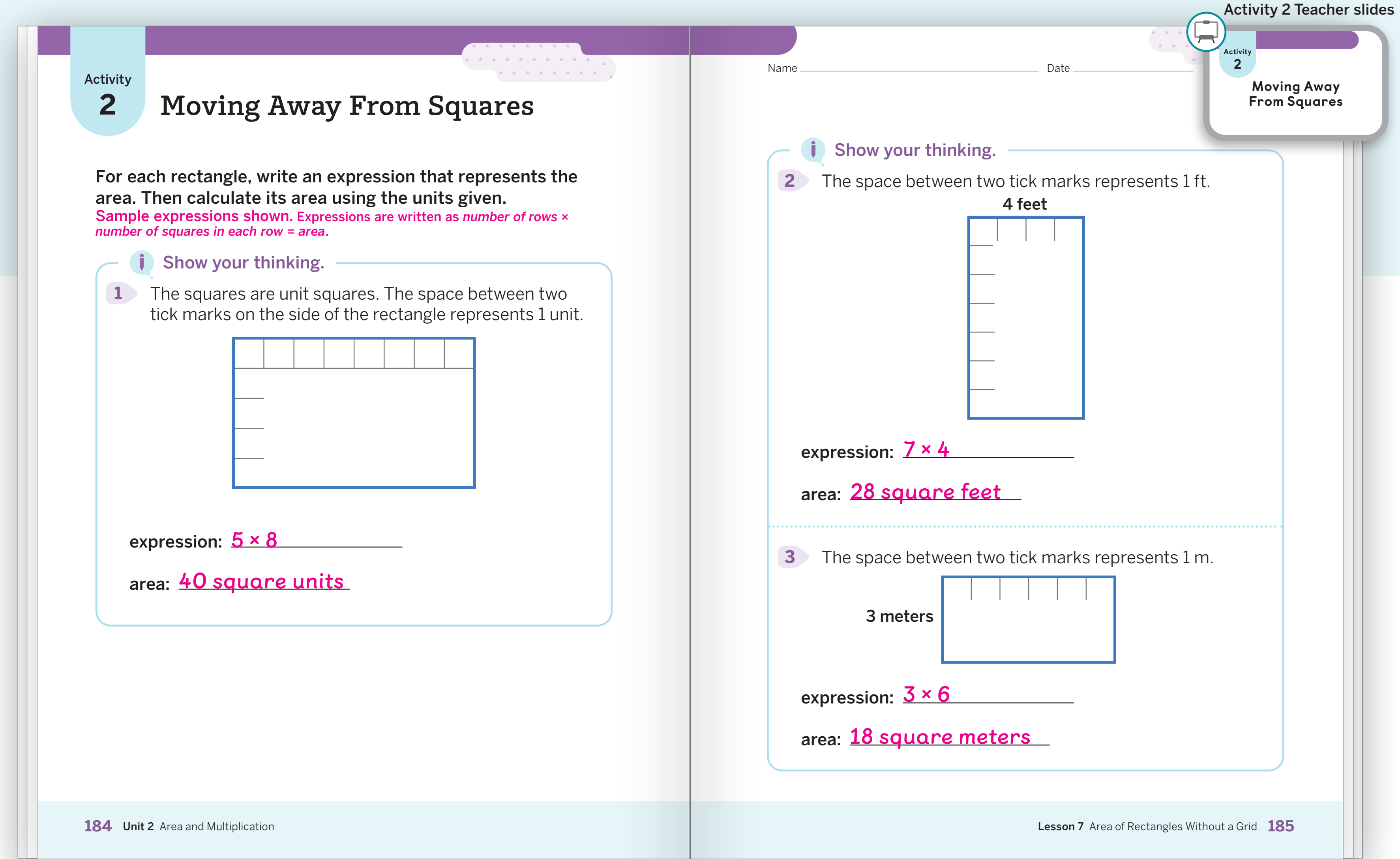
Have students share their expressions for Problems 1–3 and how each is represented in the corresponding diagram. Be sure to include, or introduce, the possibility of adding or extending tick marks to show unit squares, demonstrating it on the diagrams if necessary.

Ask: "How can you figure out the area of a rectangle if you can't see all of the unit squares? Why does multiplication help you find the area?"

Explicit Instruction

Say, "You do not need to see all of the unit squares to know the area of a rectangle. If you are given enough information to know how many squares would align to each side length, you can still use multiplication to determine the area."

Activity 2 Teacher slides


Activity 2 Moving Away From Squares

For each rectangle, write an expression that represents the area. Then calculate its area using the units given.
Sample expressions shown. Expressions are written as *number of rows × number of squares in each row = area.*

Show your thinking.

