Area and Multiplication
# Area and Multiplication

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Unit 2: Area and Multiplication

At a Glance

Unit 2 is estimated to be completed in 15-17 days including 2 days for assessment.

This unit is divided into three sections including 13 lessons and 2 optional lessons.

- Section A—Concepts of Area Measurement (Lessons 1-4)
- Section B—Relate Area to Multiplication (Lessons 5-11)
- Section C—Find Area of Figures Composed of Rectangles (Lessons 12-15)

On pages 7-8 of this Teacher Guide is a chart that identifies the section each lesson belongs in and the materials needed for each lesson.

This unit uses five student centers.

- Can You Build It?
- Five in a Row: Multiplication
- Capture Squares
- Rectangle Rumble
- Five in a Row: Addition and Subtraction
Unit 2: Area and Multiplication

Unit Learning Goals

- Students learn about area concepts and relate area to multiplication and to addition.

In this unit, students encounter the concept of area, relate the area of rectangles to multiplication, and solve problems involving area.

In grade 2, students explored attributes of shapes, such as number of sides, number of vertices, and length of sides. They measured and compared lengths (including side lengths of shapes).

In this unit, students make sense of another attribute of shapes: a measure of how much a shape covers. They begin informally, by comparing two shapes and deciding which one covers more space. Later, they compare more precisely by tiling shapes with pattern blocks and square tiles. Students learn that the area of a flat figure is the number of square units that cover it without gaps or overlaps.

Students then focus on the area of rectangles. They notice that a rectangle tiled with squares forms an array, with the rows and columns as equal-size groups. This observation allows them to connect the area of rectangles to multiplication—as a product of the number of rows and number of squares per row.

To transition from counting to multiplying side lengths, students reason about area using increasingly more abstract representations. They begin with tiled or gridded rectangles, move to partially gridded rectangles or those with marked sides, and end with rectangles labeled with their side lengths.

\[ 6 \times 3 = 18 \]

Students also learn some standard units of area—square inches, square centimeters, square feet, and square meters—and solve real-world problems involving area of rectangles.

Later in the unit, students find the area and missing side lengths of figures composed of non-overlapping rectangles. This work includes cases with two non-overlapping rectangles sharing one side of the same length, which lays the groundwork for understanding the distributive property of multiplication in a later unit.
Section A: Concepts of Area Measurement

Standards Alignments
Addressing 3.MD.C.5, 3.MD.C.5.a, 3.MD.C.5.b, 3.MD.C.6, 3.OA.A.1
Building Towards 3.MD.C.5

Section Learning Goals
- Describe area as the number of unit squares that cover a plane figure without gaps and overlaps.
- Measure the area of rectangles by counting unit squares.

In this section, students reason about area as an attribute of two-dimensional shapes and develop a sense of area as the amount of space covered by a shape.

They begin by considering how to show or explain a shape as being larger or smaller than another. Next, they see that they can quantify the size of shapes more precisely by covering them with units of the same size, such as pattern blocks or square tiles.

Students then learn that the area of a shape is the number of squares that covers it with no gaps or overlaps. To find the number of square tiles used to cover a space, students may skip-count or use multiplication.

PLC: Lesson 1, Activity 1, Compare Shapes

Suggested Centers
- Can You Build It? (3–5), Stage 1: Rectangles (Addressing)
- Five in a Row: Multiplication (3–5), Stage 1: Factors 1–5 and 10 (Supporting)
Section B: Relate Area to Multiplication

Standards Alignments

Building On: 3.OA.B.5
Addressing: 3.MD.C.6, 3.MD.C.7.b, 3.OA.B.5, 3.OA.D.9
Building Towards: 3.MD.C.7.d

Section Learning Goals

- Explain why the area of a rectangle can be determined by multiplying the side lengths.
- Solve problems involving the area of rectangles.

In this section, students relate the area of rectangles to multiplication expressions.

Students see equal-size groups in rectangles that are tiled with squares. They learn to express the area of rectangles as a product of two numbers that describe the equal groups. For example, in a rectangle that is 8 units by 4 units, students see 8 groups of 4 or 4 groups of 8. The product of the two numbers, $8 \times 4$ or $4 \times 8$, gives the number of squares that covers a rectangle completely with no gaps or overlaps.

Use of the structure of a rectangle enables students to transition from gridded rectangles to rectangles showing only side lengths (MP7). The progression in visual representations matches the progression in strategies for reasoning about area: moving from concrete (counting) to abstract (finding products of two numbers).

In this section, students also learn about standard units of area in inches, feet, centimeters, and meters. They explore these units in the context of real-world and mathematical problems.

PLC: Lesson 5, Activity 1, Match Expressions and Areas

Suggested Centers

- Capture Squares (1–3), Stage 6: Multiply with 1–5 (Addressing)
- Rectangle Rumble (3–5), Stage 1: Factors 1, 2, 5, and 10 (Addressing)
- Five in a Row: Addition and Subtraction (1–2), Stage 6: Add within 100 with Composing
(Supporting)

- Rectangle Rumble (3–5), Stage 2: Factors 1–5 (Addressing)
- Five in a Row: Addition and Subtraction (1–2), Stage 7: Add within 1,000 without Composing (Supporting)
Section C: Find Area of Figures Composed of Rectangles

Standards Alignments
Building On 2.NBT.B.5

Section Learning Goals

- Find the area of figures composed of rectangles.

In this section, students encounter figures composed of non-overlapping rectangles and find their area.

As with the rectangles in earlier lessons, students see increasingly abstract diagrams, starting with figures that are fully gridded, moving to those with a partial grid, and ending with figures showing only side lengths and no grid. The progression encourages students to decompose the figures and use multiplication to reason about area. The work here highlights the additive nature of area.

Students also use their understanding of rectangles (that opposite sides are equal) to find missing side lengths in figures composed of rectangles.

PLC: Lesson 12, Activity 2, Find the Rectangles

Suggested Centers

- Five in a Row: Multiplication (3–5), Stage 2: Factors 1–9 (Addressing)
- Five in a Row: Addition and Subtraction (1–2), Stage 8: Add within 1,000 with Composing (Supporting)
Throughout the Unit

The warm-ups in this unit support students' work toward fluency with multiplication. Students experience the idea of the distributive property as they use dot images showing groups of 2, 5, and 10 to find products that have 1 more in each group or 1 more group. For example, they can find the total number of dots in 6 groups by adding 1 more group to the total in 5 equal groups. Later in the unit, they encounter a Number Talk that also elicits this property.

Toward the end of the unit, students practice reasoning mentally about addition in preparation for the next unit, which focuses on addition and subtraction within 1,000.

Here is a sampling of the warm-ups in this unit.

<table>
<thead>
<tr>
<th>lesson 3</th>
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<th>lesson 10</th>
<th>lesson 13</th>
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<td>How Many Do You See?</td>
<td>Number Talk</td>
<td>Number Talk</td>
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<tr>
<td>A</td>
<td>B</td>
<td>5 × 2</td>
<td>109 + 4</td>
</tr>
<tr>
<td>C</td>
<td>D</td>
<td>6 × 2</td>
<td>109 + 14</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5 × 6</td>
<td>209 + 34</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6 × 6</td>
<td>219 + 34</td>
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## Materials Needed

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<tr>
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<td>A.1</td>
<td>• Pattern blocks</td>
<td>• Pattern Blocks to Compare Shapes (groups of 1)</td>
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<td></td>
<td>• Scissors</td>
<td></td>
</tr>
<tr>
<td>A.2</td>
<td>• Inch tiles</td>
<td>• Use Square Tiles to Measure Area (groups of 2)</td>
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<td>A.3</td>
<td>• Inch tiles</td>
<td>• Time to Tile (groups of 1)</td>
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<td></td>
<td></td>
<td>• Card Sort: Rectangles (groups of 2)</td>
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<tr>
<td>A.4</td>
<td>• Folders</td>
<td>• none</td>
</tr>
<tr>
<td>B.5</td>
<td>• Inch tiles</td>
<td>• Match Expressions and Areas (groups of 30)</td>
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<tr>
<td>B.6</td>
<td>• Patty paper</td>
<td>• Same Rectangle, Different Units (groups of 2)</td>
</tr>
<tr>
<td></td>
<td>• Rulers (whole units)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Scissors</td>
<td></td>
</tr>
<tr>
<td>B.7</td>
<td>• Materials from a previous activity</td>
<td>• none</td>
</tr>
<tr>
<td></td>
<td>• Materials from a previous lesson</td>
<td></td>
</tr>
<tr>
<td>B.8</td>
<td>• Rulers or straightedges</td>
<td>• none</td>
</tr>
<tr>
<td>B.9</td>
<td>• Rulers (centimeters)</td>
<td>• none</td>
</tr>
<tr>
<td></td>
<td>• Rulers (inches)</td>
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<td></td>
<td>• Tape (painter’s or masking)</td>
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</tr>
<tr>
<td></td>
<td>• Yardsticks</td>
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<tr>
<td>B.10</td>
<td>• Inch tiles</td>
<td>• Centimeter Grid Paper - Standard (groups of 2)</td>
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<td></td>
<td>• Tools for creating a visual display</td>
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</tr>
<tr>
<td>B.11</td>
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<tr>
<td><strong>C.13</strong></td>
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<td>• none</td>
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<tr>
<td><strong>C.14</strong></td>
<td>• none</td>
<td>• none</td>
</tr>
</tbody>
</table>
| **C.15** | • Grid paper  
• Scissors  
• Tools for creating a visual display | • New Bed and Desk (groups of 2) |
Center: Can You Build It? (3–5)

Stage 1: Rectangles

Lessons
- Grade3.2.A1 (addressing)
- Grade3.2.A2 (addressing)
- Grade3.2.A3 (addressing)
- Grade3.2.A4 (addressing)

Stage Narrative
One partner builds a rectangle so that their partner can't see it. They describe the rectangle to their partner who tries to build the same rectangle. Students then compare their rectangles and switch roles. Students may choose to draw their rectangle on grid paper, rather than use inch tiles.

Variation:
Students may use more tiles to build their rectangles or may choose to build shapes made out of two rectangles.

Standards Alignments
Addressing 3.MD.C.5

Materials to Gather
Folders, Grid paper, Inch tiles

Materials to Copy
Can You Build It Stage 1 Directions (groups of 6)

Additional Information
Each group of 2 needs at least 48 inch tiles.
Center: Five in a Row: Multiplication (3–5)

Stage 1: Factors 1–5 and 10

Lessons
- Grade3.2.A1 (supporting)
- Grade3.2.A2 (supporting)
- Grade3.2.A3 (supporting)
- Grade3.2.A4 (supporting)

Stage Narrative

Students multiply using factors of 1–5 and 10. Partner A chooses two numbers and places a paper clip on each number. They multiply the numbers and place a counter on the product. Partner B moves one of the paper clips to a different number, multiplies the numbers, and places a counter on the product. Students take turns moving one paper clip, finding the product, and covering it with a counter.

Standards Alignments
Addressing 3.OA.C.7

Materials to Gather
Paper clips, Two-color counters

Materials to Copy
Five in a Row Multiplication and Division Stage 1 Gameboard (groups of 2)

Additional Information

Each group of 2 needs 25 two-color counters and 2 paper clips.

Stage 2: Factors 1–9

Lessons
- Grade3.2.C12 (addressing)
- Grade3.2.C13 (addressing)
- Grade3.2.C14 (addressing)
- Grade3.2.C15 (addressing)

Stage Narrative

Students multiply using factors of 1–9. Partner A chooses two numbers and places a paper clip on each number. They multiply the numbers and place a counter on the product. Partner B moves one of the paper clips to a different number, multiplies the numbers, and places a counter on the product. Students take turns moving one paper clip, finding the product, and covering it with a counter.
### Standards Alignments

Addressing 3.OA.C.7

### Materials to Gather

Paper clips, Two-color counters

### Materials to Copy

Five in a Row Multiplication and Division Stage 2 Gameboard (groups of 2)

### Additional Information

Each group of 2 needs 25 two-color counters and 2 paper clips.
Center: Capture Squares (1–3)

Stage 6: Multiply with 1–5

Lessons
- Grade3.2.B5 (addressing)
- Grade3.2.B6 (addressing)
- Grade3.2.B7 (addressing)
- Grade3.2.B8 (addressing)
- Grade3.2.B9 (addressing)
- Grade3.2.B10 (addressing)
- Grade3.2.B11 (addressing)

Stage Narrative
Students roll a number cube and spin a spinner and find the product of the two numbers they generated. The spinner has numbers 2–5.

Standards Alignments
Addressing 3.OA.C.7

Materials to Gather
Colored pencils or crayons, Number cubes, Paper clips

Materials to Copy
Capture Squares Stage 6 Gameboard (groups of 2), Capture Squares Stage 6 Spinner (groups of 2)

Additional Information
Each group of 2 needs one number cube.

Stages used in Grade 2

Stage 1
Supporting
- Grade2.2.A

Stage 2
Supporting
- Grade2.2.A
Stage 3

Addressing

- Grade2.2.A
- Grade2.2.B
- Grade2.2.C

Supporting

- Grade2.4.A
- Grade2.6.C

Stage 4

Addressing

- Grade2.2.B
- Grade2.2.C

Supporting

- Grade2.3.B
- Grade2.4.A
- Grade2.6.C
Center: Rectangle Rumble (3–5)

Stage 1: Factors 1, 2, 5, and 10

**Lessons**
- Grade3.2.B5 (addressing)
- Grade3.2.B6 (addressing)
- Grade3.2.B7 (addressing)
- Grade3.2.B8 (addressing)

**Stage Narrative**

Students generate factors with a number cube and a spinner with the numbers 1, 2, 5, and 10. Students use a 10 × 10 grid.

**Standards Alignments**

Addressing 3.MD.C.7

**Materials to Gather**

Colored pencils, crayons, or markers, Number cubes, Paper clips

**Materials to Copy**

Rectangle Rumble Stage 1 Grid (groups of 2), Rectangle Rumble Stage 1 Spinner (groups of 2)

**Additional Information**

Each group of students need a paperclip, a number cube and two different color writing utensils.

Stage 2: Factors 1–5

**Lessons**
- Grade3.2.B9 (addressing)
- Grade3.2.B10 (addressing)
- Grade3.2.B11 (addressing)

**Stage Narrative**

Students generate factors with a number cube and a spinner with the numbers 1–5. Students use a 15 × 15 grid.

**Standards Alignments**

Addressing 3.MD.C.7
Materials to Gather
Colored pencils, crayons, or markers, Number cubes, Paper clips

Materials to Copy
Rectangle Rumble Stage 2 Grid (groups of 2), Rectangle Rumble Stage 2 Spinner (groups of 2)

Additional Information
Each group of students need a paper clip, a number cube, and two different color writing utensils.
Center: Five in a Row: Addition and Subtraction (1–2)

Stage 6: Add within 100 with Composing

Lessons
- Grade3.2.B6 (supporting)
- Grade3.2.B7 (supporting)
- Grade3.2.B8 (supporting)

Stage Narrative
Partner A chooses two numbers and places a paper clip on each number. They add the numbers and place a counter on the sum. Partner B moves one of the paper clips to a different number, adds the numbers, and places a counter on the sum. Students take turns moving one paper clip, finding the sum, and covering it with a counter.

Standards Alignments
Addressing 1.NBT.C.4, 2.NBT.B.5

Materials to Gather
Paper clips, Two-color counters

Materials to Copy
Five in a Row Addition and Subtraction Stage 6 Gameboard (groups of 2)

Additional Information
Each group of 2 needs 25 counters and 2 paper clips.

Stage 7: Add within 1,000 without Composing

Lessons
- Grade3.2.B9 (supporting)
- Grade3.2.B10 (supporting)
- Grade3.2.B11 (supporting)

Stage Narrative
Partner A chooses two numbers and places a paper clip on each number. They add the numbers and place a counter on the sum. Partner B moves one of the paper clips to a different number, adds the numbers, and places a counter on the sum. Students take turns moving one paper clip, finding the sum, and covering it with a counter.

Standards Alignments
Addressing 2.NBT.B.7
Materials to Gather
Paper clips, Two-color counters

Materials to Copy
Five in a Row Addition and Subtraction Stage 7 Gameboard (groups of 2)

Additional Information
Each group of 2 needs 25 counters and 2 paper clips.

Stage 8: Add within 1,000 with Composing

Lessons
• Grade3.2.C12 (supporting)
• Grade3.2.C13 (supporting)
• Grade3.2.C14 (supporting)
• Grade3.2.C15 (supporting)

Stage Narrative
Partner A chooses two numbers and places a paper clip on each number. They add the numbers and place a counter on the sum. Partner B moves one of the paper clips to a different number, adds the numbers, and places a counter on the sum. Students take turns moving one paper clip, finding the sum, and covering it with a counter.

Standards Alignments
Addressing 2.NBT.B.7

Materials to Gather
Paper clips, Two-color counters

Materials to Copy
Five in a Row Addition and Subtraction Stage 8 Gameboard (groups of 2)

Additional Information
Each group of 2 needs 25 counters and 2 paper clips.

Stages used in Grade 2

Stage 5
Supporting
• Grade2.2.A
Stage 6

Addressing
- Grade2.2.A
- Grade2.2.B
- Grade2.9.B

Supporting
- Grade2.2.C
- Grade2.3.A
- Grade2.4.A
- Grade2.7.A

Stage 7

Addressing
- Grade2.7.A
- Grade2.7.B
- Grade2.7.C

Supporting
- Grade2.8.A
- Grade2.8.B

Stage 8

Addressing
- Grade2.7.B
- Grade2.7.C

Supporting
- Grade2.8.A
- Grade2.8.B
Section A: Concepts of Area Measurement

Lesson 1: What is Area?

Standards Alignments
Addressing 3.MD.C.5, 3.OA.A.1
Building Towards 3.MD.C.5

Teacher-facing Learning Goals

- Describe the relative size of plane figures in their own language.

Student-facing Learning Goals

- Let's compare the size of shapes.

Lesson Purpose

The purpose of this lesson is for students to recognize that different shapes cover different amounts of space.

In grade 2, students estimated, measured, and compared lengths using standard units. They learned how the length of the unit affects measurements.

This lesson introduces the concept of area as students compare the size of different shapes. Students consider what it means for two-dimensional shapes to be larger or cover more space. They measure and describe relative area with increasing precision as they participate in the activities in this lesson.

Give students access to pattern blocks and scissors during the cool-down.

Access for:

- Students with Disabilities: Action and Expression (Activity 2)
- English Learners: MLR8 (Activity 2)

Instructional Routines

How Many Do You See? (Warm-up)

Materials to Gather

- Pattern blocks: Activity 2

Materials to Copy

- Pattern Blocks to Compare Shapes (groups)
Lesson Timeline

<table>
<thead>
<tr>
<th>Activity</th>
<th>Duration</th>
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<td>Warm-up</td>
<td>10 min</td>
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<tr>
<td>Activity 1</td>
<td>15 min</td>
</tr>
<tr>
<td>Activity 2</td>
<td>20 min</td>
</tr>
<tr>
<td>Lesson Synthesis</td>
<td>10 min</td>
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<tr>
<td>Cool-down</td>
<td>5 min</td>
</tr>
</tbody>
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Teacher Reflection Question

What part of the lesson went really well today in terms of students learning? What did you do that made that part go well?

Cool-down (to be completed at the end of the lesson)

Compare Area

Standards Alignments

Addressing 3.MD.C.5

Student-facing Task Statement

Which rectangle has the greater area? How do you know?
**Student Responses**

Sample response: Figure A covers more space. Even if you cut Figure B in half it would fit in Figure A with leftover space.

---

**Warm-up**  
10 min

How Many Do You See: Arrays

**Standards Alignments**

Addressing 3.OA.A.1

The purpose of this How Many Do You See is for students to subitize or use grouping strategies to describe the images they see. Students may see equal groups in the rows or the columns of the array. Recording the equations for each way of seeing the groups is an opportunity to reinforce the commutative property.

When students use different ways to group dots within the same array to find the total number of dots they look for and make use of structure (MP7).

---

**Instructional Routines**

How Many Do You See?

---

**Student-facing Task Statement**

How many do you see? How do you see them?

---

**Launch**

- Groups of 2
- “How many do you see? How do you see them?”
Student Responses

- 8: I counted 4 dots in each row and there are 2 rows, which is 8. There were 2 dots in each column and there are 4 columns.
- 12: I saw 3 dots in each row and there are 4 rows. I saw 4 dots in each column and there are 3 columns.
- 20: I saw two 10-frames and 10 plus 10 is 20. I saw 4 rows of 5, which is 20. I saw 5 columns of 4, which is 20.

Activity

- Flash the image.
- 30 seconds: quiet think time

Activity

- Display the image.
- “Discuss your thinking with your partner.”
- 1 minute: partner discussion
- Record responses.
- Repeat for each image.

Synthesis

- “How did the arrays allow us to find the number of dots in different ways?” (We were able to look at the number of dots in each row and think about how many rows there were. I counted the number in each column and multiplied it by the number of columns.)
- As students share, record equations to match their thinking.
- Consider asking: “How do the equations change if we think about the rows as the groups or the columns as the groups?” (For the image with 12 dots, if we think about the rows as the groups, we write \(4 \times 3 = 12\), but if we think about the columns as the groups, we write \(3 \times 4 = 12\). The order of the factors is reversed, but the product stays the same.)

Activity 1

Compare Shapes

Standards Alignments

Building Towards 3.MD.C.5
The purpose of this activity is for students to compare shapes to decide which is larger. Given their prior experiences with length, students may initially use length to reason about what it means for a shape to be larger than another shape. The synthesis should bring out the idea that length alone is not enough to compare two-dimensional shapes. Ideas around how much space the shapes cover should be emphasized. If students disagree about which shape is larger, encourage them to share their reasoning so that the class can consider multiple ideas and come to a resolution together (MP3).

**Materials to Gather**

Scissors

**Student-facing Task Statement**

1. Here are two triangles. Which triangle is larger?

2. In each pair of shapes, which shape is larger? Be prepared to explain your reasoning.
   a. 
   b. 
   c. 

**Launch**

- Groups of 2
- Display or sketch the two triangles in the first problem.
- “Which triangle do you think is larger? Be prepared to explain your reasoning.”
- 1 minute: quiet think time
- Share and record responses.
- “How could you decide for sure which shape is larger?” (I could think about putting one shape on top of the other. I could measure which is longer. I could cut one out to see if it fits inside the other.)
- 1 minute: quiet think time
- 1 minute: partner discussion
- Share and record responses.
- Give each group scissors.

