**MCC. 3.MD.7 (Area)**

Relate area to the operations of multiplication and addition.

**ENDURING UNDERSTANDINGS**

• Relate fraction work to geometry by expressing the area of a shape as a unit fraction of the whole.

• Shapes can be partitioned with equal areas in a variety of ways to show halves, thirds, fourths, sixths, and eighths.

• The length around a polygon can be calculated by adding the lengths of its sides.

• The space inside a rectangle or square can be measured in square units.

**ESSENTIAL QUESTIONS**

• How are the perimeter and area of a shape related?

• How can I demonstrate my understanding of the measurement of area and perimeter?

• How can rectangles have the same perimeter but have different areas?

• How do the measure of lengths change when the unit of measure changes?

How do the relationships discovered with the pattern blocks help us understand fractions and area?

• How does combining and breaking apart shapes affect the perimeter and area?

• What do you know about pattern blocks that would help me understand how to fill an area?

• What is the relationship between perimeter and area?

• What methods can you use to determine the area of an object?

**CONCEPTS/SKILLS TO MAINTAIN**

It is expected that students will have prior knowledge/experience related to the concepts and skills identified below. It may be necessary to pre-assess in order to determine if time needs to be spent on conceptual activities that help students develop a deeper understanding of these ideas.

• Represent and solve problems involving multiplication and division

• Understand properties of multiplication and the relationship between multiplication and division

• Multiply and divide within 100

• Solve problems involving the four operations, and identify and explain patterns in arithmetic

• Use place value

• Recognize basic geometric figures and spatial relationships of triangle, quadrilateral (squares, rectangles, and trapezoids), pentagon, hexagon, cube, trapezoid, half/quarter circle, circle, cone, cylinder, sphere

**STRATEGIES FOR TEACHING AND LEARNING**

*Area and Perimeter…*

• Students can cover rectangular shapes with tiles and count the number of units (tiles) to begin developing the idea that area is a measure of covering. Area describes the size of an object that is two-dimensional. The formulas should not be introduced before students discover the meaning of area.

• The area of a rectangle can be determined by having students lay out unit squares and count how many square units it takes to completely cover the rectangle completely without overlaps or gaps. Students need to develop the meaning for computing the area of a rectangle. A connection needs to be made between the number of squares it takes to cover the rectangle and the dimensions of the rectangle.

Ask questions such as:

o What does the length of a rectangle describe about the squares covering it?

o What does the width of a rectangle describe about the squares covering it?

• The concept of multiplication can be related to the area of rectangles using arrays. Students need to discover that the length of one dimension of a rectangle tells how many squares are in each row of an array and the length of the other dimension of the rectangle tells how many squares are in each column. Ask questions about the dimensions if students do not make these discoveries. For example:

 o How do the squares covering a rectangle compare to an array?

o How is multiplication used to count the number of objects in an array?

• Students should also make the connection of the area of a rectangle to the area model used to represent multiplication. This connection justifies the formula for the area of a rectangle.

• Provide students with the area of a rectangle (i.e., 42 square inches) and have them determine possible lengths and widths of the rectangle. Expect different lengths and widths such as, 6 inches by 7 inches or 3 inches by 14 inches.

**EVIDENCE OF LEARNING**

By the conclusion of this unit, students should be able to demonstrate the following competencies:

• Demonstrate a thorough understanding of area and solve real world and mathematical problems that relate to area.

• Find the perimeter of objects; use addition to find perimeters; and recognize the patterns that exist when finding the sum of the lengths and widths of rectangles.

Recognize perimeter as an attribute of plane figures and distinguish between linear and area measures

**LEARNZILLION:**

<https://learnzillion.com/lessonsets/581-relate-area-to-multiplication-and-addition-using-unit-squares-and-arrays>

<https://learnzillion.com/lessonsets/378-relate-area-to-multiplication-and-addition-using-arrays>

<https://learnzillion.com/lessonsets/58-understand-area-and-arrays>

<https://learnzillion.com/lessonsets/758-use-tiling-to-represent-distributive-property>

<https://learnzillion.com/lessonsets/725-use-tiling-and-area-models-to-represent-the-distributive-property>

<https://learnzillion.com/lessonsets/755-recognize-area-as-additive-find-area-of-figures-by-decomposing-them>

<https://learnzillion.com/lessonsets/266-relate-area-to-multiplication-and-division>

<https://learnzillion.com/lessonsets/248-relate-area-to-the-operations-of-multiplication-and-addition>