1 The squares are unit squares. The space between two tick marks on the side of the rectangle represents 1 unit.

expression: 5 × 8
area: 40 square units

Name Date

Activity 2 Moving Away From Squares

Show your thinking.

2 The space between two tick marks represents 1 ft.

4 feet

expression: 7 × 4
area: 28 square feet

3 The space between two tick marks represents 1 m.

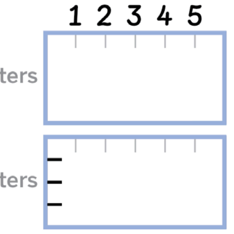
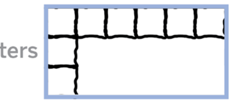
3 meters

expression: 3 × 6
area: 18 square meters

184 Unit 2 Area and Multiplication

Lesson 7 Area of Rectangles Without a Grid 185

D Differentiation | Teacher Moves

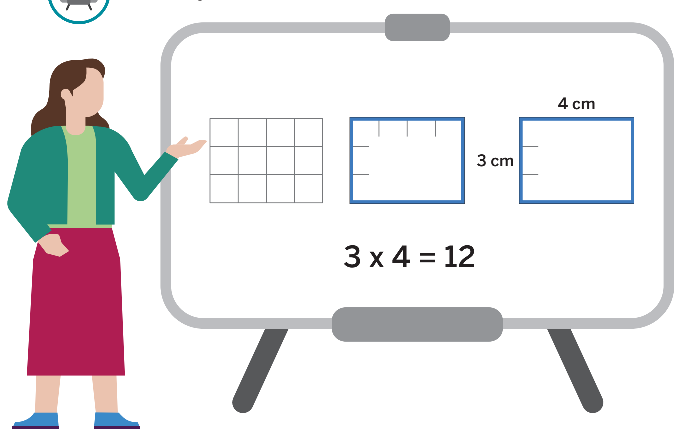
Look for students who . . .	For example . . .	Provide support . . .
Almost there Relate the number of tick marks along a side and the length of the side.	 1 2 3 4 5 / 3 meters 3 x 5 / 3 meters 4 x 6	Have students use a straightedge to make the rows and columns. Ask, "Where do you see the tick marks?" Have them write over the tick marks with a colored pencil. Ask, "How does your counting change?"
Draw the squares or grid lines in the rectangle.	 3 meters 3 x 6	Ask, "How many squares would be in each row (or column)? How could you use multiplication to calculate the area?"
Draw the tick marks or draw the squares in the top row and first column of the rectangle and then multiply the side lengths.	 3 meters 3 x 6 = 18	**Extension** Ask, "How would the area change if 3 m was changed to 2 m instead?"
Multiply the side lengths.	There would be 6 squares along the top, so the area is equal to 3 x 6, or 18 square meters.	

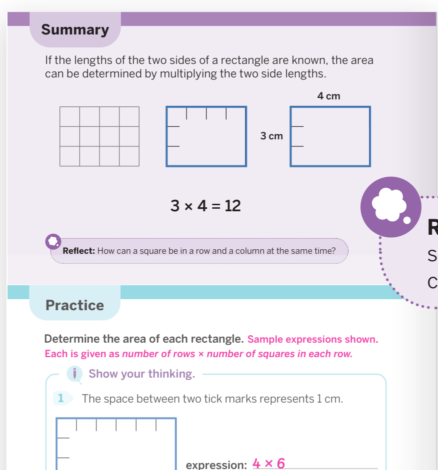
Summary

Whole Class | 10 min

Key Takeaway: If the lengths of the two sides of a rectangle are known, the area — the number of unit squares needed to cover it — is determined by multiplying the two side lengths.

Summary Teacher slide





Summary

If the lengths of the two sides of a rectangle are known, the area can be determined by multiplying the two side lengths.

4 cm

3 cm

3 × 4 = 12

Reflect: How can a square be in a row and a column at the same time?

Practice

Determine the area of each rectangle. Sample expressions shown. Each is given as *number of rows × number of squares in each row.*

Show your thinking.

1 The space between two tick marks represents 1 cm.

expression: 4 × 6

Reflect: "How can a square be in a row and a column at the same time?"

Synthesis

Say, "Today, you determined the area of rectangles where the squares were taken away."

Display the Summary slide. Consider creating a visual display of this slide to record students' responses. This can be displayed for students to reference for the remainder of the unit.

Ask:

- "Where do you see 3, 4, and 12 in each rectangle?"
- "What do you need to know in order to determine the area of a rectangle?"