**Activity**

- “Now you are going to decide which shape in each pair is larger. Consider trying some of the strategies we discussed.”
- 3 minutes: independent work time
- “Tell your partner which shape in each pair you thought was larger. Explain how you decided.”
Student Responses

Sample responses:

1. The second triangle is larger because it is taller. The first one is larger because it is longer.

2. a. The second oval is larger. I can fit the first one inside it.
   b. The hexagon is larger. The triangle is less than half the size.
   c. The first rectangle is larger. I can fit the second one inside it if I cut it in half and put the halves next to each other.

Synthesis

- 3 minutes: partner discussion
- Monitor for justifications about how much space each shape covers and disagreements students discuss.

“Which shapes did you change your mind about as you discussed your ideas with your partner?” (In the last problem, I thought that the skinny rectangle was larger because it was taller. My partner showed me how to cut the rectangles to compare them.)

“Are there shapes you still disagree about?”

Have students share their justifications for any lingering disagreements.

As students share, bring out the idea that the larger shape covers more space.

Consider asking:
- “What questions do you have?”
- “Do you agree with their reasoning?”
- “Did you justify your choice in a different way?”

Activity 2

Pattern Blocks to Compare Shapes

Standards Alignments

Addressing 3.MD.C.5

The purpose of this activity is for students to compare shapes by covering them with pattern blocks. Students experience tiling as a way to see which shape covers the most space. There are several ways to tile the shapes, but it may prove most useful to use the same units, such as triangles. The rectangle can only be fully tiled with square pattern blocks. To compare shapes B
and C, students will need to notice that the rectangle and parallelogram can be made the same length, but the square pattern blocks used to tile the rectangle are taller than the blocks used to tile the parallelogram.

The work here prepares students to tile figures with square tiles in the next lesson and to think of area in terms of square units.

Access for English Learners

MLR8 Discussion Supports. Synthesis: Create a visual display of shapes A, B, and C. As students discuss their comparisons, annotate the display with their observations. For example, when comparing shape B to C, write “same length, but taller.”

Advances: Speaking, Listening

Access for Students with Disabilities

Action and Expression: Develop Expression and Communication. Synthesis: Identify connections between strategies that result in the same outcomes but use differing approaches.

Supports accessibility for: Conceptual Processing

Materials to Gather

Pattern blocks, Scissors

Materials to Copy

Pattern Blocks to Compare Shapes (groups of 1)

Required Preparation

- Each group of 2 needs at least 2 hexagons and trapezoids, 4 squares and rhombuses, and 8 triangles.
Student-facing Task Statement
Your teacher will give you handouts with some shapes on them.
Use pattern blocks to decide which shape covers the most space. Be ready to explain your reasoning.

Student Responses
Shape C covers the most space. Shape A can be made with 7 triangles. Shape B can be made with 8 triangles. Shape C is the same length as shape B if I cut the end off and move it to the other side, but shape C is taller.

Launch
- Groups of 2
- Give each student a copy of the Instructional master.
- Give each group pattern blocks.
- Display the first two shapes (the hexagon and the heart-shaped octagon).
- “What do you notice? What do you wonder?” (Students may notice: Both shapes could be made with pattern blocks. The second shape looks like the first shape, but it’s been bent. Students may wonder: Which shape covers more space? Which shape is larger?)
- 1 minute: quiet think time
- Share and record responses.
- “Which shape covers more space? How do you know?” (We can cover them with the same blocks, so they cover the same amount of space.)
- 2 minutes: partner discussion
- Share and record responses.

Activity
- “Let’s continue comparing shapes. Work with your partner to decide which of these shapes covers the most space. Use pattern blocks if they are helpful.”
- 5 minutes: partner work time
- Monitor for students who:
  - use pattern blocks to determine which shape covers the most space
  - notice that shape B and C would be the same length if one of the ends of B was moved over, but C covers more space because it is taller

Synthesis
- Ask selected students to share strategies
Lesson Synthesis

“Today’s lesson was about area. We can think about area as the amount of space covered by a shape.”

Display the shapes from the first activity.

“Let’s revisit the shapes from the first activity. Within each pair, which of these shapes has the greater area? How do you know?” (The shapes we decided were larger have the greater area: the large oval, the hexagon, and the first rectangle. The shapes that covered more space had the greater area.)

Suggested Centers

- Can You Build It? (3–5), Stage 1: Rectangles (Addressing)
- Five in a Row: Multiplication (3–5), Stage 1: Factors 1–5 and 10 (Supporting)

Response to Student Thinking

Students say that Figure B has the greater area.

Next Day Support

- Before the warm-up, have students discuss which figure has the largest area.
Lesson 2: How Do We Measure Area?

Standards Alignments
Addressing 3.MD.C.5, 3.MD.C.5.a, 3.MD.C.5.b
Building Towards 3.MD.C.5

Teacher-facing Learning Goals
- Explore area by building shapes with unit squares.
- Use unit squares to measure area.

Student-facing Learning Goals
- Let's use square tiles to measure area.

Lesson Purpose

The purpose of this lesson is for students to use square tiles to build shapes and measure area.

Previously, students compared the area of shapes informally—by cutting out and overlaying the shapes, by observing whether one shape would fit into another, and by covering the shapes with pattern blocks and comparing the number of blocks used.

In this lesson, students learn that squares can be used to measure area: by tiling all of the shape. Each square represents one unit of area, or one square unit. Inch tiles are used, but are referred to as “square tiles” with students to emphasize how the tiles are used to measure square units. Students learn that shapes that don’t have specific names can be referred to as “figures.”

In the next lesson, students will take a closer look at square tiles that overlap.

Provide inch tiles for students to use during the cool-down.

Access for:

⚠️ Students with Disabilities
- Engagement (Activity 2)

Instructional Routines
Which One Doesn’t Belong? (Warm-up)
Materials to Gather
- Inch tiles: Activity 1, Activity 2

Materials to Copy
- Use Square Tiles to Measure Area (groups of 2): Activity 2

Lesson Timeline

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Teacher Reflection Question
What ideas and experiences do students have about area? How did they influence students' work?

Cool-down (to be completed at the end of the lesson)

Tile and Tell

Standards Alignments
Addressing 3.MD.C.5

Student-facing Task Statement
Use square tiles to find the area of the figure.
Number of square tiles used: _____ square tiles

Area: _____ square units

**Student Responses**

28 square tiles
28 square units
Which One Doesn’t Belong: Shapes with Squares

Standards Alignments
Building Towards 3.MD.C.5

The purpose of this warm-up is to elicit observations about tiled squares by comparing four images. The work here prepares students to reason about unit squares later in the lesson and gives students a reason to use language precisely (MP6). It gives the teacher an opportunity to hear how students use terminology and talk about characteristics of the shapes in comparison to one another. During the synthesis, ask students to explain the meaning of any terminology they use, such as longest, largest, and area.

Instructional Routines

Which One Doesn’t Belong?

Student-facing Task Statement
Which one doesn’t belong?

Launch
- Groups of 2
- Display the image.
- “Pick one that doesn’t belong. Be ready to share why it doesn’t belong.”
- 1 minute: quiet think time

Activity
- “Discuss your thinking with your partner.”
- 2–3 minutes: partner discussion
- Share and record responses.

Synthesis
- “What are some different attributes you compared in these images?” (How many squares were in each image, the size of the smaller squares, the overall shape, and shading.)
- Consider saying: “Let’s find at least one reason why each one doesn’t belong.”

Sample responses:
- A is the only one without a shaded square. It is the only one that doesn’t show tiling of multiples squares.
• B is the only one that doesn't have an even number of shaded squares.
• C is the only one that is not made up of small squares.
• D is the only one where the overall shape is not a square.

Activity 1
Create and Compare

Standards Alignments
Addressing 3.MD.C.5, 3.MD.C.5.a

The purpose of this activity is for students to explore area by making shapes out of square tiles and ordering the shapes from smallest to largest. Students may consider the size of the shapes in a variety of ways.

For example, they may see the first shape as larger than the second shape because the squares in the former are more spread out than in the latter, which is completely filled with tiles.

If needed, encourage students not to stack the tiles. In the synthesis, students learn they can count the square tiles to determine the amount of space a shape covers.

Materials to Gather
Inch tiles

Required Preparation
• Each group of 4 needs 80 square tiles.
Student-facing Task Statement

1. Take a handful of square tiles.
2. Create a shape from the tiles.
3. As a group, order the shapes from smallest to largest.

Student Responses

Sample responses:

Launch

- Groups of 4
- Give each group inch tiles.
- “Take some tiles and build your shape.”
- 2 minutes: independent work time

Activity

- “Now work with your group to order the shapes. Be prepared to explain how you ordered the shapes.”
- 5 minutes: group work time
- Monitor for groups who order by:
  - the amount of space the shape takes up on the table
  - the length of the shape
  - the number of tiles used to create the shape

Synthesis

- “How did you order the shapes from smallest to largest?” (We compared the length of each shape. We counted how many tiles it took to make each shape.)
- As students share, consider asking: “How did you decide how much space each shape covered?”
- “It is common to use squares like the square tiles we used in this activity to determine each square tile has one square unit of area. If we count the number of tiles that make up a shape, we can find the area of the shape. For example, if a shape is covered by 12 square tiles, it has an area of 12 square units.”
Activity 2

Use Square Tiles to Measure Area

Standards Alignments
Addressing 3.MD.C.5, 3.MD.C.5.a, 3.MD.C.5.b

The purpose of this activity is for students to use square tiles to measure area. Students are given square tiles and a variety of figures. Students learn that they can use the term “figure” to describe a shape that doesn't have a specific name. Students cover the figures completely with square tiles and use the number of tiles to describe the area of the figure. In the synthesis, students share ideas about how to tile shapes in any way that makes sense to them. They also consider why it's important to make sure they don't leave gaps when they use square tiles to measure area (MP6).

Here are the figures on the Instructional master for reference:

1. 

2. 

3. 

4. 

5. 

6. 

There is an opportunity to ask students about the figures whose area is the easiest to find. There is no right or wrong answer, but the question may elicit the idea that the structure of rectangles is helpful. This idea will be explored fully in future lessons.
**Access for Students with Disabilities**

*Engagement: Provide Access by Recruiting Interest.* Leverage choice around perceived challenge. Invite students to complete questions that will be discussed during the synthesis. *Supports accessibility for: Organization, Attention, Social-emotional skills*

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**Materials to Gather**
- Inch tiles

**Materials to Copy**
- Use Square Tiles to Measure Area (groups of 2)

**Required Preparation**
- Each group of 2 needs 80 square tiles.

**Student-facing Task Statement**

Your teacher will give you handouts with some figures on them.

Use square tiles to find the area of each figure. Record your answers here. Be prepared to explain your reasoning.

1. Area: _____ square units
2. Area: _____ square units
3. Area: _____ square units
4. Area: _____ square units
5. Area: _____ square units
6. Area: _____ square units

**Student Responses**

1. 9 square units
2. 18 square units
3. 13 square units
4. 30 square units
5. 36 square units
6. 21 square units

**Launch**

- Groups of 2
- “Now that we know we can count square tiles to find area, we can think about covering shapes with tiles to find their area. We call this tiling. In this activity you will tile each shape with square tiles to find the area.”
- Give each group a copy of the Instructional master and inch tiles.
- “Some of these aren’t shapes that we have names for like a square or triangle. Because of this, we can call them ‘figures’ as we work with them in this activity. This word will be helpful in describing other shapes that we don’t have names for.”

**Activity**

- 7–10 minutes: partner work time
- Monitor for students who:
  - keep tiling the whole figure all the way to the edges
  - do not leave gaps between the square tiles as the figure is tiled
Synthesis

- Display the first, fourth, and fifth figures.
- “How did you tile each figure?” (I filled the whole figure with tiles until I couldn't fit any more. I started with the bottom row, then made the row above it until the figure was full.)
- “How did you determine the area of each figure?” (I counted the number of tiles it took to fill each figure completely.)
- Consider asking, “Which figures did you and your partner think were easiest to find the area of?” (The rectangle, because there were clear rows and columns. The third one, because we could split it into 2 rectangles. All of them, because they could all be covered completely with square tiles and had no uncovered space.)
- “Why was it important not to leave any gaps as you tiled your figures?” (Because the whole figure needs to be completely covered. If there are gaps between tiles or around the edge, then the whole figure isn't covered.)

Lesson Synthesis

“Today we used square tiles to find area. What were some things that were important to think about or do as you used the square tiles to find area?” (I had to make sure I covered the whole figure. I had to count to see how many square tiles I used to cover the figure. The number of square tiles it took to cover the figure is the area of the figure.)

Suggested Centers

- Can You Build It? (3–5), Stage 1: Rectangles (Addressing)
- Five in a Row: Multiplication (3–5), Stage 1: Factors 1–5 and 10 (Supporting)
Response to Student Thinking

Students write 28 for the number of square tiles used to cover the figure, but write a different number for the area.

Next Day Support

- During the launch of the next day's lesson, have students discuss how covering a figure with a number of square tiles tells us the area of the figure in square units.
Lesson 3: Tile Rectangles

Standards Alignments
Addressing 3.MD.C.5.b, 3.MD.C.6

Teacher-facing Learning Goals
• Explain that rectangles that can be covered by the same number of unit squares without gaps or overlaps have the same area.
• Find the area of rectangles (within 24 square units) by counting unit squares.

Student-facing Learning Goals
• Let’s count square tiles.

Lesson Purpose
The purpose of this lesson is for students to measure area by counting square tiles and create rectangles with a given area.

In previous lessons, students learned that counting square tiles that cover a figure gives the area of the figure in square units. In this lesson, students further explore tiling and learn that, when measuring area, squares that are used to tile a figure can’t overlap. They learn that the area is the number of square units that cover a flat figure with no gaps or overlaps. Students also create rectangles of a specific area on grids to demonstrate they understand that rectangles covered by the same number of square units without gaps or overlaps have the same area.

Students should have access to square tiles throughout the lesson and also be encouraged to draw the partitioned rectangles they create with the tiles.

Access for:

Students with Disabilities
• Representation (Activity 2)

English Learners
• MLR8 (Activity 2)

Instructional Routines
Card Sort (Activity 2), MLR1 Stronger and Clearer Each Time (Activity 1), Which One Doesn’t Belong? (Warm-up)
Materials to Gather

- Inch tiles: Activity 1, Activity 2

Materials to Copy

- Time to Tile (groups of 1): Activity 1
- Card Sort: Rectangles (groups of 2): Activity 2

Lesson Timeline

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Teacher Reflection Question

Reflect on students’ counting strategies. What strategies are they comfortable using as they find area? What strategies could use more practice?

Cool-down (to be completed at the end of the lesson)

Tile a Rectangle

Standards Alignments

Addressing 3.MD.C.5.b

Student-facing Task Statement

Andre says this rectangle has an area of 23 square units because he covered it with 23 square tiles.

Do you agree with Andre? Explain your reasoning.

Student Responses

Sample responses:

- No, even though it is 23 tiles, we don't know that completely fills the rectangle because you can see some of the rectangle and some of the squares are overlapping.
No, even though it is 23 tiles, you can see that some of the space in the rectangle isn’t covered.

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**Warm-up**

Which One Doesn’t Belong: Tiles

**Standards Alignments**

Addressing 3.MD.C.6

The purpose of this warm-up is to draw students’ attention to different ways of covering a plane figure with squares and reinforce the idea that tiling involves covering a region without gaps and overlaps. It gives students a reason to use language precisely (MP6). It gives the teacher an opportunity to hear how students use terminology and talk about characteristics of the items in comparison to one another. During the synthesis, ask students to explain the meaning of any terminology they use, such as rows, columns, area, gaps, overlap, and tiling.

**Instructional Routines**

Which One Doesn’t Belong?

**Launch**

- Groups of 2
- Display the image.
- “Pick one that doesn’t belong. Be ready to share why it doesn’t belong.”
- 1 minute: quiet think time

**Activity**

- “Discuss your thinking with your partner.”
- 2–3 minutes: partner discussion
- Share and record responses.
Student Responses

Sample responses:

- A is the only one that doesn’t have all blue squares.
- B is the only one that isn’t all or mostly covered with squares.
- C is the only one that doesn’t show any white squares or white space.
- D is the only one where the squares aren’t arranged neatly or touching other squares along their entire sides.

Synthesis

- “How could you use the squares in each of these rectangles to find the area of each rectangle?” (In C, I can just count the tiles. In B, I could finish tiling the rectangle and count the tiles. In D I would need to straighten out the tiles so they cover all of the rectangle. In A, I could count the blue tiles and double the number since in each row there are the same number of white tiles as there are blue tiles.
- Consider saying:
  - “Let’s find at least one reason why each one doesn't belong.”

Activity 1

Time to Tile

Standards Alignments

Addressing 3.MD.C.5.b, 3.MD.C.6

The purpose of this activity is for students to use square tiles to find the area of rectangles. They use their knowledge of tiling to complete the tiling that is started in each rectangle. Students may use physical tiles on copies of the Instructional master or reason directly on the images in the student book, which may not be the right size for physical tiles. The synthesis focuses on solidifying the idea that area is the number of square units that cover a flat figure with no gaps or overlaps.

This activity uses MLR1 Stronger and Clearer Each Time. Advances: reading, writing
Instructional Routines
MLR1 Stronger and Clearer Each Time

Materials to Gather
Inch tiles

Required Preparation
● Each group of 2 needs 24 square tiles.

Student-facing Task Statement
Your teacher will give you square tiles and a handout showing rectangles and squares.

1. Describe or show how to use the square tiles to measure the area of each rectangle. You can place square tiles on the handout where squares are already shown. You can also move the tiles, if needed.

   a.

   b.

   c.

   d.

Launch
● Groups of 2
● Give each student 1 copy of the Instructional master.
● Give students access to inch tiles.
● “Take a minute to think about how you would finish measuring the area of these rectangles that are partially tiled.”
● 1 minute: quiet think time

Activity
● “Work with your partner to describe how to use square tiles to find the area of each rectangle. You can use the square tiles and rearrange what’s shown in each rectangle, if needed. Then complete the last problem independently.”
● 5–7 minutes: partner work time

 Synthesis
● “Why did the square tiles in the first rectangle, the third rectangle, and the fourth rectangle need to be adjusted before we could finish finding the area of the rectangle?” (In the first rectangle, the square tiles had to be moved over because they weren’t going to fill the whole rectangle if we left them in the center. In the third rectangle, the squares in the
2. Describe how to use square tiles to find the area of any rectangle.

**Student Responses**

1. **Sample response:**
   a. Move the 4 tiles in the middle to a corner and cover the rest with tiles. We can fit 5 rows with 5 square tiles in each row, or 25 square tiles in total.
   
   b. Keep covering the rectangle with tiles to get 3 rows with 5 square tiles in each, or 15 square tiles in total.
   
   c. Move the 7 tiles to the edges of the rectangle and make sure they line up. The rectangle can fit or 24 square tiles.
   
   d. Arrange the tiles at the top so that there are no overlaps. The rectangle can fit 4 rows with 3 square tiles in each row. \(4 \times 3 = 12\)

2. **Sample response:** Cover the whole rectangle with square tiles, making sure there are no gaps or overlaps. The number of tiles used is the area of the rectangle in square units.

  second row needed to be lined up with the first row so there would be the same number of squares in each row. In the fourth rectangle, the squares need to be adjusted so they are not crooked or overlapping and one square needs to be removed from the first row.)

  * “If someone told you four squares would fit across the top of the rectangle, but only three squares would fit across the bottom of the rectangle, how would you know this didn’t make sense?” (The top and bottom have the same length so they should fit the same number of squares.)

**MLR1 Stronger and Clearer Each Time**

- “Share your response to the last problem with your partner. Take turns being the speaker and the listener. If you are the speaker, share your ideas and writing so far. If you are the listener, ask questions and give feedback to help your partner improve their work.”
- 2 minutes: structured partner discussion.
- Repeat with 1–2 different partners.
- “Revise your initial draft based on the feedback you got from your partners.”
- 2–3 minutes: independent work time
- “We just found the area of rectangles, and learned that when we cover the rectangle with square tiles, the tiles can’t have gaps or overlaps. The same ideas are important with any flat figure. **Area** is the number of square units that it takes to cover a flat figure without gaps or overlaps.”

## Activity 2

Card Sort: Rectangles
Standards Alignments
Addressing 3.MD.C.6

The purpose of this activity is for students to recognize that different shapes can have the same area. Students first sort the cards in any way that makes sense to them and then by area. After the cards are sorted by area, students create another rectangle that would fit into one of the categories (by having a particular area). A sorting task prompts students to look for structure and make connections across the representations and statements being analyzed (MP7).

Students may start to notice that the organization of the squares in rectangles makes it efficient to count: The squares can be grouped by row, column, or in other ways. As students sort and create rectangles with certain areas, monitor for students who leverage the structure of a rectangle to find area. Invite them to share in the synthesis.

In this activity, the squares on the gridded rectangles are not the same size as the square tiles, but students could still use tiles as a support. Provide students access to square tiles if they would like to use them, but encourage them to draw what they create on the grid provided.

Access for English Learners

MLR8 Discussion Supports. Students should take turns finding a match and explaining their reasoning to their partner. Display the following sentence frames for all to see: “I noticed _____, so I matched . . . .” Encourage students to challenge each other when they disagree.

Advances: Conversing

Access for Students with Disabilities

Representation: Internalize Comprehension. Synthesis: On chart paper, record students’ rectangles with justifications in each category. Record students’ efficient ways for counting to find the area of rectangles.

Supports accessibility for: Memory

Instructional Routines

Card Sort

Materials to Gather
Inch tiles

Materials to Copy
Card Sort: Rectangles (groups of 2)

Required Preparation

- Create a set of cards from the Instructional master for each group of 2.
**Student-facing Task Statement**

What do you notice? What do you wonder?

Draw a rectangle with an area of 8 square units on the grid.

Your teacher will give you a set of cards that show rectangles. Sort the cards into categories of your choosing. Be prepared to explain your categories.

