



Unit Plan

3.2 Area and Multiplication

Chester / Littleville Elementary / Grade 3 / Mathematics

[↗](#) Week 6 - Week 9 | 4 Curriculum Developers | Last Updated: Mar 19, 2024 by LeBlanc, Deanna[Style Guide](#)

What is the purpose of the unit? What are the major take-aways?

Standards

MA: Mathematics (2017)

MA: Grade 3

Operations & Algebraic Thinking

3.OA Represent and solve problems involving multiplication and division.

1. Interpret products of whole numbers, e.g., interpret 5×7 as the total number of objects in 5 groups of 7 objects each. [Show Details](#)

3.OA Understand properties of multiplication and the relationship between multiplication and division.

5. Apply properties of operations to multiply. [Show Details](#)

3.OA Solve problems involving the four operations, and identify and explain patterns in arithmetic.

9. Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations. [Show Details](#)

Number & Operations in Base Ten

3.NBT Use place value understanding and properties of operations to perform multi-digit arithmetic. [Show Details](#)

2. Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.

Measurement & Data

3.MD Geometric measurement: understand concepts of area and relate area to multiplication and to addition.

5. Recognize area as an attribute of plane figures and understand concepts of area measurement.
7. Relate area to the operations of multiplication and addition.
- 5a. A square with side length 1 unit, called "a unit square," is said to have "one square unit" of area, and can be used to measure area.
- 5b. A plane figure which can be covered without gaps or overlaps by n unit squares is said to have an area of n square units.
6. Measure areas by counting unit squares (square cm, square m, square in, square ft, and non-standard units).

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Enduring Understandings

- 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.

Essential Questions

- How can we use multiplication to determine the total number of objects arranged in rows and columns?
- How do the properties of operations help us to multiply more efficiently?
- What patterns can we observe in the multiplication table and how

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

can they help us understand multiplication better?

- How does knowing how to add and subtract within 1000 help us solve problems involving area?
- Why is area considered an attribute of plane figures, and how can we measure area using different methods?

Content

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

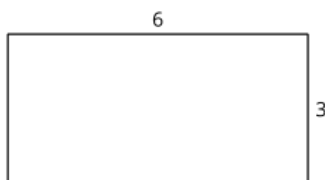
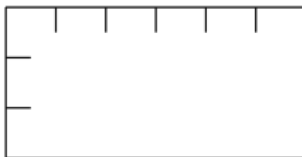
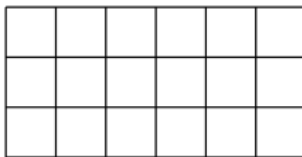
In grade 2, students explored attributes of shapes, such as number of sides, number of vertices, and length of sides. They measured and compared lengths (including side lengths of shapes).

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.

Skills

Section A 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.

Section B Goals

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

Section C Goals

- Find the area of figures composed of rectangles.


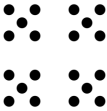



Later in the unit, students find the area and missing side lengths of figures composed of non-overlapping rectangles. This work includes cases with two non-overlapping rectangles sharing one side of the same length, which lays the groundwork for understanding the distributive property of multiplication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

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.

| lesson 3 | lesson 8 | lesson 10 | lesson 13 |
|---|---|---|--|
| Which One Doesn't Belong? A  | How many do you see?  | Number Talk 5×2 6×2 5×6 6×6 | Number Talk $109 + 4$ $109 + 14$ $209 + 34$ $219 + 34$ |
| B  | | | |
| C  | | | |
| D  | | | |

How will you gauge student learning?

Assessments

3.2 End of Unit Assessment | Summative | Written Test

[Grade3-2-End-of-Unit-Assessment-assessment.pdf](#)

6 State Standards Assessed

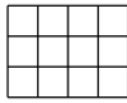
How will students learn?

Learning Activities

Section A:

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.

Section B:

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, $8 \times 4 = 4 \times 8$, 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).



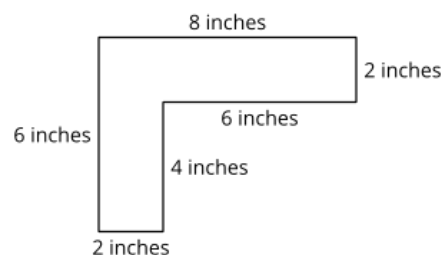
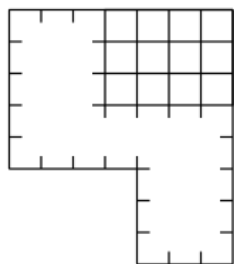
In this section, students also learn about standard units of area in inches, feet, centimeters, and meters. They explore these units in the context of real-world and mathematical problems.

Section C:

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.



Differentiated Instruction

Technology Integration

21st Century Skills

Positive Behavior

CASEL

Collaborative for Academic, Social, and Emotional Learning

Resources

Teacher Notes and Reflections