Say, "You can calculate the area of a rectangle as long as you know its two side lengths. If needed, you can draw tick marks or unit squares to help you visualize the area as unit squares. The total number of squares will always be equal to the product of the lengths of the two sides."

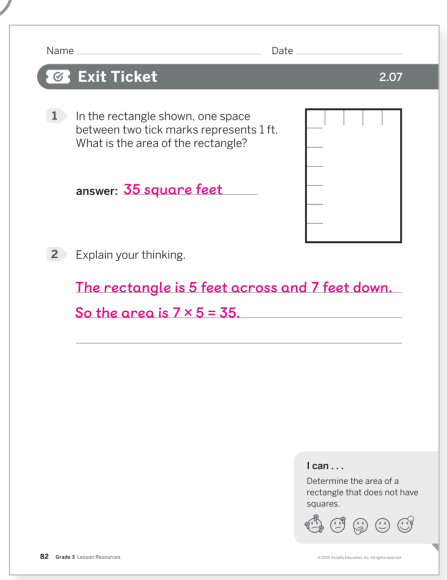
Invite students to respond to the reflection question.

Exit Ticket

Independent | 5 min

3.MD.C.7.B

Exit Ticket PDF



Name ______ Date ______

Exit Ticket 2.07

1 In the rectangle shown, one space between two tick marks represents 1 ft. What is the area of the rectangle?

answer: 35 square feet

2 Explain your thinking.

The rectangle is 5 feet across and 7 feet down. So the area is 7 × 5 = 35.

I can . . .
Determine the area of a rectangle that does not have squares.

82 Grade 3 Lesson Resources

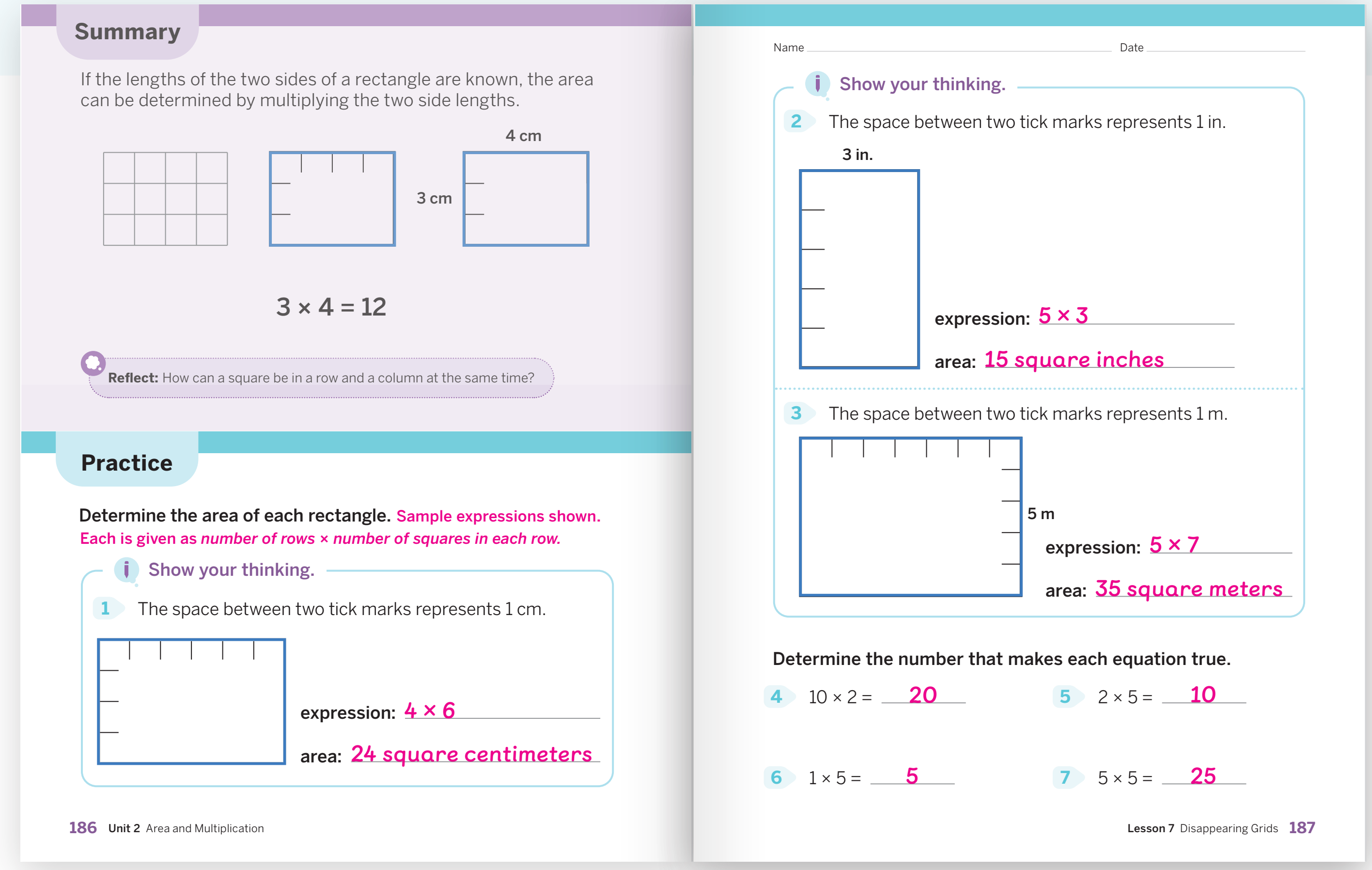
© 2025 Amplify Education, Inc. All rights reserved.