1. A
2. B
3. C
4. D
5. E
6. F

**Launch**

- Groups of 2
- Display the image.
- “What do you notice? What do you wonder?” (Students may notice: There are 3 rectangles. One of the rectangles is made up of square tiles. One of the rectangles is shaded and the other rectangle isn’t. They all have 12 squares. They all have an area of 12 square units. Students may wonder: Why are there 3 rectangles? Why is one rectangle shaded and the other one isn’t? Do the blue squares show tiles?)
- 1 minute: quiet think time
- 1 minute: partner discussion
- Record responses.
- “These are ways that we can represent a rectangle with 12 square units. When the squares are shaded in the image they look like square tiles, but we can also make a rectangle on a grid and say that it has an area of 12 square units, because it contains 12 squares.”
- “Draw a rectangle with an area of 8 square units on the grid.”
- 30 seconds: independent work time
- Share responses.
- Distribute one set of pre-cut cards to each group of students.
- Give students access to inch tiles.

**Activity**

- “Work with your partner to sort the cards into categories. Be prepared to explain how you sorted your cards.”
- 5 minutes: partner work time
- Select groups to share their categories and how they sorted their cards.
- If no groups sort their rectangles by area,
2. Create a rectangle that would fit in each group.

Student Responses

1. Students may sort by: length, height, width, or area.
   - Rectangles with the same area:
     - Area 12 square units: 3 by 4 (A), 12 by 1 (C)
     - Area 16 square units: 2 by 8 (D), 4 by 4 (E)

give students 2-3 minutes to do so and then ask them to share their new categories.

- “Take a minute to think about what other rectangles might fit into these categories.”
- 1 minute: quiet think time
- “Now, work with your partner to create at least one different rectangle that has the same area as the rectangles in each group. Be prepared to share how you know your rectangles belong in each group.”
- 5 minutes: partner work time
- Monitor for the strategies students use to find the area of rectangles.

Synthesis

- Invite students to share the rectangles they created for each category.
- Consider asking:
  - “How did you know that your rectangle belongs here?”
  - “How did you know that the rectangle you created had the same area as the other rectangles in that category?”
- Discuss some of the efficient ways that students counted to find the area of rectangles.
Area 24 square units: 8 by 3 (B), 2 by 12 (F)

2. Sample responses:
   - Area 12 square units: 2 by 6
   - Area 16 square units: 1 by 16
   - Area 24 square units: 4 by 6, 1 by 24

**Lesson Synthesis**

“Today we learned we can draw squares in rectangles to represent tiling. We can count the squares to find the area of a rectangle just like we would count tiles.”

“What helpful features do rectangles have that help us find their area?” (The rows and columns in a rectangle show equal groups of squares, so we can just count one row or column and then skip-count to find the area.)

**Suggested Centers**

- Can You Build It? (3–5), Stage 1: Rectangles (Addressing)
- Five in a Row: Multiplication (3–5), Stage 1: Factors 1–5 and 10 (Supporting)

**Response to Student Thinking**

Students respond that they agree with Andre.

**Next Day Support**

- Before the next day’s warm-up, pass back the cool-down and work in small groups to make corrections.
Lesson 4: Area of Rectangles

Standards Alignments
Addressing 3.MD.C.6

Teacher-facing Learning Goals
- Describe and represent the area of a rectangle as the total number of unit squares arranged in equal groups of rows and columns.
- Find the area of rectangles (within 60 square units) by counting unit squares.

Student-facing Learning Goals
- Let's find the area of more rectangles.

Lesson Purpose
The purpose of this lesson is for students to continue to count squares to create rectangles and to find the area of rectangles with larger numbers than in the previous lesson.

In previous lessons, students identified equal groups in the rows and columns of arrays. In this lesson, students describe rectangles in terms of the rows and columns. They find the area of rectangles that have rows or columns of 2, 5, or 10 squares to encourage students to skip-count to find the total number of squares. Students should be encouraged to use the term “square units” in preparation for working with more specific units like square centimeters in future lessons. For example, if students find that a rectangle has 12 squares, they should say the area is 12 square units. In the next section, students formally relate area to multiplication.

This lesson has a Student Section Summary.

Access for:

Students with Disabilities
- Representation (Activity 1)

English Learners
- MLR8 (Activity 2)

Instructional Routines
Which One Doesn't Belong? (Warm-up)
Materials to Gather

- Folders: Activity 1

Lesson Timeline

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<tr>
<td>Activity 2</td>
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<td>Cool-down</td>
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Teacher Reflection Question

Reflect on your norms and routines. Are they promoting engagement from all of your students? Are there any adjustments you might make so that all students do math tomorrow?

Cool-down (to be completed at the end of the lesson)

What's the Area?

Standards Alignments

Addressing 3.MD.C.6

Student-facing Task Statement

Find the area of this rectangle. Explain or show your reasoning.

Student Responses

35 square units. Sample response: I counted 7 groups of 5 as 5, 10, 15, 20, 25, 30, 35.

Begin Lesson
Which One Doesn't Belong: Area and Arrays

Standards Alignments
Addressing 3.MD.C.6

The purpose of this warm-up is to elicit strategies for quantifying the number of objects arranged in rows and columns and the language used to describe such arrangements. It gives students a reason to use language precisely (MP6). During the synthesis, ask students to explain the meaning of any terminology they use, such as row, column, array, group, line, grid, and rectangle.

Instructional Routines
Which One Doesn't Belong?

Student-facing Task Statement
Which one doesn't belong?

Launch
- Groups of 2
- Display the image.
- “Pick one that doesn't belong. Be ready to share why it doesn't belong.”
- 1 minute: quiet think time

Activity
- “Discuss your thinking with your partner.”
- 2–3 minutes: partner discussion
- Share and record responses.

Synthesis
- “Why doesn't B belong?” (It doesn't have 20 dots.)
- “How did you determine the total number for each image?” (In D, I counted every dot. In C I counted by 5 since each row had 5 dots. In A, I counted by 5 since each row had 5 squares. In B, I just added 20 and 4 for the extra column.)

Student Responses
Sample responses:
- A is the only one that doesn't have dots.
- B is the only one that doesn't show 20.
- C is the only one that doesn't include shapes.
- D is the only one where the objects are not
arranged as a rectangle.

Activity 1
What Did I Create?

Standards Alignments
Addressing 3.MD.C.6

The purpose of this activity is for students to create and describe rectangles of a certain area. Students work in groups of 2. One partner creates a rectangle and describes it, and the other partner creates a matching rectangle based on the description. Then students compare how their rectangles are the same and different. Students should describe their rectangle to their partner without revealing the total number of squares they used, so that the focus is on understanding the rectangular structure. In the synthesis, students share language that helped them understand the rectangle their partner built. When students revise their language to be more precise in the descriptions of their rectangle, they attend to precision (MP6).

Access for Students with Disabilities

Representation: Access for Perception. Begin by enacting a physical demonstration of how to accurately describe a drawn rectangle without telling them the total number of squares.

Supports accessibility for: Social-Emotional Functioning

Materials to Gather
Folders

Required Preparation
• Each group of 2 needs one folder.

Student-facing Task Statement

1. Can you and your partner draw the same rectangle without looking at each other's drawing?
   • Partner A: Draw a rectangle on one of the grids provided. Describe it to

Launch

• Groups of 2
• Ask students to place an object between them that obstructs their view, such as a folder.
Activity

- “The goal of this activity is to get both partners in a group to draw the same rectangle without looking at each other’s drawing. If you are partner A, draw a rectangle and describe it to your partner. You can’t tell them how many squares you used to draw your rectangle.”
- “If you are partner B, draw the rectangle that you think your partner is describing and then compare the drawings.”
- “After you finish describing and drawing the first rectangle, switch roles and repeat.”
- 10–12 minutes: partner work

Synthesis

- “What language did your partner use that was most helpful for you to draw the same rectangle they drew?” (The number of squares in each row or column and the number of rows or columns.)

Student Responses

Sample responses:

1. Partner A creates an 8 by 3 rectangle. Partner A describes: My rectangle has 3 rows. In each row, there are 8 squares. Partner B creates a 3 by 8 rectangle.

2. The rectangles are the same because they both have 24 squares and they both have 3 rows with 8 squares. They are different because mine was taller and my partner’s was longer.

3. No response required.
Activity 2

Find the Area

Standards Alignments
Addressing 3.MD.C.6

The purpose of this activity is for students to find the area of rectangles by counting squares. Larger rectangles provide more opportunities for students to practice counting strategies using the structure of the rectangles to group the individual squares (MP7). Rectangles in this activity lend themselves to show groups of twos, fives, or tens in rows or columns. Students may also see other ways to create equal groups within rectangles. For example, the second rectangle with an area of 30 square units can be seen as 3 groups of ten. If students finish quickly, encourage them to confirm the area by counting another way. Emphasize that each area is in square units.

Access for English Learners

MLR8 Discussion Supports. Synthesis: For each observation that is shared, invite students to turn to a partner and restate what they heard, using precise mathematical language, such as area or square units.

Advances: Listening, Speaking

Student-facing Task Statement

Find the area of each rectangle and include the units. Explain or show your reasoning.

1.

2.

Launch

Groups of 2

Activity

• “Find the area of each rectangle. Be ready to explain your reasoning.”
• 5–7 minutes: independent work time
• Monitor for counting strategies such as:
  ○ Counting the squares in a row or a column and then skip-counting by that number for subsequent rows or columns.
  ○ Grouping by twos, fives, tens, or other numbers.
Student Responses

1. 18 square units. Sample response: I counted the squares by two and there were 18, so the rectangle has an area of 18 square units.
2. 30 square units. Sample response: Each row has 5 squares so I counted 5, 10, 15, 20, 25, 30, so the area is 30 square units.
3. 60 square units. Sample response: 10, 20, 30, 40, 50, 60
4. 45 square units. Sample response: Each column has 5 squares so I counted by 5 and counted 45 squares.

Advancing Student Thinking

If students miscount the square units in the rectangles, consider asking:

- “Tell me how you counted the squares.”
- “How could you keep track of your count as you count the squares?”

Lesson Synthesis

“In the last few lessons, we learned about area. We learned that area is the amount of space covered by a shape. Then we learned that we could find the area of two-dimensional shapes by counting how...
many squares cover the shape.”

Display a 3 by 2 array of dots next to a 3 by 2 gridded rectangular area.

“We also revisited arrays today during our warm-up. Here is an array next to a rectangular area. How is area different from an array?” (Area is space covered by a shape, and an array is a collection of objects.)

“How do you see equal groups in these representations?” (You can see equal groups in the rows and columns. In the rectangle, you can see squares, but in the array, you count the objects.)

“Take five minutes to respond to one or more of these prompts: Describe area in your own words. How can we measure area? What lingering questions do you have about area?” (Area is the amount of space that a shape covers. We can count squares to find the area of a shape in square units. How do you find the area of a triangle?)

**Suggested Centers**

- Can You Build It? (3–5), Stage 1: Rectangles (Addressing)
- Five in a Row: Multiplication (3–5), Stage 1: Factors 1–5 and 10 (Supporting)

**Student Section Summary**

In this section, we learned that **area** is the amount of space covered by a shape.

We saw that we can count squares to measure area. When we tile a shape, we need to make sure that the squares are covering the whole shape without gaps or overlaps.

Area is measured in square units. The area of the tiled rectangle here is 24 square units.
Response to Student Thinking

Students count the squares one by one to find the area.

Next Day Support

- During the launch of the first activity, have students practice skip-counting to find the total number of squares in a rectangle.
Section B: Relate Area to Multiplication

Lesson 5: Represent Products as Areas

Standards Alignments
Addressing 3.MD.C.7.b, 3.OA.B.5

Teacher-facing Learning Goals
- Relate multiplication to finding the area of rectangles.

Student-facing Learning Goals
- Let’s connect multiplication expressions to area.

Lesson Purpose
The purpose of this lesson is for students to connect multiplication expressions to rectangular areas.

In previous lessons, students counted unit squares to find the area of rectangles. In this lesson they explicitly connect multiplication to rectangular areas. Students match multiplication expressions to rectangular areas, specifically relating the factors of the expressions to the rows and columns of squares in the rectangle. Then, students are given multiplication expressions and create matching rectangles with inch tiles and drawings on grids.

Access for:

- Students with Disabilities
  - Engagement (Activity 2)

Instructional Routines
How Many Do You See? (Warm-up)

Materials to Gather
- Inch tiles: Activity 2

Materials to Copy
- Match Expressions and Areas (groups of 30): Activity 1
Lesson Timeline

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Teacher Reflection Question

In previous lessons students worked with arrays as a way to represent multiplication. How did students’ previous work with arrays support them in representing products as rectangular areas?

Cool-down (to be completed at the end of the lesson)  5 min

Create a Rectangular Area

Standards Alignments

Addressing  3.MD.C.7.b

Student-facing Task Statement

Use the grid to create a rectangular area that represents the expression $7 \times 4$.

Explain your reasoning.

Student Responses

Sample response: There are 4 rows and each row has 7 squares, so it’s 4 groups of 7.
Warm-up

How Many Do You See: One More

Standards Alignments
Addressing 3.OA.B.5

The purpose of this How Many Do You See is for students to subitize or use grouping strategies to describe the images they see. The arrangement of the groups of dots encourages students to see 5 groups of dots in the first image and then 6 groups of dots in the next image. When students use equal groups and a known quantity to find an unknown quantity, they are looking for and making use of structure. (MP7).

Instructional Routines

How Many Do You See?

Student-facing Task Statement
How many do you see? How do you see them?

Launch
- Groups of 2
- “How many do you see? How do you see them?”
- Flash the image.
- 30 seconds: quiet think time

Activity
- Display the image.
- “Discuss your thinking with your partner.”
- 1 minute: partner discussion
- Record responses.
- Repeat for each image.

Synthesis
- “How did the first image help you find the number of dots in the second image?” (I know that 5 groups of 3 is 15, and one more group of 3 would be 18.)
Student Responses

- 15: I saw 5 groups of 3, which is 15. I counted by 3 five times like 3, 6, 9, 12, 15.
- 18: I know that 5 groups of 3 is 15 and one more group of 3 is 18.
- 24: I saw 5 groups of 4 and 1 more group of 4. Five groups of 4 is 20 and one more group of 4 makes 24.

- “How did the first and second images help you find the number of dots in the third image?” (I figured out 5 groups of 4 pretty quickly, then added another group of 4.)

Activity 1

Match Expressions and Areas

Standards Alignments

Addressing 3.MD.C.7.b

The purpose of this activity is for students to directly connect multiplication expressions to equal groups they see within rectangular areas. Students may decompose the rectangular areas in various ways to see equal groups, but they should relate the rows and columns to the factors of a multiplication expression. This will be helpful in future activities when students multiply side lengths to find the area.

Materials to Copy

Match Expressions and Areas (groups of 30)

Student-facing Task Statement

Your teacher has posted images of rectangles around the room. Match each expression with a rectangle that can represent it. Be prepared to explain your reasoning.

1. $9 \times 5$
2. $8 \times 2$
3. $7 \times 10$
4. $3 \times 3$

Launch

- Groups of 3–4
- Sketch a 5-by-3 gridded rectangle, as shown.
5. \(2 \times 6\)
6. \(8 \times 4\)
7. \(5 \times 7\)

**Student Responses**

Sample responses:

1. F: There are 9 groups of 5 squares.
2. C: There are 8 rows with 2 squares in each row.
3. E: There are 7 rows with 10 squares in each row.
4. D: There are 9 squares and 3 times 3 is 9.
5. A: There are 6 rows and each row has 2 squares.
6. G: The length of the short side is 4 and the length of the long side is 8.
7. B: There are 35 squares in the rectangle and 5 times 7 equals 35.

• “What is one way you could describe this rectangle?” (It has 3 rows of 5 squares. There are 5 groups of 3. Its area is 15 square units. There are 15 squares.)
• Share and record responses. Save responses for discussion after the next activity.
• Display rectangles from the Instructional master around the room.

**Activity**

• “Match each expression to one of the rectangles posted around the room. Be ready to explain your reasoning.”
• 5–7 minutes: group work time

**Synthesis**

• “How do you see each factor in the rectangle?” (I can see one factor in the number of squares in a row. I can see the other factor as the number of rows. I see one factor as the number of squares in a column. The other factor is the number of columns. It’s like I see the factors in an array, only it’s squares, not dots.)
• “How do you see the product in the rectangles?” (If we count the squares in each rectangle, it gives us the same number as the product of the factors. The product is the same as the total number of squares in each rectangle.)
• “Why does multiplication give the same number as counting one by one?”

**Advancing Student Thinking**

If students don’t mention the groups in the rows and columns of squares, consider asking:

• “How did you decide which rectangle matched each expression?”
• “Where do we see equal groups in the rectangles?”
Activity 2
Create from Expressions

Standards Alignments
Addressing 3.MD.C.7.b

The purpose of this activity is for students to represent multiplication expressions as rectangular areas. Students use a grid to draw the rectangular area that represents a multiplication expression. In the synthesis, students explain how they interpret the multiplication expression, specifically how they see the equal groups in the rows and columns of the rectangular area. Give students access to square tiles if needed. When students draw and relate area diagrams to multiplication expressions they are reasoning abstractly and quantitatively (MP2).

Access for Students with Disabilities

Engagement: Provide Access by Recruiting Interest. Leverage choice around perceived challenge. Invite students to select at least 3 of the 5 problems to complete.
Supports accessibility for: Organization, Attention, Social-emotional skills

Materials to Gather

Inch tiles

Student-facing Task Statement

1. The numbers in each expression represent the number of rows (or columns) in a rectangle and how many squares are in each row (or column).

On the grid, draw each rectangle, label it with the numbers, and find its area.

   a. 3 \times 4
   b. 4 \times 6
   c. 6 \times 3
   d. 7 \times 4
   e. 3 \times 2

Launch

- Groups of 2
- Give students access to inch tiles.
- “Now you’re going to draw rectangles that match some multiplication expressions.”
- 1 minute: quiet think time

Activity

- 7–10 minutes: partner work time
- Monitor for a rectangle that two students oriented differently.
2. Explain why multiplying the numbers in each expression gives us the area of the rectangle.

**Student Responses**

1. Sample responses:
   a. 3 by 4 rectangle
   b. 4 by 6 rectangle
   c. 6 by 3 rectangle
   d. 7 by 4 rectangle
   e. 3 by 2 rectangle

2. Sample response: You can think about the rows as groups and the number of rows as the number of groups. When you multiply these numbers, it gives you the total number of squares.

**Synthesis**

- Have 2–3 students share a rectangle for each expression.
- For each student sample ask:
  - “How does the area of this rectangle match the expression?” (I see 4 equal groups of 6 because each row has 6 squares. I see 4 equal groups because each column has 6 squares.)
- Consider asking:
  - “Did anyone draw a different rectangle for this expression?”
- Display a rectangle that two students oriented differently.
- “How can both of these rectangles match the same expression?” (They have the same number of squares. They have the same side lengths, just switched. I see the groups in the rows in the first rectangle and in the columns in the second rectangle.)
- Display the 3-by-5 rectangle and descriptions from the launch in the first activity.
- “Which way of describing a rectangle was the most helpful to you as you drew rectangles in this activity?” (It was helpful to describe how many rows were in the rectangle and how many squares were in each row. It was helpful to think about one factor as the number of columns and the other factor as the number of squares in each column.)

**Lesson Synthesis**

Display or sketch a 2-by-7 gridded rectangle with the side lengths labeled 2 and 7, as shown:
“How could you figure out the total number of squares in this rectangle?” (Count by one. Count by 2. Count by 7. Multiply $2 \times 7$. Multiply $7 \times 2$.)

“How are rectangular areas similar to other ways we’ve shown multiplication?” (We can see rows and columns like arrays. We can see equal groups in the rows. We can see equal groups in the columns.)

“How are rectangular areas different from other ways we’ve shown multiplication?” (We’re counting spaces instead of objects.)

**Suggested Centers**

- Capture Squares (1–3), Stage 6: Multiply with 1–5 (Addressing)
- Rectangle Rumble (3–5), Stage 1: Factors 1, 2, 5, and 10 (Addressing)

**Response to Student Thinking**

Students create a rectangle that doesn’t represent $7 \times 4$.

**Next Day Support**

- Use the launch of the next day’s activity to have students discuss how to draw a rectangular area that represents a multiplication expression.
Lesson 6: Different Square Units (Part 1)

Standards Alignments
Addressing 3.MD.C.6

Teacher-facing Learning Goals
- Describe square units based on different linear units of measurement.
- Use square inches and square centimeters to measure the area of a rectangle.

Student-facing Learning Goals
- Let’s learn about different units we can use to measure area.

Lesson Purpose
The purpose of this lesson is for students to learn that there are different units that can be used to measure area, specifically square centimeters and square inches.

In previous lessons, students learned the meaning of area and measured area in square units. In this lesson, students work with standard units of area, based on linear measurement units they worked with in grade 2. Students consider the difference in size between the same amount of square inches and square centimeters, then they measure the area of a rectangle with both square inches and square centimeters.

Access for:

Students with Disabilities
- Action and Expression (Activity 2)

English Learners
- MLR8 (Activity 1)

Instructional Routines
MLR2 Collect and Display (Activity 2), Notice and Wonder (Warm-up)

Materials to Gather
- Patty paper: Activity 2
- Rulers (whole units): Activity 1
- Scissors: Activity 2

Materials to Copy
- Same Rectangle, Different Units (groups of 2): Activity 1
- Same Rectangle, Different Units (groups of 2): Activity 2
Lesson Timeline

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Teacher Reflection Question

What question do you wish you had asked today? When and why should you have asked it?

Cool-down (to be completed at the end of the lesson)

Which Square?

Standards Alignments
Addressing 3.MD.C.6

Student-facing Task Statement

Here is a rectangle.

Here are 2 different squares you could use to tile.

A

B

1 square inch

1 square centimeter

Which square would allow you to tile the rectangle with the fewest number of squares? Explain your reasoning.
Student Responses
Sample response: A, because it's larger than B, so it wouldn't take as many squares to fill the rectangle as with B.

Warm-up
Notice and Wonder: Squares, Squares

Standards Alignments
Addressing 3.MD.C.6

This warm-up elicits the idea that squares of different sizes can be used to measure area, which will be useful when students encounter different square units later. While students may notice and wonder many things, focus the discussion on how different-size squares could be used to tile the rectangle.

Instructional Routines
Notice and Wonder

Student-facing Task Statement
What do you notice? What do you wonder?

Launch
- Groups of 2
- Display the image.
- “What do you notice? What do you wonder?”
- 1 minute: quiet think time

Activity
- “Discuss your thinking with your partner.”
- 1 minute: partner discussion
- Share and record responses.
**Student Responses**

Students may notice:

- There are 4 rectangles that are the same size.
- The rectangles are tiled with different-size squares.
- It takes a lot of the smallest squares to cover the rectangle.
- It only takes 2 of the large squares to cover the rectangle.

Students may wonder:

- Why are there different-size squares?
- Are the squares related?
- Could we use even smaller squares?

**Synthesis**

- “We spent some time thinking about how rectangles could be tiled with different-size squares. Keep this in mind as we move on to the next activity.”

---

**Activity 1**

**Same Rectangle, Different Units**

**Standards Alignments**

Addressing 3.MD.C.6

The purpose of this activity is for students to see that there are different types of square units that can be used to measure area and that an area with the same number of square units can be larger or smaller depending on the unit that is used. To facilitate comparison, one partner works on inch grid paper and one works on centimeter grid paper. In the synthesis, students are introduced to square inches and square centimeters.

**Access for English Learners**

MLR8 Discussion Supports. Synthesis: For each observation that is shared, listen for the appropriate use of the word area, and invite students to turn to a partner and restate what they heard using precise mathematical language.

Advances: Listening, Speaking
Materials to Gather
Rulers (whole units)

Student-facing Task Statement
Your teacher will give you two kinds of grid paper. Use them to create a rectangle for each expression.

Partner 1: Use grid 1.
Partner 2: Use grid 2.
1. $2 \times 5$
2. $7 \times 3$
3. $6 \times 8$

Student Responses
1. ○ Partner 1

○ Partner 2

2. Each partner draws a 7 by 3 rectangle on their grid paper.
3. Each partner draws a 6 by 8 rectangle on their grid paper.

Materials to Copy
Same Rectangle, Different Units (groups of 2)

Launch
- Groups of 2
- Give each group 1 copy of the Instructional master.
- “Work with your partner to create a rectangle for each expression. Partner 1 will use grid 1 and partner 2 will use grid 2. Think about how the rectangles might be different.”
- 30 seconds: quiet think time

Activity
- 3–5 minutes: partner work time
- “Discuss how the rectangles are the same and how they are different with your partner.”
- 2–3 minutes: partner discussion

Synthesis
- “How are the rectangles the same and different?” (The rectangles have the same number of squares, but they do not have the same area because they do not cover the same amount of space.)
- Give students rulers.
- “Work with your partner to investigate the squares on both grids. Be prepared to share what you find.” (On the grid with the large squares, each side is 1 inch. On the grid with the small squares, each side is 1 centimeter.)
- “These are 2 types of squares we can use to measure area. The square inch has a side length of 1 inch. The square centimeter has a side length of 1 centimeter.”
• “Grid 1 is inch grid paper. Inch grid paper has squares with side lengths of 1 inch. Grid 2 is centimeter grid paper. Centimeter grid paper has squares with side lengths of 1 centimeter.”

Advancing Student Thinking

If students say that rectangles with the same number of squares have the same area, even if the squares are different sized, consider asking:

• “What are we measuring when we measure area?”
• “If there’s the same amount of squares, how does changing the size of the squares affect the area that the squares cover?”

Activity 2

What’s the Area?

Standards Alignments

Addressing 3.MD.C.6

The purpose of this activity is for students to estimate and then find the area of a square using different standard units of area (square inches and square centimeters). Students discuss why using square inches and square centimeters gives different measurements for the same area.

To measure the area of the square, students trace the square or cut it out, place the traced or cut square on the grids from the previous activity, and determine the number of squares covered on each grid. The measurement in square centimeters is not exactly 25 square centimeters because the square is 2 inches by 2 inches. The main idea is that it takes more of a smaller unit than a larger unit to cover the same area. When students reference units in their area measurements they are attending to precision in language (MP6).

This activity uses MLR2 Collect and Display. Advances: conversing, reading, writing
Access for Students with Disabilities

*Action and Expression: Develop Expression and Communication.* Give students access to a square centimeter cube and a square inch tile to support their estimation.

*Supports accessibility for: Conceptual Processing, Visual-Spatial Processing*

Instructional Routines

MLR2 Collect and Display

Materials to Gather

Patty paper, Scissors

Materials to Copy

Same Rectangle, Different Units (groups of 2)

Required Preparation

- Prepare additional copies of the grids from Same Rectangles, Different Units so students can have a fresh copy to measure the area of the square.
- Have patty paper available, in case requested.

Student-facing Task Statement

Estimate how many square centimeters and inches it will take to tile this square.

- square inches (estimate) ________
- square centimeters (estimate) ________

1. Use the inch grid and centimeter grid to find the area of the square
   - square inches _________________
   - square centimeters _________________

2. Write a multiplication expression that describes the rows and columns in the square and can tell us the area in each unit.

Launch

- Groups of 2
- “Estimate how many square inches and how many square centimeters you think it will take to tile this square. Record your estimates.”
- 1 minute: independent work time
- “Share your estimate with your partner. You may revise your estimate if your thinking changes.”
- 1–2 minutes: partner discussion
- Give students access to scissors.

Activity

- “Now you’re going to measure the area of the square using your inch grid paper and your centimeter grid paper.”
- “You can trace the square or cut it out if you want to.”
○ square inches ________________
○ square centimeters ________________

Student Responses
1. ○ 4 square inches
○ about 25 square cm
2. ○ 2 × 2
○ 5 × 5

“Then, you can place the square over the grids from Activity 1 to find the area in square inches and square centimeters.”

“Finally, write a multiplication expression to match the area you found.”

5 minutes: partner work time

MLR2 Collect and Display

• Circulate, listen for, and collect the language students use to discuss square inches and square centimeters. Listen for: square inch, square centimeter, 1 inch on each side, 1 centimeter on each side, takes up less space than square inches, takes up more space than square centimeters, takes more square centimeters than square inches to cover the same space, or takes fewer square inches than square centimeters to cover the same space.

• Record students' words and phrases on a visual display and update it throughout the lesson.

Synthesis

• “Are there any other words or phrases that are important to include on our display?”

• As students share responses, update the display, by adding (or replacing) language, diagrams, or annotations.

• Remind students to borrow language from the display as needed.

• “How did measuring with different square units affect the measurement of the area of the square?” (It took more of the smaller squares to tile the same area. It took fewer of the larger squares to tile the same area.)
Display a square inch and a square centimeter.

“Why is it useful to have different types of square units to use when measuring area?” (We could use square inches to measure something larger and square centimeters for something a little smaller. If we didn't want to use as many squares, we could use the larger square.)

**Suggested Centers**

- Capture Squares (1–3), Stage 6: Multiply with 1–5 (Addressing)
- Rectangle Rumble (3–5), Stage 1: Factors 1, 2, 5, and 10 (Addressing)
- Five in a Row: Addition and Subtraction (1–2), Stage 6: Add within 100 with Composing (Supporting)

**Response to Student Thinking**

Students answer A, but they do not explain that it would take fewer of the larger square to tile the rectangle.

**Next Day Support**

- During the launch of the next day’s activity, have students discuss whether it would take less square inches or square centimeters to cover a surface (like a desk or book cover) and why.
Lesson 7: Different Square Units (Part 2)

Standards Alignments
Addressing 3.MD.C.6

Teacher-facing Learning Goals
- Use square feet and square meters to measure the area of a rectangle.

Student-facing Learning Goals
- Let's learn about larger square units.

Lesson Purpose
The purpose of this lesson is for students to learn about square feet and square meters, and consider when these larger units can be helpful to measure area.

In a previous lesson, students learned about the difference between square inches and square centimeters. In this lesson, students work with square feet and square meters, building on their work with feet and meters in grade 2. Students consider different areas in real-world situations and choose a square unit that would be the most useful to measure each given area.

Access for:

Students with Disabilities
- Engagement (Activity 2)

English Learners
- MLR8 (Activity 2)

Instructional Routines
Notice and Wonder (Warm-up)

Materials to Gather
- Materials from a previous activity: Activity 2
- Materials from a previous lesson: Activity 2

Lesson Timeline
<table>
<thead>
<tr>
<th>Activity</th>
<th>Time</th>
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<tbody>
<tr>
<td>Warm-up</td>
<td>10 min</td>
</tr>
<tr>
<td>Activity 1</td>
<td>10 min</td>
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</tbody>
</table>

Teacher Reflection Question
In what ways can you connect the math in today's lesson to student's lived experience? Consider interviewing student's family or community members to find out how they use
Cool-down  (to be completed at the end of the lesson)  ⏰  5 min

Square Feet?

Standards Alignments
Addressing  3.MD.C.6

Student-facing Task Statement
Select all the areas that you would measure with square feet.

A. Area of a room
B. Area of the cover of a book
C. Area of a basketball court
D. Area of a window
E. Area of a note card

Student Responses
A, C, and D

Warm-up  ⏰  10 min

Notice and Wonder: A Bigger Square

Standards Alignments
Addressing  3.MD.C.6
The purpose of this warm-up is to elicit the idea that larger square units, specifically the square meter, can be useful in situations involving large areas. While students may notice and wonder many things about the image, the idea of tiling a large area with larger square units is the important discussion point.

**Instructional Routines**

**Notice and Wonder**

**Student-facing Task Statement**

What do you notice? What do you wonder?

*Image of a person holding a large square and a playground in the background.*

**Student Responses**

Students may notice:

- The person is holding a large square.
- There's a playground in the background.

Students may wonder:

- How did the person make the large square?
- How long is each side of the square?
- How many squares would it take to tile the playground?

**Launch**

- Groups of 2
- Display the image.
- “What do you notice? What do you wonder?”
- 1 minute: quiet think time

**Activity**

- “Discuss your thinking with your partner.”
- 1 minute: partner discussion
- Share and record responses.

**Synthesis**

- If needed, “What could you measure with this square?” (You could measure the area of big areas, like the playground.)
- “Why might you want this square instead of square centimeters or square inches?” (It takes fewer squares of this size to measure an area that is a lot larger like a playground or a room.)

**Activity 1**

**Square Feet and Square Meters**

10 min
Standards Alignments
Addressing 3.MD.C.6

The purpose of this activity is for students to encounter larger squares units, specifically the square meter and the square foot. There are two options for introducing square meters and square feet for the first time. Students get a sense of the size of a square meter and a square foot from the images in the activity. Also, you could construct and display a square foot and a square meter using rubber bands, 4 meter sticks, and 4 rulers.

Required Preparation
- Optional: Create square foot and square meter units made from rulers, meter sticks, and rubber bands.

Student-facing Task Statement

1. This is a square meter.

What kinds of areas would make sense to measure with square meters? Be ready to explain your reasoning.

2. This is a square foot.

What kinds of areas would make sense to measure with square feet?

Launch
- Groups of 2
- Display a square meter.
- “This is a square meter because it has a side length of 1 meter. Think about what kinds of areas would make sense to measure with square meters.”
- 1 minute: quiet think time

Activity
- “Discuss your ideas with your partner.”
- 1–2 minutes: partner discussion
- Share and record responses.
- Display a square foot.
- “This is a square foot because it has a side length of 1 foot. Think about what kinds of areas would make sense to measure with square feet.”
- 1 minute: quiet think time
- 1–2 minutes: partner discussion
- Share and record responses.
measure with square feet? Be ready to explain your reasoning.

**Student Responses**

1. Sample responses:
   - A field, because it’s really large.
   - A basketball court, because it’s big.
2. Sample responses:
   - A floor, because it’s large.
   - A wall, because it’s large.
   - A table, because it’s medium sized, but pretty big. (Students may give other units based on the relative size of the table. The important focus is the reasoning around the unit that students choose.)

**Synthesis**

- Display examples of each square unit used so far (square centimeter, square inch, square foot, and square meter).
- “How are the square units that we’ve learned about in this activity different from square inches and square centimeters?” (They cover more space. They could be used to measure larger areas.)

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**Activity 2**

Which Square Unit?

**Standards Alignments**

Addressing 3.MD.C.6

The purpose of this activity is for students to consider the units to use to measure given areas. Students choose from square inches, square centimeters, square feet, and square meters. Students have not spent much time with these square units, so examples should be displayed during this activity to support them in choosing the unit that makes the most sense in the given situation.
Access for English Learners

MLR8 Discussion Supports. Before partner work time, remind students to use words and phrases such as area, square centimeters, square inches, square feet, and square meters.

Advances: Listening, Conversing

Access for Students with Disabilities

Engagement: Provide Access by Recruiting Interest. Synthesis: Invite students to generate a list of additional examples that connect to their personal backgrounds and interests of items to measure with square inches, square centimeters, square feet, and square meters.

Supports accessibility for: Organization

Materials to Gather

Materials from a previous activity, Materials from a previous lesson

Required Preparation

• Gather examples of a square centimeter and a square inch from a previous lesson, and examples of a square meter and a square foot from the previous activity.

Student-facing Task Statement

1. For each area tell if you would use square centimeters, square inches, square feet, or square meters to measure it and why you chose that unit.
   a. The area of a baseball field
   b. The area of a cover of a book you’re reading
   c. The area of our classroom
   d. The area of a piece of paper
   e. The area of the top of a table
   f. The area of the screen on a phone

2. Choose the area that best matches each item. Be ready to explain your reasoning.

Launch

• Groups of 2
• Display examples of each square unit (square centimeter, square inch, square foot, and square meter).
• “Today we are going to choose some square units that we would use to measure some areas that we might find around a school. What are some areas that you might measure around your home or community?”
• 1 minute: quiet think time
• Share responses.

Activity

• “Discuss the first problem with your partner.”
Grade 3

4–5 minutes: partner work time

Whole-class discussion.

“Now complete the next problem to choose the area that best matches each item.”

1 minute: independent work time

5 minutes: partner work time

Synthesis

“How did you think about the area of each item?” (We thought about the size of the area we were measuring to decide which unit made sense. Then we thought about one unit, like one square foot, and then thought about what 3 square feet would be like.)

Consider asking:

○ “Is it reasonable to think this many of these unit squares could fit in this area?”

○ “Why would this make sense with the given area?”

○ “How are you imagining the units fitting in this area?”

Advancing Student Thinking

If students choose a square unit that isn’t reasonable to use for the given area, consider asking:
“Tell me how you thought about which square units you would use to measure this area.”
“How would it affect the measurement if you used a smaller (or larger) square unit?”

Activity 3 (optional)

Area Scavenger Hunt

Standards Alignments
Addressing 3.MD.C.6

The purpose of this activity is for students to find things they could measure with the standard area units they have learned about. This activity can be completed in the classroom, but could also be completed during a walk around the school or community if time allows. This activity is optional because it could be condensed into a discussion about areas with which students are familiar and what units they would use to measure them. If time doesn’t allow for taking a walk around the school or community, this activity could also be completed at a time when students are already walking around the school.

When students recognize the mathematical features of familiar real world objects and use those features to solve problems, they model with mathematics (MP4).

Student-facing Task Statement

Find some object or space that you would measure with square inches, square centimeters, square feet, and square yards.

Launch

- Groups of 2
- Display examples of square centimeters, square inches, square feet, and square meters.
- “We’re going to walk around the classroom (or school, or community) and look for areas that we could measure with the different square units we’ve learned about.”

<table>
<thead>
<tr>
<th>area</th>
<th>square unit and reasoning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Example: a piece of paper</td>
<td>“I think it can fit about 8 inches across and 10 inches down, so square inches work well. It can be measured in square centimeters, too, but would just take a lot more squares. Square feet and square meters would be too large.”</td>
</tr>
</tbody>
</table>
### Activity
- “List the things you find and the square unit you would use to measure the area in the table. Be sure to include your reasoning for why you chose that unit.”
- 5–7 minutes: partner work time
- Monitor for students who use different units to measure the same area.

### Synthesis
- Select students to share responses for 3–5 things they saw around the classroom (or school).
- For each object or space that students present, ask if others also chose that object or space and if they chose the same square unit: “Could other square units be used to measure its area?”
- “How did you decide which square unit to use to measure each area?” (I thought about whether the area was a smaller area or a larger area. I chose small units for smaller areas and larger units for larger areas. I thought about how carefully I would want to measure the area.)

### Lesson Synthesis

Display examples of each square unit (square centimeter, square inch, square foot, and square meter).

“Now, we’ve worked with different types of square units. Why is it important to have many different options rather than just square centimeters and square inches?” (Square inches and centimeters are too small for measuring larger areas. It would take too many square centimeters to tile a field.)

### Suggested Centers
- Capture Squares (1–3), Stage 6: Multiply with 1–5 (Addressing)
Response to Student Thinking

Students select areas that would result in part of a square foot.

Next Day Support

During the launch of the next day's activity, have students discuss what would happen if you used square feet to measure the area of a notecard or the cover of a book.
Lesson 8: Area of Rectangles Without a Grid

Standards Alignments
Addressing 3.MD.C.7.b, 3.OA.B.5

Teacher-facing Learning Goals
• Determine the area of rectangles not displayed on a grid.

Student-facing Learning Goals
• Let's solve area problems without a grid.

Lesson Purpose

The purpose of this lesson is for students to determine the area of rectangles that are not fully gridded with squares.

In previous lessons, students used gridded rectangles to relate area to multiplication. They were also introduced to standard units of square inches, square centimeters, square feet, and square meters. In this lesson, students work with rectangles where the squares are less and less visible to encourage students to multiply the side lengths to find the area. This takes the form of partially tiled rectangles and rectangles with side lengths marked off in linear units. Students will consider strategies they use and discuss multiplying side lengths to find area. When students use multiplication to find the area of rectangles, they are using the structure of equal rows or columns and relating this to the operation of multiplication (MP7).

In this lesson, students see diagrams of rectangles that are described with standard units, such as square inches and square meters, but are not to scale. They will gain experience working with such diagrams throughout the unit. Students should understand that shapes and figures may not always be the size the units indicated because drawing a picture can help us understand a situation even if we cannot draw the actual size.

Access for:

Students with Disabilities
• Engagement (Activity 1)

English Learners
• MLR8 (Activity 1)

Instructional Routines
How Many Do You See? (Warm-up)
Materials to Gather

- Rulers or straightedges: Activity 2

Lesson Timeline

<table>
<thead>
<tr>
<th>Activity</th>
<th>Duration</th>
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</thead>
<tbody>
<tr>
<td>Warm-up</td>
<td>10 min</td>
</tr>
<tr>
<td>Activity 1</td>
<td>15 min</td>
</tr>
<tr>
<td>Activity 2</td>
<td>20 min</td>
</tr>
<tr>
<td>Lesson Synthesis</td>
<td>10 min</td>
</tr>
<tr>
<td>Cool-down</td>
<td>5 min</td>
</tr>
</tbody>
</table>

Teacher Reflection Question

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

Cool-down (to be completed at the end of the lesson)  5 min

Where are the Squares?

Standards Alignments

Addressing 3.MD.C.7.b

Student-facing Task Statement

The tick marks on the sides of the rectangle are 1 foot apart. What is the area of the rectangle? Explain or show your reasoning.

Student Responses

35 square feet. Sample response: $7 \times 5 = 35$
Warm-up
How Many Do You See: One More, One Less

Standards Alignments
Addressing 3.OA.B.5

The purpose of this How Many Do You See is for students to subitize or use grouping strategies to describe the images they see.

When students use equal groups and a known quantity to find an unknown quantity, they are looking for and making use of structure (MP7).

Instructional Routines
How Many Do You See?

Student-facing Task Statement
How many do you see? How do you see them?

Launch
- Groups of 2
- “How many do you see? How do you see them?”
- Flash the image.
- 30 seconds: quiet think time

Activity
- Display the image.
- “Discuss your thinking with your partner.”
- 1 minute: partner discussion
- Record responses.
- Repeat for each image.

Synthesis
- “What numbers were easy to see in the images?” (4, 5, 6)
- “How did the first image help you find the number of dots in the next 2 images?”

Sample responses:
- 20: I counted by 5 four times. I know that 4 times 5 is 20.
24: It was like the first problem, but there was 1 more dot in each group. So I added 20 to 4 to get 24.

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

Each group in the second image has 1 more dot than each group in the first image, so I figured out 4 groups of 5, then added 4 more dots. For the last image, I subtracted 4 from 20, since one dot was missing in each group.

Activity 1
Partially Tiled

Standards Alignments
Addressing 3.MD.C.7.b

The purpose of this activity is for students to solve an area problem with a partially tiled rectangle. This encourages students to multiply to solve problems involving area, but still provides some visual support to see the arrangement of the rows and columns. This problem includes a product of ten, with which students should be increasingly comfortable. The number of square inches is large in order to discourage one-by-one counting.

Access for English Learners
MLR8 Discussion Supports. Synthesis: 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 you tiled the rest of the rows, each row would be an equal group.”

Access for Students with Disabilities
Engagement: Develop Effort and Persistence: Differentiate the degree of difficulty or complexity. Some students may benefit from starting with a rectangle with more accessible value. For example, display a partially tiled rectangle with fewer rows.

Supports accessibility for: Conceptual Processing

Student-facing Task Statement
What do you notice? What do you wonder?

Launch
- Groups of 2
After learning about azulejos in Portugal, Elena is making her own tile artwork. This rectangle shows the project Elena is tiling. Each tile has a side length of 1 inch.

How many tiles are needed to tile the whole rectangle? Explain or show your reasoning.

90 tiles. Sample response: 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.

● Display images of the painted tiles.
● “What do you notice? What do you wonder?” (Students may notice: There are many square tiles. That is a lot of tiles. The tiles are painted. Students may wonder: How many tiles were used? What else could be tiled? How long did it take to tile that building?)
● 1 minute: quiet think time
● Share and record responses.
● “These are examples of painted tiles called azulejos from Portugal. In Portugal, they have been used for a very long time to decorate walls, floors, and even ceilings. They also show events in Portuguese history.”
● “This problem involves finding the area of an art project that is partially tiled with square tiles. Think about how many tiles are needed to tile the whole rectangle.”
● 1 minute: quiet think time

Activity

● 3–5 minutes: partner work time
● Monitor for students who use multiplication to find the number of tiles.
● Consider asking:
  ○ “How did you find how many tiles it would take to cover the rectangle?”
  ○ “Is there a way that’s faster than counting every square one by one?”

Synthesis

● “How did you know how many tiles would be in each row or column?” (The first row had 10 tiles, so I know every other row has 10 tiles because I could put more tiles to fill in the rows. It’s like an array. Each column has to have the same number of tiles, so there is 9 in each column.)
“How did you find the total number of tiles needed?” (I counted by ten 9 times. I multiplied 9 times 10.)