Professional Learning

How did students change their methods for determining area when they saw rectangles that were partially tiled or rectangles that showed only tick marks along two sides?

Practice

Provide students with sufficient practice to build and reinforce their conceptual understanding, fluency, and application of mathematical topics including connections to STEM, assessment practice, and ongoing spiral review.



Summary

If the lengths of the two sides of a rectangle are known, the area can be determined by multiplying the two side lengths.

4 cm

3 cm

3 × 4 = 12

Reflect: How can a square be in a row and a column at the same time?

Practice

Determine the area of each rectangle. Sample expressions shown. Each is given as *number of rows × number of squares in each row.*

Show your thinking.

1 The space between two tick marks represents 1 cm.

expression: 4 × 6

area: 24 square centimeters

186 Unit 2 Area and Multiplication

Name ______ Date ______

Show your thinking.

2 The space between two tick marks represents 1 in.

3 in.

expression: 5 × 3

area: 15 square inches

3 The space between two tick marks represents 1 m.

5 m

expression: 5 × 7

area: 35 square meters

Determine the number that makes each equation true.

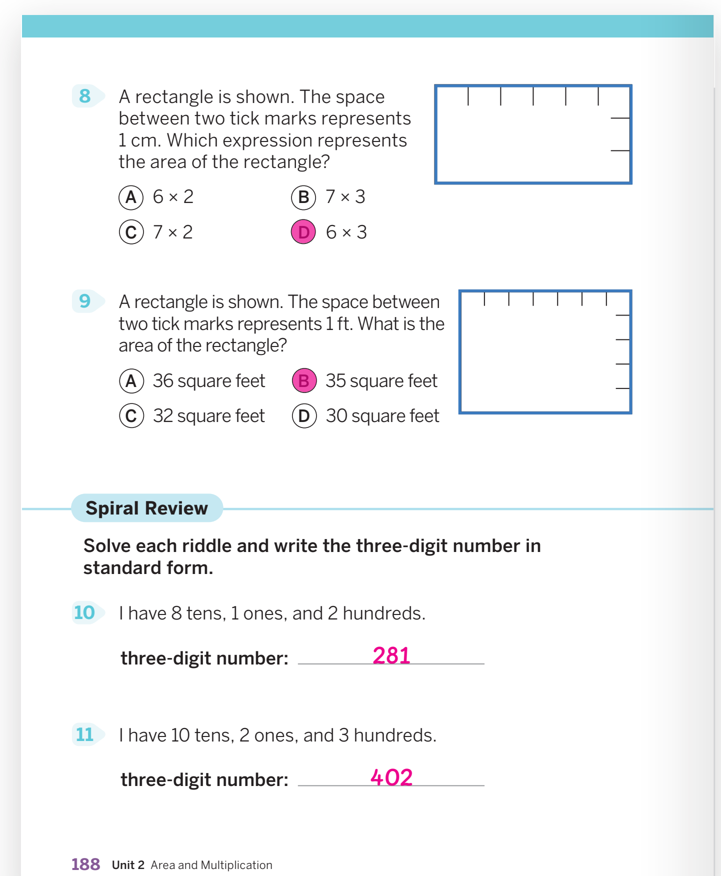
4 10 × 2 = 20

5 2 × 5 = 10

6 1 × 5 = 5

7 5 × 5 = 25

Lesson 7 Disappearing Grids 187



8 A rectangle is shown. The space between two tick marks represents 1 cm. Which expression represents the area of the rectangle?