“The activity mentions that the tiles are 1 inch on each side. Is the side of each tile actually 1 inch long?” (No). “How can you tell?” (Sample response: We know how long 1 inch is and can see that the sides of the tiles are less than 1 inch. There are 10 tiles across. If they really are 1 inch wide, the image won't fit on the paper.)

“Sometimes we will see images labeled with units that are not exactly the size the label says. We can still use these images to represent the situation we are talking about.”

**Advancing Student Thinking**

If students count one by one to find the total number of square tiles, consider asking:

- “How many squares would be in each row (or column)?”
- “How could we use this to find the area?”

**Activity 2**

No More Squares

**Standards Alignments**

Addressing 3.MD.C.7.b

In this activity, students find the area of rectangles that are not tiled but whose sides are marked with equally spaced tick marks. The tick marks give students the side lengths of the rectangle, help students visualize a tiled region, and enable them to confirm that multiplying the side lengths give the number of square units in the rectangle. The work here serves to transition students to using only side lengths to find area.
Materials to Gather
Rulers or straightedges

Student-facing Task Statement
What is the area of the rectangle in square meters?

1. The tick marks on the sides of the rectangle are 1 meter apart.

![Rectangle with tick marks]

What is the area of this rectangle in square meters?

2. The top side of this rectangle is marked off in meter lengths. The left side is labeled with the length in meters.

![Rectangle with labeled sides]

What is the area of this rectangle in square meters?

Student Responses
1. 32 square meters
2. 18 square meters

Launch
- Groups of 2
- Display the first problem and the image.
- Read the first sentence in the first problem.
- “The statement says the tick marks are 1 meter apart. Are they really 1 meter apart?” (No, the spaces between them represent 1 meter each.)
- “We could not draw a rectangle that is actually in meters on a standard piece of paper because it would be much larger than the paper. We can draw this rectangle to represent that larger rectangle.”
- “How is this different from other rectangles whose area we've found?” (Before we had squares or tiles to count or we used actual tiles filled into a shape to count to find the area.)
- 30 seconds: quiet think time
- 1 minutes: partner discussion
- Share responses.
- Give students access to rulers or straightedges.

Activity
- “Work with your partner to find the area of this rectangle.”
- 3–5 minutes: partner work time
- Circulate and consider asking:
  - “How would you describe the rows and columns if you pictured the squares in the rectangle?”
  - “How could you find the total number of square meters?”
• Monitor for students who draw the missing grid lines before they multiply to find the area of the rectangle.
• Invite 2–3 students to share how they found the area of this rectangle.
• Display the second problem.
• “This rectangle is marked off in meters along the top and is labeled with meters on the side. Think about how you might find the area of this rectangle.”
• 1 minute: quiet think time
• 3 minutes: partner work time
• Monitor for students who create the missing grid lines before they multiply to find the area of the rectangle.

Synthesis

• Display samples of student work where students created the missing grid lines.
• “How can creating the grid from the tick marks help us see the missing groups?” (We can see all the squares in a row or in a column. We can see how many rows and columns there are.)
• “Did you have to fill in the grid lines to find the area of these rectangles?” (No, since counting the squares gives the same area as multiplying the side lengths, we can just find the length of each side.)

Advancing Student Thinking

If students count one by one to find the total number of square units, consider asking:

• “How did you find the area of the rectangle?”
• “How many squares would be in each row (or column)? How could we use this to find the area?”
Lesson Synthesis

“Today we found the area of rectangles where the squares weren’t visible.”

“What did you need to think about to find the area of rectangles where only some of the squares were visible or none of the squares were visible?” (I used the squares that I could see to imagine the rest. I used the tick marks to think about how many squares are in each row and how many rows there are. I multiplied the side lengths to find the area if I couldn’t see all the squares.)

“What do you need to know to find the area of any rectangle?” (The side lengths.)

Suggested Centers

- Capture Squares (1–3), Stage 6: Multiply with 1–5 (Addressing)
- Rectangle Rumble (3–5), Stage 1: Factors 1, 2, 5, and 10 (Addressing)
- Five in a Row: Addition and Subtraction (1–2), Stage 6: Add within 100 with Composing (Supporting)

Response to Student Thinking

Students do not accurately multiply the side lengths or count the square inches in the rectangle.

The work in this lesson builds from measurement concepts developed in a prior unit.

Next Day Support

- During the launch of the next day’s lesson, have students brainstorm ways to find the total number of square units in a rectangle where no square units are visible.

Prior Unit Support

Grade 2, Unit 3, Section A: Metric Measurement
Lesson 9: Measure to Find the Area

Standards Alignments
Addressing 3.MD.C.7.b, 3.OA.B.5

Teacher-facing Learning Goals
- Find the area of rectangles by measuring and multiplying the side lengths.

Student-facing Learning Goals
- Let’s measure the sides of rectangles and find the area.

Lesson Purpose
The purpose of this lesson is for students to measure side lengths of rectangles to find their area.

In grade 2, students measured length in centimeters and feet. In earlier lessons, they found the area of rectangles in standard units. Here, students measure side lengths of rectangles and multiply them to find area. They also find side lengths that would result in a rectangle with a given area.

Provide rulers for students to use during the cool-down.

Access for:

Students with Disabilities
- Engagement (Activity 2)

English Learners
- MLR8 (Activity 2)

Instructional Routines
Notice and Wonder (Warm-up)

Materials to Gather
- Rulers (centimeters): Activity 1
- Rulers (inches): Activity 2
- Tape (painter’s or masking): Activity 2
- Yardsticks: Activity 2

Lesson Timeline
Warm-up 10 min

Teacher Reflection Question
Identify ways the math community you are fostering is going well. What aspects would you
Cool-down (to be completed at the end of the lesson)  

Find the Area

**Standards Alignments**

Addressing 3.MD.C.7.b

**Student-facing Task Statement**

Use your ruler to find the area of the rectangle in square inches.
**Student Responses**

24 square inches.

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**Warm-up**

**Notice and Wonder: Groups and Arrays**

**Standards Alignments**

Addressing 3.OA.B.5

In this warm-up, students observe two dot images that show the same number of dots in groups of 3 but arranged in different ways. The purpose is to elicit observations about the similarities in their structure (5 groups of 3 dots, plus 1 more group of 3 dots) and to prepare students to make sense of expressions with a similar structure in an upcoming lesson.

When students notice that there is an additional group of 3 in the equal groups diagram and the array, they are looking for and making use of structure (MP7).

**Instructional Routines**

Notice and Wonder

**Student-facing Task Statement**

What do you notice? What do you wonder? 

![Image of dot images]

**Launch**

- Groups of 2
- Display the image.
- “What do you notice? What do you wonder?”
- 1 minute: quiet think time

**Activity**

- “Discuss your thinking with your partner.”
- 1 minute: partner discussion
- Share and record responses.
**Student Responses**

Students may notice:

- There are 6 groups of 3 in both diagrams.
- There are 15 black dots and 3 blue dots in each diagram.
- There are 18 dots in both diagrams.
- The first image and the array each have a group of dots that's a different color.

Students may wonder:

- Why are some dots a different color?
- What situations could these diagrams represent?
- Why are the dots arranged differently in the 2 images?

**Synthesis**

- “How do you see the extra equal group of 3 in each diagram?” (In the equal groups diagram it’s an extra group that is separate from the 5 groups of 3. In the array the extra group of 3 is the column of dots that is a different color.)

---

**Activity 1**

Measure to Find Area

**Standards Alignments**

Addressing 3.MD.C.7.b

The purpose of this activity is for students to measure the side lengths of a rectangle and multiply them to find the area. Students may use the ruler to create tick marks along the sides of the rectangle to help them visualize square units or multiply the side lengths. Either strategy is fine as students work towards finding the area of rectangles with labeled side lengths.

**Materials to Gather**

Rulers (centimeters)

**Student-facing Task Statement**

Use a ruler to measure the

**Launch**

- Groups of 2
rectangles. Then, calculate the area of the rectangles in square centimeters.

A  

B  

C  

Student Responses

A. 20 square centimeters
B. 30 square centimeters
C. 18 square centimeters

Display or sketch two rectangles, one with tick marks on two sides and one without.

“How could we use a ruler to find the area of the rectangle without marks on the sides?” (We could measure to see how long each side is. The ruler would help us see the marks so we know what numbers to multiply.)

30 seconds: quiet think time

Share responses.

“We are going to measure some rectangles in centimeters to help us calculate the area. First, look at all of them and predict which one has the greatest area.”

30 seconds: quiet think time

“Circle the letter of the rectangle that you think has the greatest area.”

Give each student a centimeter ruler.

Activity

“Use your ruler to measure the rectangles in centimeters. Find the area of each rectangle, and include the units.”

8–12 minutes: partner work

Synthesis

“How does measuring with a ruler help you find the area?” (Measuring with the ruler gives the side lengths, which we can multiply.)

Advancing Student Thinking

If students say they need to see the squares before they can multiply to find the area of the
rectangle, consider asking:

- “What have you tried so far to find the area?”
- “Could you use the ruler to make tick marks to help you picture the squares?”

### Activity 2

Create a Rectangle

#### Standards Alignments

Addressing 3.MD.C.7.b

The purpose of this activity is for students to create a rectangle with a given area. Students use what they know about area and the structure of rectangles to decide on the side lengths of the rectangle. Students use tape (painter’s or masking) to create the rectangles. They should have enough tape to create square feet within the rectangle, but should be encouraged to mark the 1 foot intervals to help them visualize the square feet inside the rectangle, if needed.

In the synthesis, each group shares strategies for creating a rectangle and how they know the area is the given number of square feet.

When students think about the structure of a rectangle and use it to create a rectangle with a given area they are looking for and making use of structure (MP7).

#### Access for English Learners

**MLR8 Discussion Supports.** Synthesis: At the appropriate time, give students 2–3 minutes to make sure that everyone in their group can explain their approach. Invite groups to rehearse what they will say when they share with the whole class.

*Advances: Conversing*

#### Access for Students with Disabilities

**Engagement: Develop Effort and Persistence:** Check in and provide each group with feedback that encourages collaboration and community. For example, make sure all students are participating. Elicit from each group such things as what is your strategy, what is your first step, how do you know your rectangle is correct.

*Supports accessibility for: Social-Emotional Functioning*
Materials to Gather

Rulers (inches), Tape (painter's or masking), Yardsticks

Required Preparation

- Each group of 4 will need one roll of either painter's tape or masking tape.

Student-facing Task Statement

Your teacher will give you some tape. Use it to create a rectangle with your assigned area.

- Area 1: 4 square feet
- Area 2: 6 square feet
- Area 3: 9 square feet
- Area 4: 10 square feet
- Area 5: 12 square feet
- Area 6: 16 square feet

Launch

- Groups of 4
- Give students painter's or masking tape.
- Give students access to rulers and yardsticks.
- Assign each group an area.

Activity

- “Work together to create a rectangle that has the area your group is assigned.”
- 7–10 minutes: small-group work time

Synthesis

- Select each group to share the rectangle they created and how they know it has the given area.
- Consider asking:
  - “Are there any other side lengths that would give us a rectangle with an area of ___ square feet?”
  - “How do we know this rectangle has an area of ___ square feet?”

Advancing Student Thinking

If students don’t create a rectangle with the given area, consider asking:

- “How did you build your rectangle?”
- “How could you build the rectangle if you started with 1 square foot?”
Lesson Synthesis

Display a fully gridded rectangle, a partially gridded rectangle, and a rectangle with only labeled side lengths.

“Over the last few lessons, we've solved area problems where the square units are less and less visible, and in this lesson you couldn't see them at all.”

“How has the way you solve area problems changed as the grid has gone away?” (I've drawn the grid to help me count the squares. I've pictured the squares even though they're not there. I've measured and multiplied the side lengths because it's the same as the number of unit squares as if I count them.)

Suggested Centers

- Capture Squares (1–3), Stage 6: Multiply with 1–5 (Addressing)
- Rectangle Rumble (3–5), Stage 2: Factors 1–5 (Addressing)
- Five in a Row: Addition and Subtraction (1–2), Stage 7: Add within 1,000 without Composing (Supporting)

Response to Student Thinking

Students measure correctly, but do not multiply the length measurements to find the area of the rectangle.

The work in this lesson builds from measurement concepts developed in a prior unit.

Next Day Support

- During the launch of the next day's activity, have students discuss how they could use the given measurements to find the area of the wall.

Prior Unit Support

Grade 2, Unit 3, Section A: Metric Measurement
Lesson 10: Solve Area Problems

Standards Alignments
Addressing 3.MD.C.7.b, 3.OA.B.5

Teacher-facing Learning Goals
• Solve real-world and mathematical problems involving area.

Student-facing Learning Goals
• Let’s solve area problems.

Lesson Purpose
The purpose of this lesson is for students to solve problems involving area.

In previous lessons, students found the area of rectangles with tiles, grids, partial grids, or linear measurements marked along the sides of the rectangle. Students also used rulers to find the area of rectangles.

The problems in this lesson are about a community garden. Consider launching the lesson with a read-aloud of City Green by DyAnne DiSalvo-Ryan to get students thinking about different aspects of a community garden. Students might draw squares within rectangles, draw tick marks on side lengths, count groups, or multiply to find area in this lesson. Any reasoning that makes sense to them is acceptable.

This lesson has a Student Section Summary.

Access for:

Students with Disabilities
• Engagement (Activity 2)

English Learners
• MLR8 (Activity 1)

Instructional Routines
MLR6 Three Reads (Activity 2), Number Talk (Warm-up)

Materials to Gather
• Inch tiles: Activity 2
• Tools for creating a visual display: Activity 2

Materials to Copy
• Centimeter Grid Paper - Standard (groups of 2): Activity 2
Lesson Timeline

<table>
<thead>
<tr>
<th>Activity</th>
<th>Time</th>
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<tr>
<td>Warm-up</td>
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<td>Activity 2</td>
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<tr>
<td>Lesson Synthesis</td>
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<tr>
<td>Cool-down</td>
<td>5 min</td>
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Teacher Reflection Question

Which question did you ask today that best supported students’ understanding of area within a context? What did students say or do that showed the question was effective?

Cool-down (to be completed at the end of the lesson)  5 min

How Much Fabric?

Standards Alignments
Addressing 3.MD.C.7.b

Student-facing Task Statement
Kiran bought two pieces of fabric. The black fabric is 9 yards by 2 yards. The purple fabric is 4 yards by 5 yards. Which piece of fabric has the larger area? Explain or show your reasoning.

Student Responses
The purple fabric has the larger area. The area of the black fabric is 18 square yards because $9 \times 2 = 18$. The area of the purple fabric is 20 square yards because $4 \times 5 = 20$.

Warm-up  10 min

Number Talk: One More Group

Standards Alignments
Addressing 3.OA.B.5
The purpose of this Number Talk is to elicit strategies and understandings students have for multiplying within 100. These understandings help students develop fluency and will be helpful later in this lesson when students are to multiply side lengths to find area. While recording students’ thinking, consider using equal groups or arrays as in the images in the warm-up of the previous lesson.

**Instructional Routines**

**Number Talk**

**Student-facing Task Statement**

Find the value of each expression mentally.

- 5 × 2
- 6 × 2
- 5 × 6
- 6 × 6

**Student Responses**

- 10: I counted by 2. I just knew 5 times 2 is 10.
- 12: I knew that 5 groups of 2 is 10, so one more group of 2 would be 12. I knew 2 times 6 is 12, and that 6 times 2 is 12 because the factors were just in a different order. I just knew it.
- 30: I counted by 10. I just knew 5 times 6 is 30.
- 36: I knew that 5 groups of 6 is 30, so one more group of 6 would make 36.

**Launch**

- Display one expression.
- “Give me a signal when you have an answer and can explain how you got it.”
- 1 minute: quiet think time

**Activity**

- Record answers and strategy.
- Keep expressions and work displayed.
- Repeat with each expression.

**Synthesis**

- “What happens when we increase one of the factors by 1?” (The product goes up by 1 of the other factor.)
- “What makes this happen?” (The amount increases by 1 group. Each group gets 1 more.)

- Consider asking:
  - “Who can restate ______’s reasoning in a different way?”
  - “Did anyone have the same strategy but would explain it differently?”
  - “Did anyone approach the problem in a different way?”
  - “Does anyone want to add on to____’s strategy?”
Activity 1
Paint a Wall

Standards Alignments
Addressing 3.MD.C.7.b

The purpose of this activity is for students to solve a real-world problem involving area. The activity includes a rectangle where the side lengths are labeled. When students solve problems with multiple solutions and have to choose and justify a solution, they make sense of problems and persevere in solving them (MP1). In their small groups and in the class discussion students have an opportunity to explain and defend their choices (MP3).

Access for English Learners
MLR8 Discussion Supports. Synthesis: Create a visual display of the diagram. As students share their strategies, annotate the display to illustrate connections. For example, as students share the number of columns and rows, draw them on the diagram, and write “3 rows and 6 columns.”

Advances: Speaking, Representing

Student-facing Task Statement
Noah is painting a wall in a community garden. The wall is shaped like a rectangle. A diagram of the wall is shown here.

Paint is sold in 3 different sizes:
• A small container will cover 3 square meters.
• A medium container will cover 10 square meters.

Launch
• Groups of 3–4
• “A community garden is a garden space that is shared by members of the community. Each member gets their own space to create their part of the community garden.”
• “This is a problem about painting a wall in a community garden. What materials do you need when you paint?” (Paint. Brushes. Paint rollers. Drop cloth. Painter’s tape.)
• 1 minute: quiet think time
• Share responses.

Activity
• “Work with your group to solve the
meters.

- A large container will cover 40 square meters.

What should Noah buy? Explain your reasoning.

**Student Responses**

Sample responses:

- He should buy 2 medium containers because he needs to cover 18 square meters and this will give him a little extra.
- He should buy a large container because all the other amounts are too small.
- He should buy 6 small containers because 6 times 3 is 18 and he needs to cover 18 square meters.

**Synthesis**

- “How did you find the area of the wall that Noah is painting?” (I counted by 3 six times since I pictured 3 squares in each column and 6 columns. I multiplied 3 by 6 and got 18.)
- Discuss several different responses and their accompanying reasoning.
- Consider asking:
  - “How do you know that would be enough to cover the whole wall?”
  - “Would there be paint left over? Enough to paint how many square yards?”

**Advancing Student Thinking**

If students don’t find a solution to the problem, consider asking:

- “Tell me about what you’ve done so far to solve the problem.”
- “How could you represent the problem?”

**Activity 2**

Create a Garden

**Standards Alignments**

Addressing 3.MD.C.7.b
The purpose of this activity is for students to solve an area problem that involves missing side lengths. The problem has multiple solutions, as the area of the garden could be between 20 square feet to 30 square feet. The launch serves to familiarize students with the ideas involved in designing a garden before they solve the problem.

When students share with other groups and describe what others did that was different they are making and understanding mathematical arguments (MP3).

This activity uses *MLR6 Three Reads, Advances: reading, listening, representing*.

### Access for Students with Disabilities

**Engagement: Develop Effort and Persistence:** Invite students to generate a list of shared expectations for group work. Record responses on a display and keep visible during the activity.

**Supports accessibility for Social-Emotional Functioning**

### Instructional Routines

**MLR6 Three Reads**

### Materials to Gather

Inch tiles, Tools for creating a visual display

### Materials to Copy

Centimeter Grid Paper - Standard (groups of 2)

### Student-facing Task Statement

1. Elena is planning how to use her rectangular space in the community garden. She needs a space that is at least 20 square feet to fit her plants. She has enough soil for a garden that is 30 square feet. The space she has available has to be 3 feet on one side.

   What are the possible sizes for her garden?

   Create a poster to show your thinking. Organize it so it can be followed by others.

2. As you look at the posters with your group:

### Launch

- Groups of 3–4
- Display the image.

**MLR6 Three Reads**

- Display only the problem stem, without revealing the question(s).
- “We are going to read this problem 3 times.”
- 1st Read: “Elena is planning how to use her rectangular space in the community garden. She needs a space that is at least 20 square feet to fit her plants. She has enough soil for a garden that is 30 square feet. The space she has available has to be 3 feet on one side.”
a. Describe how another group solved the problem in a different way than your group did.
b. Write three things you saw that helped you understand how other students solved the problem.

Student Responses

1. Sample responses: A garden that is 3 feet by 7 feet, 3 feet by 8 feet, 3 feet by 9 feet, and 3 feet by 10 feet.
2. Sample responses:
   a. One group drew on grid paper many rectangles with one side being 3 units long. Our group thought about numbers that when multiplied by 3 are less than 30.
   b. Drawings with labels, equations, and explanations

Activity

• “What is this situation about?”
• 1 minute: small-group discussion
• Listen for and clarify any questions about the context.
• 2nd Read: “Elena is planning how to use her rectangular space in the community garden. She needs a space that is at least 20 square feet to fit her plants. She has enough soil for a garden that is 30 square feet. The space she has available has to be 3 feet on one side.”
• “Name the quantities. What can we count or measure in this situation?”
• 30 seconds: quiet think time
• 1–2 minutes: group discussion
• Share and record all quantities.
• Reveal the question(s).
• 3rd Read: Read the entire problem, including the question aloud.
• “What are some strategies we can use to solve this problem?”
• 30 seconds: quiet think time
• 1–2 minutes: group discussion
• Give each group tools for creating a visual display and access to square tiles and grid paper.

Activity

• “Work with your group to solve the problem. Create a poster to show how you solved the problem.”
• 10 minutes: group work time
• Monitor for students who:
  ◦ recognize that they are missing a side length of the garden.
  ◦ create an expression or equation that reflects the missing side length with a missing factor.
  ◦ come up with multiple gardens that
could be built.

**Synthesis**

- Display students’ posters around the room.
- “Now, half of the class is going to stand with their posters while the other half visits other students’ posters. If you’re standing with your poster, explain how you solved the problem. As you visit other posters, ask any questions you have about the solution to the problem.”
- Ask half of the groups to stand with their poster and share their ideas or answer questions as the other half visit their posters.
- 5 minutes: gallery walk
- Remind students to switch posters at 2 minutes if they haven’t already so they see a few posters.
- Switch group roles and repeat.

**Lesson Synthesis**

“Today we solved problems involving area. What are some ideas or representations you saw that you might use as you solve area problems in the future?” (I saw a drawing on grid paper that showed what was happening in the problem. I saw that we can multiply side lengths to find the area of a rectangle. If I was missing a side length, I multiplied the side length I knew by different numbers until I came up with the area I needed.)

**Suggested Centers**

- Capture Squares (1–3), Stage 6: Multiply with 1–5 (Addressing)
- Rectangle Rumble (3–5), Stage 2: Factors 1–5 (Addressing)
- Five in a Row: Addition and Subtraction (1–2), Stage 7: Add within 1,000 without Composing (Supporting)
Student Section Summary

In this section, we learned how area is related to multiplication. We multiplied the side lengths of a rectangle to find its area.

\[ 6 \times 3 = 18 \]

We also learned about how different square units are useful for measuring area in different situations and solved problems involving area.

Square inch

Square meter

Response to Student Thinking

Students do not find the area of each piece of fabric.

Next Day Support

- Before the warm-up, have students work in partners to discuss a correct response to this cool-down.
Lesson 11: Area and the Multiplication Table (Optional)

Standards Alignments
Building On 3.OA.B.5
Addressing 3.MD.C.7.b, 3.OA.B.5, 3.OA.D.9
Building Towards 3.MD.C.7.d

Teacher-facing Learning Goals
• Explore connections between area and the multiplication table.

Student-facing Learning Goals
• Let’s explore area and the multiplication table.

Lesson Purpose
The purpose of this lesson is for students to explore connections between area and the multiplication table.

This lesson introduces students to the multiplication table as a way to organize and find products of two whole-number factors (up to 10). Students begin by marking rectangles on blank multiplication tables, always starting from the upper left corner, and finding their areas. They see that the area of each rectangle is the product of the numbers at the right and bottom boundaries of the rectangle.

Through repeated reasoning, students see that finding the value of each cell in the table is like finding the area of a rectangle whose side lengths are a number from the top of the table and one from the left. Along the way, students notice patterns in the table and make use of them to complete the rest of the table (MP8).

This lesson is optional because it gives students more time to take a deeper look at the relationship between multiplication and area, and make addition connections.

Access for:

Students with Disabilities
• Representation (Activity 1)

English Learners
• MLR8 (Activity 2)

Instructional Routines
How Many Do You See? (Warm-up)
Lesson Timeline

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Teacher Reflection Question

Which multiplication facts did students seem most confident in as they found products in the multiplication table? For ones they did not know right away, what strategy did they go to?

Cool-down (to be completed at the end of the lesson)

What’s the Product?

Standards Alignments

Addressing 3.MD.C.7.b

Student-facing Task Statement

What is the missing product? Explain your reasoning.

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Student Responses

16. Sample response: I saw there are 4 squares in each row so I counted 4, 8, 12, 16.
Warm-up

How Many Do You See: Arrays that Grow

Standards Alignments
Addressing 3.OA.B.5
Building Towards 3.MD.C.7.d

The purpose of this warm-up is for students to notice that figures composed of multiple arrays can be decomposed into smaller arrays, and that this is a strategy to determine the total number of dots. This will be helpful in later lessons when students decompose figures into rectangles to find the total area.

When students find ways to decompose the given arrangements of dots to find the number of dots, they practice looking for and making use of structure (MP7).

Instructional Routines

How Many Do You See?

Student-facing Task Statement
How many do you see? How do you see them?

Launch
- Groups of 2
- “How many do you see? How do you see them?”
- Flash the image.
- 30 seconds: quiet think time

Activity
- Display the image.
- “Discuss your thinking with your partner.”
- 1 minute: partner discussion
- Record responses.
- Repeat for each image.

Synthesis
- “What’s the same in how you found the number of dots in each image?” (I looked for groups of 4. I decomposed each arrangement of dots into smaller arrays.)
- Consider asking:
is 8. There are 4 groups of 2, which is 8.
- 12: It’s like the first one, but there’s another group of 4 and 8 plus 4 is 12.
- 16: It’s like the second one, but there’s another group of 4. 12 plus 4 equals 16.

“Who can restate the way ___ saw the dots in different words?”
“Did anyone see the dots the same way but would explain it differently?”
“Does anyone want to add an observation to the way ____ saw the dots?”

Activity 1
Area and the Multiplication Table

Standards Alignments
Addressing 3.MD.C.7.b, 3.OA.D.9

The purpose of this activity is for students to find missing products in the multiplication table as they consider the rectangular structure of how products are organized in the table.

Access for Students with Disabilities

*Representation: Internalize Comprehension:* Record students’ notices and wonderings about the multiplication table on a piece of chart paper.
*SUPPORTS ACCESSIBILITY FOR:* Visual-Spatial Processing

Student-facing Task Statement
What do you notice? What do you wonder?

1. Use the blank table to create your own rectangle. Start from the top left corner.

Launch
- Groups of 2
- Display the four blank 5-by-5 multiplication tables, each showing a multiple of 3 in the third row, in order from 3 to 12.
- “What do you notice? What do you wonder?” (Students may notice: There are numbers along the top and down the left column. In each table the number in the rectangle is going up by 3. The number in the rectangle lines up with two factors that you would multiply to get that number.)
Record the product that the rectangle represents. Be prepared to explain your reasoning.

2. Use the following table to create a rectangle with an area of 24 square units. Start from the top left corner. Record the product that the rectangle represents. Be prepared to explain your reasoning.

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**Student Responses**

Sample responses:

1. The rectangle represents $4 \times 2$ (or $2 \times 4$).

2. $8 \times 3$ (or $3 \times 8$)

Students may wonder: Why are there numbers in each rectangle? Why are there numbers along the top and on the left?)

- 1 minute: quiet think time
- 1 minute: partner discussion
- Record responses

**Activity**

- “Create your own rectangles in these tables and record the product in each table that represents the rectangle.”
- 3–5 minutes: independent work time
- “Share your rectangles with your partner and explain your reasoning.”
- 2–3 minutes: partner discussion
- Monitor for students who:
  - Create a rectangle by lining up the bottom and right edges with the corresponding factors.
  - Count the total number of squares to make sure it matches the product they record in the rectangle.
  - Record the product that represents the rectangle in the bottom right square of the rectangle.
  - Record different rectangles that both have an area of 24 square units.

**Synthesis**

- Have 3–5 previously selected students share their rectangles and how they created them.
- “This is called the multiplication table. The numbers along the top and on the left side are the factors, or the numbers we are multiplying.”
- “The number in the lower right square of the rectangle is the product. The product
matches up with a factor above it and a factor to the left of it.”
* “We could represent the factors and the product in the last table in the first group of tables with 3 times 4 equals 12.”
* Display $3 \times 4 = 12$
* “How is the multiplication table different than other ways we've represented multiplication?” (It’s harder to see the factors. There’s no equal sign. We can picture a rectangle that helps you find the product.)

## Activity 2
Products in the Multiplication Table

### Standards Alignments

**Building On** 3.OA.B.5  
**Addressing** 3.OA.D.9

The purpose of this activity is for students to find products in the multiplication table. Students are encouraged to find familiar products before working on less-familiar ones. They do not need to fill in all of the products in the table. The synthesis focuses on patterns students find in the table and how they can show the patterns with equations.

### Access for English Learners

**MLR8 Discussion Supports.** Synthesis: Some students may benefit from the opportunity to rehearse what they will say with a partner before they share with the whole class.

**Advances: Speaking**

### Student-facing Task Statement

What do you notice? What do you wonder?

### Launch

- Groups of 2
1. Find as many other products in the table as you can. You may want to start with rows and columns that show products of 2, 5, and 10.
2. What patterns do you see in the row and column that show products of 5?
3. Write some equations that show one of the patterns that you see in the multiplication table. Explain or show your reasoning.

**Student Responses**

1. Sample responses:

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2. Sample responses: Every other number is a count by 10. The products increase by 5 as

- Display the image.
- “What do you notice? What do you wonder?” (Students may notice: Each product is in 2 places in the multiplication table. The number 4 only shows up in one place on the multiplication table. If I go down from the top 2 or across from the 2 on the left the products count by 2. The factors count by 1 as the products count by 2, like 1 and 2, 2 and 4, 3 and 6. All the numbers in the table are even. The highest product is 10. Students may wonder: Could we put other products in the table?)
- 1 minute: quiet think time
- Share responses.

**Activity**

- “Work independently on the first problem.”
- 3–5 minutes: independent work time
- Share responses.
- “Let’s finish filling in the rows and columns that show products of twos and products of fives.”
- Display table showing all the products of 2 and 5.
- “Think about how you would answer the last two problems.”
- 1 minute: quiet think time
- “Now work with your partner to complete the last two problems.”
- 5–7 minutes: partner work

**Synthesis**

- “What patterns did you find in the products of 5? How did you show them with equations?”
- “What other patterns do we see in the table? How could we show the patterns with equations?”
one factor increases by one.

3. Sample responses:
   - In the row that shows 5, the product goes up by 5 left to right: \(1 \times 5 = 5\), \(2 \times 5 = 10\), and \(3 \times 5 = 15\).
   - I see 8 in two places in the table: \(2 \times 4 = 8\) and \(4 \times 2 = 8\).
   - I only see 25 once in the table: \(5 \times 5 = 25\).

Lesson Synthesis

“Today we worked with the multiplication table. What did you learn about the multiplication table?” (The factors are along the top and down the left side. If we go down the column from one factor at the top and go right on the row from a factor on the left, the cell where they meet shows the product. There are patterns in the multiplication table, for example, we can find a product like 15 appearing twice, once for \(3 \times 5\) and once for \(5 \times 3\).)

Suggested Centers

- Capture Squares (1–3), Stage 6: Multiply with 1–5 (Addressing)
- Rectangle Rumble (3–5), Stage 2: Factors 1–5 (Addressing)
- Five in a Row: Addition and Subtraction (1–2), Stage 7: Add within 1,000 without Composing (Supporting)

Response to Student Thinking

Students respond with a number other than 16.

Next Day Support

- Before the warm-up, pass back the cool-down and work in small groups to make corrections.
Section C: Find Area of Figures Composed of Rectangles

Lesson 12: Area and Addition

Standards Alignments

Building On 2.NBT.B.5
Addressing 3.MD.C.7.d
Building Towards 3.NBT.A.2

Teacher-facing Learning Goals

- Find the area of figures composed of rectangles.
- Recognize that area is additive.

Student-facing Learning Goals

- Let's find the area of figures made up of rectangles.

Lesson Purpose

The purpose of this lesson is for students to use gridded rectangles to learn that area is additive.

Students first decompose a rectangle into parts to see that area is additive. Then, students decompose a figure composed of rectangles into rectangles in any way that makes sense to them, find the area of those rectangles, and add them together to find the area. Students learn that parentheses are grouping symbols that can be used in expressions or equations, and use them to represent how they decomposed the figure into rectangles. The work of this lesson connects to previous work because students find the area of rectangles within the figure before adding to find the total area of the figure.

Access for:

- Students with Disabilities
  - Action and Expression (Activity 1)

Instructional Routines

MLR7 Compare and Connect (Activity 2), Number Talk (Warm-up)
Lesson Timeline

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Teacher Reflection Question

Which students came up with an unexpected strategy in today’s lesson? What are some ways you can be more open to the ideas of each and every student?

Cool-down (to be completed at the end of the lesson)

Where are the Rectangles?

Standards Alignments

Addressing 3.MD.C.7.d

Student-facing Task Statement

Find the area of this figure. Explain or show your reasoning.

Student Responses

54 square units. Sample response: I split the figure into 2 rectangles, 1 across the top and 1 below. I found the area of the rectangle across the top by multiplying 3 \times 10, which is 30. I found the area of the bottom rectangle by multiplying 4 \times 6, which is 24. Then, I added the area of both rectangles to get 54.
Warm-up

Number Talk: So Close

Standards Alignments
Building On 2.NBT.B.5
Building Towards 3.NBT.A.2

The purpose of this Number Talk is to elicit strategies and understandings students have for adding two numbers when one number is close to a multiple of ten. These understandings help students develop fluency and will be helpful later in this lesson when students add the area of parts of a figure to determine the area of the whole figure.

When students use the fact that one number is close to 10 to find the sum, they look for and make use of structure (MP7).

Instructional Routines

Number Talk

Student-facing Task Statement
Find the value of each expression mentally.

- 9 + 6
- 29 + 6
- 59 + 6
- 49 + 8

Student Responses

- 15: I just know it. I took one away from 6 and added it to the 9 to make 10 and then added the leftover 5, which makes 15.
- 35: I took 1 away from 6 and added it to the 29 to make 30 and then added the leftover 5 to make 35.
- 65: I changed 59 to 60 and then added 6 to get 66. Then I subtracted 1 to make up for the extra 1, which makes 65.

Launch

- Display one expression.
- “Give me a signal when you have an answer and can explain how you got it.”
- 1 minute: quiet think time

Activity

- Record answers and strategy.
- Keep expressions and work displayed.
- Repeat with each expression.

Synthesis

- “How are the numbers in the four expressions alike?” (The first number has two digits and is 1 away from a multiple of ten. The second number is a single-digit number.)
- “How did these features help you find each
• 57: I took 1 away from the 8 and added it to the 49 to make 50 and then added 50 and 7 to get 57.

Consider asking:
  ○ “Who can restate _____’s reasoning in a different way?”
  ○ “Did anyone have the same strategy but would explain it differently?”
  ○ “Did anyone approach the problem in a different way?”
  ○ “Does anyone want to add on to ____’s strategy?”

Activity 1
Rectangles in Rectangles

Standards Alignments
Addressing 3.MD.C.7.d

The purpose of this activity is for students to learn that area is additive. Students decompose a rectangle into two smaller ones and find the sum of their areas in order to find the area of the whole rectangle. They can find the area of the two smaller rectangles by counting or by multiplying the side lengths.

When students consider how to decompose a larger rectangle into smaller ones to facilitate the process of finding area, they look for and make use of structure (MP7).

Access for Students with Disabilities

Action and Expression: Develop Expression and Communication: Identify connections between strategies that result in the same outcomes but use differing approaches. When students share different ways that they found the area, elicit from students how the strategies vary but result in the same answer.

Supports accessibility for: Conceptual Processing
Student-facing Task Statement

1. This rectangle represents space in a community garden. The shaded part is covered with vegetables and the unshaded part is covered with flowers. Each square represents 1 square foot.

   What is the area of the whole space?

2. Design your own garden. Find the area of each part of the garden and the area of the whole garden.

Student Responses

1. 42 square feet. Sample responses: I multiplied $7 \times 6$ or I multiplied $5 \times 6 = 30$ and $2 \times 6 = 12$ from the parts and then added $30 + 12$.

2. Sample response: Students draw a 5-by-10 rectangular garden. They decide a 5-by-7 portion will be used for carrots and a 5-by-3 portion will be used for broccoli. The area of the part used for carrots is 35 square feet and the area of the part used for broccoli is 15 square feet. The area of the whole garden is 50 square feet.

Launch

- Groups of 2
- “You are going to answer some questions about planting vegetables and flowers in this garden. Take a minute to think about the vegetables and flowers you would plant in a garden space.”
- 1 minute: quiet think time
- Share responses.

Activity

- “Now work with your partner on the first problem.”
- 2–3 minutes: partner work time
- Monitor for students who found the area by:
  - using counting strategies
  - multiplying the side lengths of the entire rectangle
  - adding the areas of the smaller rectangles
- Select previously identified students to share how they found the area.
- “How do you know that adding the area of the parts is the same as finding the area of the whole garden?” (The part covered with vegetables and the part covered with flowers make up the whole garden. If I add the area of both parts, I get the same number if I counted all the squares in the whole garden.)
- “Now you are going to design your own garden. Be sure to explain the area of each part of your garden and the area of the whole garden.”
- 5 minutes: independent work time
- Monitor for students who create rectangular gardens and gardens composed of rectangles.
Synthesis

- Select 2–3 students who created a rectangular garden that is decomposed into rectangles to share.
- Consider asking:
  - “How many square units does each part of the garden cover?”
  - “How many square units does the garden cover?”
  - “What equation would represent how you found the area of the rectangle?”

Advancing Student Thinking

If students count one by one to find the area of their gardens, consider asking:

- “Tell me how you found the area of your garden.”
- “How could you use multiplication to find the area of your garden?”

Activity 2

Find the Rectangles

Standards Alignments

Addressing 3.MD.C.7.d

The purpose of this activity is for students to find the area of a figure by decomposing it into two non-overlapping rectangles. The synthesis should emphasize different strategies and also encourage students to directly link expressions and the use of parentheses to the way they decomposed the figure. If students drew gardens in the shape of the image in the launch, display those drawings as well during the notice and wonder.

Some students may partition diagonally to split the figure into what looks like 2 symmetrical parts, or cut the figure up into more than 2 parts. These are both acceptable ways of finding the area.
Ask students who partition diagonally to find the area in the way they partitioned, but then encourage them to find a second way that has partitions on one of the grid lines. As students look through each others’ work, they discuss how the representations are the same and different and can defend different points of view (MP3).

When students notice that the smaller parts of the figure can be added to find the total area of the figure they are looking for and making use of structure (MP7).

This activity uses MLR7 Compare and Connect. Advances: representing, conversing

**Instructional Routines**

MLR7 Compare and Connect

**Student-facing Task Statement**

What do you notice? What do you wonder?

Find the area of this figure. Explain or show your reasoning. Organize it so it can be followed by others.

**Student Responses**

70 square units. Sample reasoning:

- I saw a small rectangle on top and a larger rectangle on bottom. I added the areas of both rectangles together.

  \[
  5 \times 4 = 20 \\
  5 \times 10 = 50 \\
  20 + 50 = 70
  \]

**Launch**

- Groups of 2
- Display the image of the gridded figure.
- “What do you notice? What do you wonder?” (Students may notice: It looks like 2 rectangles. It looks like a big rectangle with a chunk missing. There are squares. Students may wonder: What is this shape called? Could we find the area of the shape? How would we find the area?)
- 1 minute: quiet think time
- Share responses.
- “This isn't a shape that we have a name for like a square or triangle. Because of this, we'll call it a ‘figure’ as we work with it in this activity. This word will be helpful in describing other shapes that we don't have a name for.”
- “Talk with your partner about different ways you could find the area of this figure.”
- 1 minute: partner discussion

**Activity**

- “There are many ways to find the area of this figure. Take some time to find the area.
We are going to share these with the class, so you may want to include details such as shading, notes, and labels to help others understand your thinking.”

- 5 minutes: independent work time

**Synthesis**

**MLR7 Compare and Connect**

- Have students display their work.
- 5–7 minutes: gallery walk
- “What is the same and what is different about how other students found the area of the figure?” (Some students broke the rectangle apart vertically and some students broke it apart horizontally. Others imagined a missing part that wasn’t there. They all found the same area. They all broke the rectangle into smaller parts and then added the parts to find the area.)
- 30 seconds quiet think time
- 1 minute: partner discussion
- Display an expression that reflects how students found the area, such as:
  \[ 4 \times 5 + 5 \times 10 \]
- “How does this expression show how to find the area?” (The \(4 \times 5\) represents the rectangle on the top of the figure if we break it into 2 rectangles. The \(5 \times 10\) represents the bottom rectangle.)
- Add parentheses to create the expression:
  \[ (4 \times 5) + (5 \times 10) \]
- **Parentheses** are grouping symbols that can be used in expressions or equations. To show how you saw the figure we can show the first rectangle with \(4 \times 5\) and the second rectangle with \(5 \times 10\). Parentheses let us put both rectangles in the same expression like \((4 \times 5) + (5 \times 10)\) and see which part of the expression represents each rectangle.”
• Reinforce the meaning of parentheses in a similar way with other ways students decomposed the figure.

**Advancing Student Thinking**

If students add numbers that indicate they tried to find the area by adding the areas of rectangles that overlap, consider asking:

- “Tell me about how you broke the figure apart into rectangles to find the area.”
- “How would overlapping the rectangles affect the number of squares it would take to cover the figure?”

**Lesson Synthesis**

Display the figure from the last activity.

“Today we learned that we can decompose figures into rectangles to find the area. Why does it make sense that we can decompose a figure in many ways, but still get the same area for it?” (No matter how we decompose the figure, as long as we include all the squares, we are getting the total area.)

**Suggested Centers**

- Five in a Row: Multiplication (3–5), Stage 2: Factors 1–9 (Addressing)
- Five in a Row: Addition and Subtraction (1–2), Stage 8: Add within 1,000 with Composing (Supporting)

**Response to Student Thinking**

The work in this lesson builds from the addition concepts developed in a prior unit.

**Prior Unit Support**

Grade 2, Unit 2, Section A: Add and Subtract
Lesson 13: Find the Area of Figures

Standards Alignments
Addressing 3.MD.C.7.d, 3.NBT.A.2

Teacher-facing Learning Goals
- Calculate the area of ungridded figures made of rectangles using multiplication and addition.

Student-facing Learning Goals
- Let’s find the area of figures.

Lesson Purpose
The purpose of this lesson is for students to calculate the area of ungridded figures made of rectangles using multiplication and addition.

Students continue to find the area of figures composed of rectangles by decomposing them into non-overlapping rectangles. In this lesson, the square tiling is slowly removed to focus students on multiplying side lengths to find area.

Access for:

Students with Disabilities
- Engagement (Activity 1)

English Learners
- MLR7 (Activity 2)

Instructional Routines
Number Talk (Warm-up)

Lesson Timeline

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Teacher Reflection Question
This lesson is designed to help students shift toward multiplying to find areas, rather than by counting unit squares. Did you see this shift in students' strategies? What questions could you ask students about their strategies to help them make that shift if they are still counting frequently?
Cool-down (to be completed at the end of the lesson)  5 min

Find the Area

Standards Alignments
Addressing  3.MD.C.7.d

Student-facing Task Statement
Find the area of this figure. Explain or show your reasoning.

Student Responses
24 square inches. Sample response: I saw two rectangles making an L shape. I multiplied 2 \times 8 to find the area of the top rectangle and 2 \times 4 to find the area of the bottom rectangle. I added 16 and 8 to find the area of the whole figure.

--- Begin Lesson ---

Warm-up  10 min
Number Talk: Extend Make a Ten

Standards Alignments
Addressing  3.NBT.A.2
The purpose of this Number Talk is to elicit strategies students have for adding two numbers when one number is close to a whole number of tens. These understandings help students develop fluency in addition. Students may look for and make use of structure (MP7) in a number of ways. For example, they may add 1 to the first addend to make a full ten and subtract 1 from the second addend to find each sum. They may also notice how the addends compare to those in the previous expression and use the change to find the new sum.