(A) 6 × 2
(B) 7 × 3
(C) 7 × 2
(D) 6 × 3

9 A rectangle is shown. The space between two tick marks represents 1 ft. What is the area of the rectangle?

(A) 36 square feet
(B) 35 square feet
(C) 32 square feet
(D) 30 square feet

Spiral Review

Solve each riddle and write the three-digit number in standard form.

10 I have 8 tens, 1 ones, and 2 hundreds.

three-digit number: 281

11 I have 10 tens, 2 ones, and 3 hundreds.

three-digit number: 402

188 Unit 2 Area and Multiplication

Practice Problem Item Analysis

	Problem	DOK	Standard(s)
On-lesson			
	1–3	2	3.MD.C.7.B
Fluency	4–7	1	3.OA.C.7
Test Practice	8–9	1	3.MD.C.7.B
Spiral Review			
	10–11	1	2.NBT.A.1

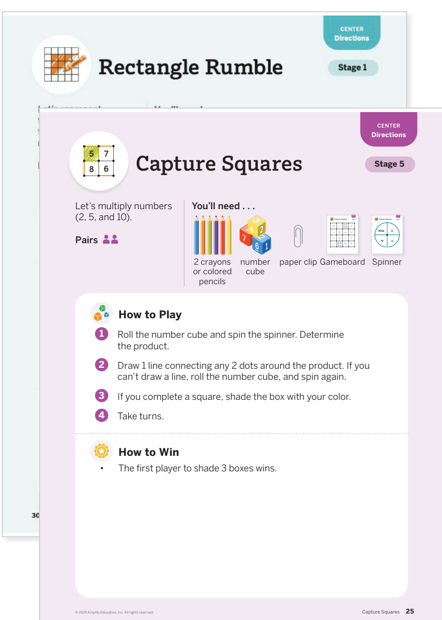
Support

Provide targeted intervention for students by using these resources.

Centers | 15 min

Have students choose from these Centers and use them as games to practice their math skills. **(Centers Resources)**

- *Capture Squares*, Stage 5
- *Rectangle Rumble*, Stage 1


Center Directions

Rectangle Rumble

Stage 1

Center Directions

Capture Squares

Stage 5

Let's multiply numbers (2, 5, and 10).

Pairs

You'll need . . .

2 crayons or colored pencils, number cube, paper clip, Gameboard, Spinner

How to Play

1. Roll the number cube and spin the spinner. Determine the product.
2. Draw 1 line connecting any 2 dots around the product. If you can't draw a line, roll the number cube, and spin again.
3. If you complete a square, shade the box with your color.
4. Take turns.

How to Win

- The first player to shade 3 boxes wins.

Capture Squares 25

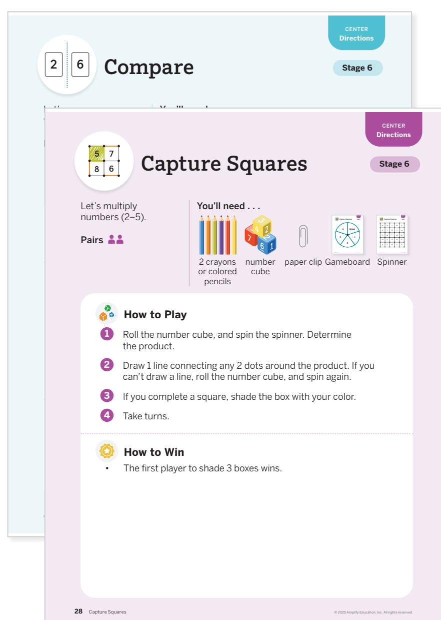
Strengthen

Reinforce students' understanding of the lesson's concepts and skills by using these resources.

Centers | 15 min

Have students choose from these Centers and use them as games to practice their math skills. **(Centers Resources)**

- *Capture Squares*, Stage 6
- *Compare*, Stage 3
- *Rectangle Rumble*, Stages 1 and 2


Center Directions

Compare

Stage 6

Center Directions

Capture Squares

Stage 6

Let's multiply numbers (2–5).

Pairs

You'll need . . .

2 crayons or colored pencils, number cube, paper clip, Gameboard, Spinner

How to Play

1. Roll the number cube, and spin the spinner. Determine the product.
2. Draw 1 line connecting any 2 dots around the product. If you can't draw a line, roll the number cube, and spin again.
3. If you complete a square, shade the box with your color.
4. Take turns.

How to Win

- The first player to shade 3 boxes wins.

28 Capture Squares

Stretch

Challenge students and extend their learning with these rich mathematical tasks and problems.