In this string, students may also add the tens and ones separately to find the sum. Adding by place value is the focus of upcoming work. This Number Talk also enables the teacher to learn the strategies students currently have for addition.

**Instructional Routines**

**Number Talk**

**Student-facing Task Statement**

Find the value of each expression mentally.

- 109 + 4
- 109 + 14
- 209 + 34
- 219 + 34

**Student Responses**

- 113: I took 1 away from the 4 and added it to the 109 to make 110, and then added the remaining 3.
- 123: I knew it was 10 more than the first sum.
- 243: I took 1 away from the 34 and added it to the 209 to get 210, and then added the 33 by counting 210, 220, 230, 240, and then 243.
- 253: I noticed it's 10 more than the last sum because we started at 219 instead of 209.

**Launch**

- Display one expression.
- “Give me a signal when you have an answer and can explain how you got it.”
- 1 minute: quiet think time

**Activity**

- Record answers and strategy.
- Keep expressions and work displayed.
- Repeat with each expression.

**Synthesis**

- “What do you notice about how the first two expressions are related? What about how the last two expressions are related?” (The second sum is 10 more than the first. The fourth sum is 10 more than the third.)

**Activity 1**

Bye-Bye Squares

20 min
Standards Alignments
Addressing 3.MD.C.7.d

The purpose of this activity is for students to find the area of figures that are composed of rectangles but are not fully gridded with squares. Partially gridded figures help to prepare students to find the area of figures with only side length measurements. Students should be encouraged to find side lengths and multiply, rather than rely on counting, as the grids disappear. If students continue to draw in the squares, ask them if there is another way to find the area.

Access for Students with Disabilities

Engagement: Develop Effort and Persistence: Differentiate the degree of difficulty or complexity. Some students may benefit from starting with a smaller figure, one with more accessible values. Supports accessibility for: Social-Emotional Functioning, Visual-Spatial Processing

Student-facing Task Statement

What do you notice? What do you wonder?

Find the area of each figure. Explain or show your reasoning.

1.

2.

Launch

• Groups of 2
• Sketch or display a rotated L-shape figure as shown.
• “What do you notice? What do you wonder?” (Students may notice: The figure is not a rectangle. It could be split into smaller rectangles. Students may wonder: Why are there no squares inside? How can I find out how many squares will cover that shape?)
• 1 minute: quiet think time
• Share and record responses.
• “What information would help you find the area of this figure?” (The side lengths. Being able to see the squares inside the figure.)
• 1 minute: quiet think time
• Share responses.
• Display image from the first problem.
• “What information is given in this figure that could help you find the area?” (Grid lines. The side lengths. Some of the
Student Responses

1. 44 square units. Sample response:
   \[7 \times 5 = 35, 3 \times 3 = 9, 35 + 9 = 44\]
2. 32 square units. Sample response: I broke it into a smaller \(4 \times 2\) rectangle at the bottom and a bigger \(3 \times 8\) rectangle at the top and added \(8 + 24\). I counted the spaces between the tick marks like on a number line to find the side lengths.

Activity

- “Now work with your partner to find the area of this figure.”
- 5 minutes: partner work time
- Monitor for strategies for finding the side lengths and decomposing into rectangles.
- “Let’s look at the first figure.”
- Have students share strategies for finding the side lengths and area of figures with a partial grid.
- “Take a look at the next figure. Think about how you could find the area of this figure.”
- 1 minute: quiet think time
- “Work with your partner to find the area of this figure.”
- 5 minutes: partner work time
- Monitor for strategies for finding the side lengths.

Synthesis

- “What was your strategy for finding the area of the second figure?”
- “What helps you find the area of figures like these where the shape is not fully covered with squares?” (Imagining where the squares would be so I can count them or find the side lengths. Finding the side lengths and multiplying to find the area of rectangles in the figure.)

Activity 2

How Many Pavers Do We Need?  

\(\textcircled{1} 15\ \text{min}\)
Standards Alignments

Addressing 3.MD.C.7.d

The purpose of this activity is for students to find the area of a figure composed of rectangles given only their side lengths. The context of paving a patio provides students a link to their experience with squares of various sizes and should help them imagine how the diagram of the patio could be covered with squares. Students decompose the patio into rectangles and can multiply to find the area of the patio, but they should make the connection that the number of pavers needed to cover the patio is the same as the area of the patio. When students connect the quantities in the story problem to an equation, they reason abstractly and quantitatively (MP2).

Access for English Learners

MLR7 Compare and Connect. Synthesis: Invite groups to prepare a visual display that shows the strategy they used to figure out the number of tiles and the area of the floor. Encourage students to include details that will help others interpret their thinking. Give students time to investigate each others’ work. During the whole-class discussion, ask students, “How did the same area show up in each method?” “Why did the different approaches lead to the same outcome?” “Did anyone solve the problem the same way, but would explain it differently?”

Advances: Representing, Conversing

Student-facing Task Statement

Noah wants to use square pavers that are 1 square foot each to create a small patio in the community garden. A diagram of the patio is shown.

1. How many 1 square foot pavers will Noah need to cover the whole patio?
2. What is the area of the patio? Explain or show your reasoning.

Launch

- Groups of 2
- Display the image.
- “This problem is about making a patio using pavers. Pavers are stones, bricks, or blocks that are put on the ground to make a path or paved area. This is a patio that’s made of pavers.”
- “Earlier, we’ve talked about several different types of units that we can use to measure area. Here, Noah is using pavers that are 1 square foot. That means the paver is 1 foot by 1 foot. Help him figure out how many pavers he needs to cover the patio. Take a minute to think about the situation.”
- 1 minute: quiet think time
Student Responses

1. 42 pavers. Sample response: I saw a 6 by 3 rectangle that would have 18 square foot pavers in it and a 4 by 6 rectangle that would have 24 pavers in it.

2. 42 square feet. Sample response: I can find the area by figuring out how many pavers he used. $18 + 24 = 42$

Activity

- “Now work with your partner to answer the questions.”
- 5 minutes: partner work time
- Monitor for multiplication expressions students use to represent the area of the rectangles within the figure, such as:
  - $9 \times 4 = 36$, $3 \times 2 = 6$, $36 + 6 = 42$
  - $6 \times 3 = 18$, $6 \times 4 = 24$, $18 + 24 = 42$
  - $9 \times 4 + 3 \times 2$ or $(9 \times 4) + (3 \times 2)$
  - $6 \times 3 + 6 \times 4$ or $(6 \times 3) + (6 \times 4)$

Synthesis

- “How did you figure out how many pavers Noah would need?”
- Select students to share a variety of strategies. Display any expressions students used in their explanations.
- During each explanation, ask the class which measurements were and were not used and why.
- “How does each expression represent a way of finding the area of the figure?” (The expression $(9 \times 4) + (3 \times 2)$ shows the figure decomposed into a big rectangle across the top and a small rectangle below. Each part of the expression in parentheses represents one of the smaller rectangles in the figure. The expressions $6 \times 3 = 18$, $6 \times 4 = 24$, and $18 + 24 = 42$ show how the figure was decomposed into a 6-by-3 rectangle on the left and a 4-by-6 rectangle on the right, then the areas were added.)

Advancing Student Thinking

If students add numbers that indicate they tried to find the area by adding the areas of rectangles that overlap, consider asking:
“Tell me about how you found the area of the figure?”
“How would overlapping the rectangles affect the number of squares it would take to cover the figure?”

Lesson Synthesis

“In this lesson, we found the area of figures even if they were not fully gridded with squares. What did you need to think about when finding the area of a figure with just side length measurements?” (I can imagine it being filled with squares and count them. I can break the shape into rectangles and multiply the side lengths and then add those areas together.)

Suggested Centers

- Five in a Row: Multiplication (3–5), Stage 2: Factors 1–9 (Addressing)
- Five in a Row: Addition and Subtraction (1–2), Stage 8: Add within 1,000 with Composing (Supporting)

Response to Student Thinking

Students multiply numbers that represent side lengths of rectangles that overlap.

The work in this lesson builds from the addition concepts developed in a prior unit.

Next Day Support

- During the launch of the next day’s activity, have students discuss ways that they could decompose the figure to find its area.

Prior Unit Support

Grade 2, Unit 2, Section A: Add and Subtract
Lesson 14: Find the Area of Figures with Missing Sides

Standards Alignments
Addressing 3.MD.C.7.d

Teacher-facing Learning Goals
- Calculate the area of ungridded figures composed of rectangles, including figures with missing side lengths.

Student-facing Learning Goals
- Let’s find the area of figures with missing side lengths.

Lesson Purpose
The purpose of this lesson is for students to calculate the area of ungridded figures made of rectangles, including figures with missing side lengths.

In previous lessons, students found the area of figures that were fully gridded with squares and moved toward figures without a grid but had all their side lengths labeled. In this lesson, students use the strategies they have learned to decompose the figures into non-overlapping rectangles. They realize that not all measurements need to be given, and that some lengths can be determined given the rectangular structure of these figures.

This lesson has a Student Section Summary.

Access for:

- Students with Disabilities
  - Engagement (Activity 2)

- English Learners
  - MLR8 (Activity 2)

Instructional Routines
Notice and Wonder (Warm-up)

Lesson Timeline

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<td>Activity 2</td>
<td>25 min</td>
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</tbody>
</table>

Teacher Reflection Question
Reflect on which students have not shared their strategies in class lately. How can their insight or ways of thinking be highlighted in or tied to upcoming lessons?
Cool-down (to be completed at the end of the lesson)  

Mystery Side Area

Standards Alignments
Addressing  3.MD.C.7.d

Student-facing Task Statement
Find the area of the figure. Explain or show your reasoning.

Student Responses
42 sq cm. Sample response: I found the area of the top rectangle to be 30 sq cm because $3 \times 10 = 30$. Then I found the missing side length to be 6 cm by subtracting 3 cm and 1 cm from 10 cm because opposite side lengths are equal in a rectangle. Then I found the area of the smaller rectangle on the bottom to be $2 \times 6$, which is 12 sq cm. Then I added $30 + 12$ to get 42 sq cm.
Warm-up
Notice and Wonder: Mystery Sides

Standards Alignments
Addressing 3.MD.C.7.d

The purpose of this warm-up is to elicit the idea that we can find the area of figures even though not all side lengths are given, which will be useful when students find missing side lengths and areas in a later activity. While students may notice and wonder many things about this figure, the missing side lengths are the important discussion points.

Instructional Routines
Notice and Wonder

Student-facing Task Statement
What do you notice? What do you wonder?

Launch
- Groups of 2
- Display the image.
- “What do you notice? What do you wonder?”
- 1 minute: quiet think time

Activity
- “Discuss your thinking with your partner.”
- 1 minute: partner discussion
- Share and record responses.

Synthesis
- “Do you think we could still find the area of this figure even though some of the side lengths are missing? Why or why not?” (Yes, we could use the side lengths we know to find the missing side lengths.)
- “How would you find the missing side lengths?” (I know the top side is 10 cm, and that is the horizontal length of the entire figure. If one part of that length is 4 cm, then the missing length is 6 cm. I know the vertical length of the figure is 9 cm. If one part of it is

Grade 3, Unit 2
Activity 1
The Mystery Side

Standards Alignments
Addressing 3.MD.C.7.d

The purpose of this activity is for students to consider a strategy to find a missing side length of a figure composed of rectangles. They find the missing side length by decomposing the figure into non-overlapping rectangles.

Student-facing Task Statement
Tyler says that the missing side length is 5 meters because it looks longer than the sides that are 4 meters long. Do you agree or disagree? Be prepared to explain your reasoning.

Launch
• Groups of 2
• Display the image.
• “Consider this figure. Take some time to think about Tyler’s reasoning for finding the missing side length.”
• 1–2 minutes: quiet think time

Activity
• “Share your ideas about Tyler’s reasoning with your partner.”
• 2–3 minutes: partner discussion

Synthesis
• Invite students to share their ideas about Tyler’s reasoning.
• Consider asking:
Student Responses

Sample response: I disagree with Tyler. The side does look longer than 4 meters, but I think it is 6 meters long. If we add the missing side to the 6 meter side, they need to add to 12 meters to match the other side of the figure. This is because in a rectangle, the sides opposite each other have to be the same length.

“What strategies did you or your partner use to find the missing side length?” (Encourage students to share on the displayed figure.)

Activity 2

Practice with Mystery Sides

Standards Alignments

Addressing 3.MD.C.7.d

The purpose of this activity is for students to find the area of a figure composed of rectangles with missing sides by decomposing it into two non-overlapping rectangles. There are several ways to approach these problems and students are given freedom to choose their own strategy to find the area. They share their reasoning with a student who has used a different method and prepare to share this new method during the class discussion (MP3). The synthesis should focus on ways to find missing side lengths and emphasize different ways to find the area of the figure.

At this point, students should be comfortable multiplying side lengths of rectangles to find the area. Discussion should focus on how students decompose the figures and how they find the missing side lengths.

Access for English Learners

MLR8 Discussion Supports: Before students explain their strategies to each other, remind them to restate what they hear using precise mathematical language and their own words. Display the sentence frame: “I heard you say . . . .” Original speakers can agree or clarify for their partner.

Advances: Listening, Speaking
**Access for Students with Disabilities**

*Engagement: Provide Access by Recruiting Interest:* Use timers, alerts, or previews to help learners anticipate and prepare to transition between activities.

*Supports accessibility for: Attention, Organization*

---

**Student-facing Task Statement**

Find the area of each figure. Explain or show your reasoning.

**A**

```
8 meters
6 meters
4 meters
7 meters
4 meters
```

**B**

```
2 feet
3 feet
2 feet
7 feet
7 feet
4 feet
```

---

**Launch**

- Groups of 2

**Activity**

- “Now that we’ve discussed how we would find the missing side length of this figure, find the area of this figure.”
- 3–5 minutes: independent work time
- Monitor for a variety of strategies to group students for discussion.
- “Find someone who used the same strategy that you used to find the area of the figure. Discuss how your strategy makes sense.”
- 2 minutes: partner discussion
- “Now, find someone who used a different strategy than you. Explain your strategies to each other. Be sure you could explain your partner’s strategy to the class.”
- 4 minutes: partner discussion
- “Work with your current partner to find the area of the second figure.”
- 5 minutes: partner work time
- Circulate and consider asking: “What information do you know that might help you find what you are missing?”
- Monitor for a variety of ways that students use to find the area of the second figure, including different decompositions, different strategies for finding missing sides lengths, and different expressions

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**Student Responses**

1. The missing side length is 6 m. Sample response: Adding 6 m to the given 6 m equals 12 m.
   
   The area is 72 sq m. Sample response:
   
   - I saw a larger rectangle at the top and a smaller one at the bottom.
I saw a short rectangle on the left and its area is $6 \times 4$, which is 24 sq m. I saw a tall rectangle on the right and its area is $12 \times 4$ or 48 sq m. $24 + 48 = 72$

2. The missing vertical side is 4 ft. Sample response: I pictured the bottom section as a rectangle with 4 ft for the vertical side length.

The missing horizontal side is 2 ft. Sample response: The top side is 7 ft and I would take away 3 ft and 2 ft, leaving 2 ft.

The area is 22 sq ft. Sample response: I saw a rectangle that is 2 ft by 7 ft on the top and a rectangle that is 4 ft by 2 ft on the bottom. I wrote: $(2 \times 7) + (4 \times 2) = 14 + 8 = 22$

they write.

**Synthesis**

- Select students to share a variety of strategies for finding the area of the second figure.

- Consider asking:
  - “What missing side had to be found to use this strategy? How did you find the missing side length?”
  - “After you knew the missing side lengths, how did you find the area?”
  - “What is the expression we would write to match how you decomposed the figure?”
  - “Is there another way that we could break this figure into non-overlapping rectangles?” (Students may also see the figure as 3 rectangles: $(2 \times 3) + (6 \times 2) + (2 \times 2)$.)

**Advancing Student Thinking**

If students determine incorrect lengths for the missing sides, consider asking:

- “Tell me about how you found the missing side length.”
- “What strategies from the previous activity could you use to find the missing side length?”

**Lesson Synthesis**

Display the figure from the warm-up.

“Today we learned that we can find missing side lengths in figures. What is it about the structure of the figures we saw in this lesson that helps you find missing side lengths?” (They are made up of rectangles, so if we break them into rectangles, we can think about how the lengths of opposite sides need to match.)

“How do you like to find the area of these figures after you know the side lengths?” (I break the shape
into rectangles I see and find their area. Then I add the area of those rectangles together.)

**Suggested Centers**

- Five in a Row: Multiplication (3–5), Stage 2: Factors 1–9 (Addressing)
- Five in a Row: Addition and Subtraction (1–2), Stage 8: Add within 1,000 with Composing (Supporting)

**Student Section Summary**

In this section, we found the area of figures that could be decomposed into rectangles. We added the area of each rectangle to find the area of the entire figure.

We also found missing side lengths by using what we know about opposite sides of rectangles.

![Diagram of a rectangle with unknown side lengths]

**Complete Cool-Down**

**Response to Student Thinking**

Students do not accurately find the missing side length.

**Next Day Support**

- Before the warm-up, pass back the cool down and work in small groups to make corrections.

**Prior Unit Support**

Grade 2, Unit 2, Section A: Add and Subtract
## Lesson 15: New Room (Optional)

### Standards Alignments

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### Teacher-facing Learning Goals

- Solve problems involving the area of ungridded figures composed of rectangles, including figures with missing side lengths.

### Student-facing Learning Goals

- Let's fit furniture into a room.

### Lesson Purpose

The purpose of this lesson is for students to use their experience with areas of figures composed of rectangles to solve problems.

This lesson is optional because it does not address any new mathematical content standards. This lesson does provide students with an opportunity to apply precursor skills of mathematical modeling.

In previous lessons, students solved rectangular area problems. They connected area problems to multiplication. They learned that area is additive as they found the area of figures composed of rectangles by decomposing them into non-overlapping rectangles.

In this lesson, students find missing side lengths of a room and use their knowledge about areas of rectangles to solve a problem about fitting a bed and desk into a room. As students make decisions, they consider what space is really usable in the room or what is the best spot in the room for each piece of furniture.

There are several ways to approach this problem and students are given freedom to choose their own strategy to make a decision (MP1).

When students make choices and translate mathematics to real world contexts, they model with mathematics (MP4).

### Access for:

- **Students with Disabilities**
  - Action and Expression (Activity 1)

- **English Learners**
  - MLR5 (Activity 1)
Instructional Routines

Notice and Wonder (Warm-up)

Materials to Gather

- Grid paper: Activity 2
- Scissors: Activity 2
- Tools for creating a visual display: Activity 2

Materials to Copy

- New Bed and Desk (groups of 2): Activity 2

Lesson Timeline

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<tr>
<td>Activity 1</td>
<td>10 min</td>
</tr>
<tr>
<td>Activity 2</td>
<td>25 min</td>
</tr>
<tr>
<td>Lesson Synthesis</td>
<td>10 min</td>
</tr>
</tbody>
</table>

Teacher Reflection Question

What unfinished learning or misunderstandings do your students have about the area of rectangles? How did you leverage those misconceptions in a positive way to further the understanding of the class?

Standards Alignments

Addressing 3.MD.C.5
Building Towards 3.MD.C.7.d

The purpose of this warm-up is to familiarize students with the context of floor plans and the mathematics that might be involved. This will be useful when students design a layout for a bedroom in a later activity. While students may notice and wonder many things about this image such as the familiar shape of the diagram that can be broken up into rectangles, the features that make this a floor plan such as windows and the door, are the important discussion points.
Instructional Routines

Notice and Wonder

Student-facing Task Statement
What do you notice? What do you wonder?

Launch

- Groups of 2
- Display the image.
- “What do you notice? What do you wonder?”
- 1 minute: quiet think time

Activity

- “Discuss your thinking with your partner.”
- 1 minute: partner discussion
- Share and record responses.

Synthesis

- “This diagram represents a floor plan. A floor plan is like a map for a room.”
- “What are some other things we might see on a floor plan for a bedroom?” (bed, computer desk, bookshelf, rug, bunk bed)

Student Responses

Students may notice:

- We can break this figure into two rectangles.
- Some of the side lengths are missing.
- We could use what we know about rectangles to find the missing side lengths.
- The measurements are given in feet.
- There is a door and windows.

Students may wonder:

- What does the figure represent?
- What is the area of the figure?
- What are the missing sides?
Activity 1

Floor Plans

Standards Alignments
Addressing 3.MD.C.5
Building Towards 3.MD.C.7.b

The purpose of this activity is for students to make sense of floor plans. In the launch, students make sense of how different features of the floor plan such as windows, doors, and furniture are visually represented. Students analyze the plan and consider what is usable floor space and where it makes sense to put the furniture. Students may give both aesthetic and practical reasons for furniture placement. This short activity prepares students to make similar considerations in the next activity.

In the synthesis, students work to explain their reasoning and construct viable arguments (MP3).

Access for English Learners

MLR5 Co-Craft Questions. Display the image of the floor plan, and invite students to write a list of possible mathematical questions they could ask about the situation. Invite students to compare their questions, “What do these questions have in common? How are they different?” Amplify questions related to comparison and areas of rectangles.
Advances: Reading, Writing

Access for Students with Disabilities

Action and Expression: Provide Access for Physical Action. Provide access to a variety of pre-cut materials to reduce barriers for students who need support with fine motor skills and students who benefit from extra processing time.
Supports accessibility for: Fine Motor Skills, Organization, Visual-Spatial Processing

Student-facing Task Statement

Launch
• Groups of 2

Activity
• “Take a couple of minutes to think about
The image shows a design of a floor plan for a bedroom. Discuss with your partners:

1. What is one thing you like about the given design?
2. What is one thing you would change and why?

**Student Responses**

1. Sample response: I like that they put the desk by the window because this might help the person focus more if they are working or can enjoy looking outdoors if they want to take a break.
2. Sample response: I would move the plants to the other side of the door so that it can open all the way.

**Synthesis**

- Invite a few students to share what they like about the current design and what they would change and why.
- Consider asking:
  - “Why might it be a good idea to move the plants to another spot?” (When the door is opened, it might bump into the plants. The door can't be opened all the way.)
  - “What else could we rearrange to make moving around the room easier?”

---

**Activity 2**

New Bed and Desk

**Standards Alignments**


The purpose of this activity is for students to apply their understanding of the area of rectangles to design a floor plan for a room. Students use their experience from the previous activity and consider what space is usable as they arrange the furniture. When students think about the dimensions of the different objects, the constraints of the space available, and the way things in a
bedroom are usually arranged, they model with mathematics (MP4).

**Materials to Gather**

Grid paper, Scissors, Tools for creating a visual display

**Student-facing Task Statement**

This is a diagram of Tyler's new room, his desk, and his bed.

1. How should Tyler arrange his bed and desk in his new room?
2. What is the area of the room that is not covered with furniture?

Create a poster to show your thinking. Organize it so it can be followed by others.

**Materials to Copy**

New Bed and Desk (groups of 2)

**Launch**

- Groups of 2 or 4
- Display images of Tyler's desk, bed, and new room.
- “Tyler is moving into a new room and needs to decide where he is going to put his bed and desk. What are some of the things you would want to think about to decide where a bed and desk should go in a room?”
- 30 seconds: quiet think time
- 1 minute: small-group discussion
- Give students access to grid paper.
- Give each group a copy of the Instructional master and scissors.
- Give each group tools for creating a visual display.

**Activity**

- “Work with your group to solve both of the problems. You can cut out the furniture in the handout or create your own diagram on grid paper. Then, create a poster to show how you solved the problems.”
- 15 minutes: small-group work time

**Synthesis**

- Display the student posters around the room.
- “Now, half of the class is going to stand
2. Sample response: I split the room into a rectangle on the bottom and a rectangle on top. There are 29 square feet that aren’t covered in the bottom rectangle and 51 square feet that aren’t covered in the top rectangle. Altogether, there are 80 square feet that aren’t covered with furniture. (Students may or may not include the closet as being covered with furniture.)

with their posters while the other half visits other students’ posters. If you’re standing with your poster, explain how you solved the problem. As you visit other posters, ask any questions you have about the solution to the problem.

• Have half the groups stand with their poster to share their ideas or answer questions as the other groups visit their posters.
• Have the other half of the class visit other groups’ posters.
• 5 minutes: small-group work time
• Remind students to switch posters at 2 minutes if they haven’t already so they see a few posters.
• Switch group roles and repeat.

Lesson Synthesis

“Today we solved a problem that had many different possible answers. What are some things you thought about when designing the different floor plans?” (I had to make sure Tyler had space to walk around the bed or have space for his chair. I made sure not to block the door.)

Suggested Centers

• Five in a Row: Multiplication (3–5), Stage 2: Factors 1–9 (Addressing)
• Five in a Row: Addition and Subtraction (1–2), Stage 8: Add within 1,000 with Composing (Supporting)
Family Support Materials
Family Support Materials

Area and Multiplication

In this unit, students learn about the concept of area and relate area to multiplication and addition.

Section A: Concepts of Area Measurement

In this section, students make sense of the area of flat shapes. They learn that the area of a shape is the amount of space it covers, and it can be measured by the number of square units that cover it without gaps or overlaps. Students explore this idea by tiling shapes with squares and counting the number of squares.

We cannot measure area by the number of squares when they cover a shape with gaps and overlaps. We can measure the area of this shape by the number of squares because the squares tile the shape.

Section B: Relate Area to Multiplication

In this section, students relate the area of rectangles to multiplication. They see that rectangles can be tiled with squares in equal-size rows (or columns), so if the rectangle is 6 units by 4 units, there are 6 groups of 4 or 4 groups of 6. The number of square units is then $6 \times 4$ or $4 \times 6$.

Students come to understand that multiplying the side lengths of a rectangle gives the same number of squares as counting them. A rectangle that is 3 units by 6 units can be tiled with 3 rows of 6 squares, so its area is $3 \times 6$ or 18 square units.

Students then use these ideas to solve real-world story problems related to area.
Section C: Find Area of Figures Composed of Rectangles

In this section, students find the area of figures composed of rectangles. They do so by decomposing (breaking apart) the figures into non-overlapping rectangles, finding the area of each rectangle, and adding all the areas.

Students also use the structure of rectangles to find missing side lengths in figures composed of rectangles.

Try it at home!

Near the end of the unit, ask your student to find the area of this figure:

Questions that may be helpful as they work:

- How can this figure be decomposed into rectangles?
- How many rows (or columns) are there in each rectangle?
- What multiplication expressions would you use to find the area?
- Where do we see this kind of design in our home or in places we visit?
Unit Assessments

Check Your Readiness A, B and C
End-of-Unit Assessment
Area and Multiplication: Section A Checkpoint

1. Use square tiles to find the area of this figure. Explain or show your reasoning.

2. Andre places these squares on the rectangle and says the area of the rectangle is 10 square units.

Do you agree with Andre? Explain your reasoning.
3. Find the area of the rectangle. Explain or show your reasoning.
Area and Multiplication: Section B Checkpoint

1. Select all expressions that represent the area of this rectangle.

![Rectangle](image)

A. $6 \times 5$
B. $6 + 5 + 6 + 5$
C. $6 + 4 + 2$
D. $5 \times 6$
E. $6 \times 6$

2. Priya and Han are designing a tree fort with a rectangular floor. They want at least 30 square feet of floor space. The sides all have to measure less than 8 feet.

What are two possible pairs of side lengths for the floor of the fort? Explain your reasoning.

3. Explain why the area of the rectangle is $5 \times 3$ square units.
Area and Multiplication: Section C Checkpoint

1. The figure represents a garden. What is the area of the garden? Explain or show your reasoning.

2. Find the area of the figure. Explain or show your reasoning.
Area and Multiplication: End-of-Unit Assessment

1. Select all rectangles that have an area of 20 square units.

   A. 
   
   B. 
   
   C. 
   
   D. 
   
   E. 
2. What is the area of this figure in square units? Explain or show your reasoning.

3. A rectangle has an area of 12 square inches. What could be the length and width of the rectangle? Select all that apply.
   A. 2 inches and 6 inches
   B. 5 inches and 7 inches
   C. 3 inches and 4 inches
   D. 2 inches and 4 inches
   E. 1 inch and 12 inches

4. a. Explain or show how the expression $4 \times 7$ represents the area of this rectangle in square units.

   b. Explain or show how the expression $4 \times 5 + 4 \times 2$ also represents the area of the rectangle.
5. Find the area of the figure. Explain or show your reasoning.

6. Find the value of each expression.
   a. $4 \times 7$
   b. $3 \times 9$
   c. $6 \times 4$
   d. $5 \times 8$
7. Lin is putting carpet squares in her bedroom. Each carpet square is 1 foot by 1 foot.

   a. What are the lengths of the two missing sides? Explain or show your reasoning.

   b. How many carpet squares does Lin need to cover the floor? Explain or show your reasoning.
Assessment
Answer Keys
Check Your Readiness A, B and C
End-of-Unit Assessment
Teacher Instructions

Give students access to inch tiles.

Problem 1

Goals Assessed

- Describe area as the number of unit squares that cover a plane figure without gaps and overlaps.

Use square tiles to find the area of this figure. Explain or show your reasoning.

Solution

11 square units. Sample reasoning: I fit 5 squares on the bottom, then 4 more, and then 2 on top so that’s 11 total.
Problem 2

**Goals Assessed**

- Describe area as the number of unit squares that cover a plane figure without gaps and overlaps.

Andre places these squares on the rectangle and says the area of the rectangle is 10 square units.

Do you agree with Andre? Explain your reasoning.

**Solution**

No. The squares overlap in some spots and there are gaps so the full rectangle is not covered. Andre cannot decide what the area of the rectangle is with the squares placed like this.

Problem 3

**Goals Assessed**

- Measure the area of rectangles by counting unit squares.

Find the area of the rectangle. Explain or show your reasoning.

**Solution**

20 square units. I counted the squares and there are 4 rows of 5 squares which is 20 squares.
Assessment: Section B Checkpoint

Problem 1

Goals Assessed

- Explain why the area of a rectangle can be determined by multiplying the side lengths.

Select all expressions that represent the area of this rectangle.

A. $6 \times 5$
B. $6 + 5 + 6 + 5$
C. $6 + 4 + 2$
D. $5 \times 6$
E. $6 \times 6$

Solution

["A", "D"]

Problem 2

Goals Assessed

- Solve problems involving the area of rectangles.

Priya and Han are designing a tree fort with a rectangular floor. They want at least 30 square feet
of floor space. The sides all have to measure less than 8 feet.

What are two possible pairs of side lengths for the floor of the fort? Explain your reasoning.

Solution

Sample response: A 6-foot-by-5-foot floor would give an area of 30 square feet. A 7-foot-by-5-foot floor would give an area of 35 square feet.

Problem 3

**Goals Assessed**

- Explain why the area of a rectangle can be determined by multiplying the side lengths.

Explain why the area of the rectangle is $5 \times 3$ square units.

Solution

Sample response: There are 5 columns and 3 squares in each column so that's $5 \times 3$ total squares that cover the rectangle with no gaps or overlaps.
Assessment: Section C Checkpoint

Problem 1

The figure represents a garden. What is the area of the garden? Explain or show your reasoning.

Solution

100 square feet. Sample responses:

- I can cut the garden vertically into two rectangles. The one on the left is 5 feet by 10 feet and it has an area of 50 square feet. The one on the right is also 5 feet by 10 feet and has an area of 50 square feet. The total area is 100 square feet.

- I can cut the garden horizontally into two rectangles. The one on the bottom is 15 feet by 5 feet, so it has an area of 75 square feet. The one on top is 5 feet by 5 feet so it has an area of 25 square feet. The total area is 100 square feet.

Problem 2

Goals Assessed

- Find the area of figures composed of rectangles.
Find the area of the figure. Explain or show your reasoning.

Solution

66 square centimeters. Sample responses:

- I can cut the figure vertically into a rectangle that is 8 cm by 7 cm and a rectangle that is 5 cm by 2 cm. The areas of those rectangles are 56 square centimeters and 10 square centimeters so the total area is 66 square centimeters.
- $8 \times 9 = 72$, $3 \times 2 = 6$, $72 - 6 = 66$
Assessment: End-of-Unit Assessment

Problem 1

Standards Alignments
Addressing 3.MD.C.5.b, 3.MD.C.7.b

Narrative
Students identify rectangles of a given area. The pictures show all of the individual square units, so counting is a possible strategy as is using multiplication. Students who select answer B may be counting by adding up the 4 side lengths of 5 while students who select C may be counting incorrectly.

Select all rectangles that have an area of 20 square units.

A.

B.

C.

D.
E.

Solution

["A", "D", "E"]

Problem 2

**Standards Alignments**
Addressing 3.MD.C.5, 3.MD.C.6

**Narrative**
Students find the area of an irregularly shaped figure on a square grid. This item assesses student understanding of what area means. The shape is irregular, so the expectation here is to apply the definition of area and count the number of squares. Students who miss this item are either struggling with counting accurately or need to review further the concept of area.

What is the area of this figure in square units? Explain or show your reasoning.
Solution

The area is 13 square units. There are 7 squares in the part on the bottom left and 6 more squares in the part to the top right, making 13 total.

Problem 3

**Standards Alignments**

Addressing 3.MD.C.5, 3.MD.C.7.b

**Narrative**

Students are given the area of a rectangle. Using the definition of area, they identify possible side lengths of the rectangle. Students may select B if they notice that the sum of 5 and 7 is 12. They may select D if they look at the sum of the side lengths (the perimeter).

A rectangle has an area of 12 square inches. What could be the length and width of the rectangle? Select all that apply.

- A. 2 inches and 6 inches
- B. 5 inches and 7 inches
- C. 3 inches and 4 inches
- D. 2 inches and 4 inches
- E. 1 inch and 12 inches

Solution

["A", "C", "E"]

Problem 4

**Standards Alignments**

Addressing 3.MD.C.7.a, 3.MD.C.7.b, 3.MD.C.7.c

**Narrative**

Students use a given rectangle, tiled by square units, to explain the relationship between
multiplication and area and then to reason about a case of the distributive property. They view the rectangle as a collection of equal rows, and the area then can be seen as the product of the number of rows and the number of square units in each row. For the distributive property, students will need to identify that the given rectangle can be divided into a 4 unit by 5 unit rectangle and a 4 unit by 2 unit rectangle.

Students may answer both questions numerically, that is they may say that the area of the rectangle is 28 square units and the expressions both have value 28. These students may understand the relationship between multiplication and area but the response does not allow any conclusion in this direction. Their work on other problems that do not show the individual squares in figures will help show how well they understand the relationship between multiplication and area.

a. Explain or show how the expression $4 \times 7$ represents the area of this rectangle in square units.

b. Explain or show how the expression $4 \times 5 + 4 \times 2$ also represents the area of the rectangle.

Solution

a. There are 4 rows of 7 squares in the rectangle so that's $4 \times 7$ squares covering the rectangle.
b. The rectangle can be divided into 4 rows of 5 and then 4 rows of 2 so that's $4 \times 5 + 4 \times 2$.

Problem 5

**Standards Alignments**

Addressing 3.MD.C.7.a, 3.MD.C.7.b, 3.MD.C.7.d
**Narrative**

Students find the area of a figure composed of rectangles with no grid. Measurements are provided, allowing students to find area using a variety of strategies, including:

- cutting vertically into two rectangles and using addition
- cutting horizontally into two rectangles and using addition
- surrounding with a larger rectangle and using subtraction

Find the area of the figure. Explain or show your reasoning.

---

**Solution**

56 square inches. Sample responses:

- A horizontal line divides the figure into a 10 inch by 4 inch rectangle and a 4 inch by 4 inch rectangle. So the area is $40 + 16$ or 56 square inches.
- The figure is a 10 inch by 8 inch rectangle with a 6 inch by 4 inch rectangle taken away. So its area is $10 \times 8 - 6 \times 4$ or 56 square inches.

---

**Problem 6**

**Standards Alignments**

Addressing 3.OA.C.7

**Narrative**

Since this item assesses an end-of-year fluency, students may be at different points of fluency this early in the year. It is okay for a student to just know the fact and write it down with no other work,
Problem 7

**Standards Alignments**
Addressing 3.MD.C.7.b, 3.MD.C.7.d

**Narrative**
Students find the area of a composite shape and relate it to the number of unit squares it takes to cover a space. There are two expected techniques that students may use to find the area:

- find the area of the 9 foot by 9 foot square and subtract the area of the missing 2 foot by 4 foot rectangle
- decomposing the shape into 3 (or more) rectangles in a variety of ways and adding their areas

Student answers for the area of the room will depend on the values they find for the missing side lengths and their calculations should be reviewed for correctness accordingly.

Lin is putting carpet squares in her bedroom. Each carpet square is 1 foot by 1 foot.

a. What are the lengths of the two missing sides? Explain or show your reasoning.
b. How many carpet squares does Lin need to cover the floor? Explain or show your reasoning.

Solution

a. They are both 2 feet. The one on the bottom is 2 feet because that whole side is 9 feet long like the top and the other two sides going across add up to 7 feet. The vertical one is 2 feet because it's the same as the side across from it that is 2 feet.

b. Sample response: The whole space is 9 feet by 9 feet so that's $9 \times 9$ or 81 square feet. Then I need to take away 8 square feet for the missing part. That leaves $81 - 8 = 73$. She needs 73 carpet squares to cover the floor.
Lesson
Cool Downs
Lesson 1: What is Area?

Cool Down: Compare Area

Which rectangle has the greater area? How do you know?
Lesson 2: How Do We Measure Area?

Cool Down: Tile and Tell

Use square tiles to find the area of the figure.

Number of square tiles used: _____ square tiles

Area: _____ square units
Lesson 3: Tile Rectangles

Cool Down: Tile a Rectangle

Andre says this rectangle has an area of 23 square units because he covered it with 23 square tiles.

Do you agree with Andre? Explain your reasoning.
Lesson 4: Area of Rectangles

Cool Down: What’s the Area?

Find the area of this rectangle. Explain or show your reasoning.
Lesson 5: Represent Products as Areas

Cool Down: Create a Rectangular Area

Use the grid to create a rectangular area that represents the expression $7 \times 4$.

Explain your reasoning.
Lesson 6: Different Square Units (Part 1)

Cool Down: Which Square?

Here is a rectangle.

Here are 2 different squares you could use to tile.

A

B

1 square inch

1 square centimeter

Which square would allow you to tile the rectangle with the fewest number of squares? Explain your reasoning.
Lesson 7: Different Square Units (Part 2)

Cool Down: Square Feet?
Select all the areas that you would measure with square feet.

A. Area of a room
B. Area of the cover of a book
C. Area of a basketball court
D. Area of a window
E. Area of a note card
The tick marks on the sides of the rectangle are 1 foot apart. What is the area of the rectangle? Explain or show your reasoning.
Lesson 9: Measure to Find the Area

Cool Down: Find the Area

Use your ruler to find the area of the rectangle in square inches.
Lesson 10: Solve Area Problems

Cool Down: How Much Fabric?

Kiran bought two pieces of fabric. The black fabric is 9 yards by 2 yards. The purple fabric is 4 yards by 5 yards. Which piece of fabric has the larger area? Explain or show your reasoning.
Lesson 11: Area and the Multiplication Table

Cool Down: What's the Product?

What is the missing product? Explain your reasoning.

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Lesson 12: Area and Addition

Cool Down: Where are the Rectangles?
Find the area of this figure. Explain or show your reasoning.
Lesson 13: Find the Area of Figures

Cool Down: Find the Area

Find the area of this figure. Explain or show your reasoning.
Lesson 14: Find the Area of Figures with Missing Sides

Cool Down: Mystery Side Area

Find the area of the figure. Explain or show your reasoning.
Instructional Masters
## Instructional Masters for Area and Multiplication

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Same Rectangle, Different Units

Grid 1
Same Rectangle, Different Units

Grid 1
Same Rectangle, Different Units

Grid 2
Same Rectangle, Different Units

Grid 1
Same Rectangle, Different Units

Grid 2
Match Expressions and Areas
Match Expressions and Areas
Match Expressions and Areas
Match Expressions and Areas
Match Expressions and Areas
Match Expressions and Areas
Match Expressions and Areas
Pattern Blocks to Compare Shapes

“What do you notice? What do you wonder?”
Use pattern blocks to decide which shape covers the most space. Be ready to explain your reasoning.
New Bed and Desk
Time to Tile

a.

b.
c. Time to Tile

---

d. Time to Tile
Use Square Tiles to Measure Area

Use square tiles to find the area of each shape. Be prepared to explain your reasoning.

1.
Use Square Tiles to Measure Area

2.
3. Use Square Tiles to Measure Area
Use Square Tiles to Measure Area

4.
Use Square Tiles to Measure Area

5.
Use Square Tiles to Measure Area

6.
Can You Build It Stage 1 Directions

Directions:
- Partner A:
  - Use 16–24 tiles to build a rectangle. Don’t let your partner see it!
  - Describe it to your partner.
- Partner B: Build the rectangle your partner describes to you.
- Place the two rectangles next to each other and discuss what is the same and what is different about them.
- Switch roles and repeat.
Five in a Row Multiplication and Division Stage 1 Gameboard

Directions:
- **Partner A:**
  - Put a paper clip on 2 numbers in the grey row.
  - Multiply the numbers.
  - Cover the product of the 2 numbers with a counter.
- **Partner B:**
  - Move 1 of the paper clips, multiply the numbers, and cover the product with a counter.
- Take turns. The first partner to cover 5 squares in a row wins.

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| 1  | 2  | 3  | 4  | 5  | 10 |

[Image of a multiplication and division gameboard]
Capture Squares Stage 6 Gameboard

Directions:
- On your turn:
  - Roll the number cube and spin the spinner. Find the product.
  - Choose a square on the gameboard that shows that number. Draw one line connecting any 2 dots around the number.
  - If you can't draw a line, roll and spin again.
  - If you draw a line that finishes a square around a number, shade in that box with your color.
- Take turns with your partner. The first player to shade in 3 boxes wins.
Capture Squares Stage 6 Spinner

- 5
- wild
- 4
- 3
- 2
Directions:

- Choose a color for your rectangles different from your partner.
- On your turn:
  - Spin the spinner and roll the number cube.
  - Shade in a rectangular area to represent the product of the two numbers.
- Take turns until the grid can't fit any more rectangles.
- Each partner adds up their total area, the partner with the greatest total square units wins.
Rectangle Rumble Stage 1 Spinner

1

2

10

5
Directions: (two-digit plus two-digit)

- Partner A: Put a paper clip on 2 numbers in the grey rows. Cover the sum of the 2 numbers with a counter.
- Partner B: Move 1 of the paper clips, add the numbers, and cover the sum with a counter.
- Take turns. The first partner to cover 5 squares in a row wins.

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Directions: (one-digit plus two-digit)
- Partner A: Put a paper clip on 2 numbers in the grey rows. Cover the sum of the 2 numbers with a counter.
- Partner B: Move 1 of the paper clips, add the numbers, and cover the sum with a counter.
- Take turns. The first partner to cover 5 squares in a row wins.

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Rectangle Rumble Stage 2 Grid

Directions:
- Choose a color for your rectangles different from your partner.
- On your turn:
  - Spin the spinner and roll the number cube.
  - Shade in a rectangular area to represent the product of the two numbers.
- Take turns until the grid can't fit any more rectangles.
- Each partner adds up their total area, the partner with the greatest total square units wins.
Rectangle Rumble Stage 2 Spinner

- wild
- 1
- 2
- 3
- 4
- 5
Directions:
- Partner A: Put a paper clip on 2 numbers in the grey rows. Cover the sum of the 2 numbers with a counter.
- Partner B: Move 1 of the paper clips, add the numbers, and cover the sum with a counter.
- Take turns. The first partner to cover 5 squares in a row wins.

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Five in a Row Multiplication and Division Stage 2 Gameboard

Directions:
- Partner A:
  - Put a paper clip on 2 numbers in the grey rows.
  - Multiply the numbers.
  - Cover the product of the 2 numbers with a counter.
- Partner B:
  - Move 1 of the paper clips, multiply the numbers, and cover the product with a counter.
- Take turns. The first partner to cover 5 squares in a row wins.

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Five in a Row Addition and Subtraction Stage 8 Gameboard

Directions:
- Partner A: Put a paper clip on 2 numbers in the grey rows. Cover the sum of the 2 numbers with a counter.
- Partner B: Move 1 of the paper clips, add the numbers, and cover the sum with a counter.
- Take turns. The first partner to cover 5 squares in a row wins.

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Credits

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