Topic B

Concepts of Area Measurement

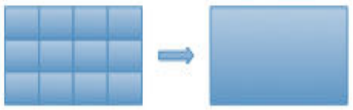
3.MD.5, 3.MD.6, 3.MD.7abd

Focus Standards:		3.MD.5	Recognize area as an attribute of plane figures and understand concepts of area measurement. a. 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. b. 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.
		3.MD.6	Measure areas by counting unit squares (square cm, square m, square in, square ft, and improvised units).
		3.MD.7	Relate area to the operations of multiplication and addition. a. Find the area of a rectangle with whole-number side lengths by tiling it, and show that the area is the same as would be found by multiplying the side lengths. b. Multiply side lengths to find areas of rectangles with whole-number side lengths in the context of solving real world and mathematical problems, and represent whole-number products as rectangular areas in mathematical reasoning. d. Recognize area as additive. Find areas of rectilinear figures by decomposing them into non-overlapping rectangles and adding the areas of the non-overlapping parts, applying this technique to solve real world problems.
Instructional Days:		4	
Coherence	**-Links from:**	G2–M2	Addition and Subtraction of Length Units
		G3–M1	Properties of Multiplication and Division and Solving Problems with Units of 2–5 and 10
		G3–M3	Multiplication and Division with Units of 0, 1, 6–9, and Multiples of 10
	-Links to:	G4–M3	Multi-Digit Multiplication and Division
		G4–M7	Exploring Multiplication

In previous lessons, students tiled given rectangles. In Lesson 5, students build rectangles using unit square tiles to make arrays when provided with specific criteria. For example, students may be told that there are 24 tiles inside the rectangle and one side of the rectangle is covered with 4 tiles. Students may start by building one column of the array to represent a length of 4 units and then duplicate that process until they reach 24 total tiles, skip-counting by fours. Finally, they physically push together the rows of tiles to make the array. When they count the number of fours, the process connects to unknown factor problems (in this case, the unknown factor of 6) from previous modules and builds toward students' discovery of the area formula.

Now experienced with drawing rectangular arrays within an area model, students find the area of an incomplete array in Lesson 6. They visualize and predict what the finished array looks like and then complete it by joining opposite end points with a straight edge. They determine the total area using skip-counting. The incomplete array model bridges to the area model, where no array is given.

In Lesson 7, students receive information about the side lengths of an area model (shown to the right). Based on this information, they use a straight edge to draw a grid of equal-sized squares within the area model and then skip-count to find the total number of squares. Units move beyond square centimeters and inches to include square feet and square meters.



Array Area Model

In Lesson 8, students recognize that side lengths play an important part in determining the area of a rectangle. They understand that multiplying the number of square units in a row by the number of rows produces the same result as skip-counting the squares within the array. Given the area and one side length, students realize that they can use multiplication with an unknown factor or division to find the unknown side length.

A Teaching Sequence Toward Mastery of Concepts of Area Measurement	
Objective 1:	**Form rectangles by tiling with unit squares to make arrays. (Lesson 5)**
Objective 2:	**Draw rows and columns to determine the area of a rectangle given an incomplete array. (Lesson 6)**
Objective 3:	**Interpret area models to form rectangular arrays. (Lesson 7)**
Objective 4:	**Find the area of a rectangle through multiplication of the side lengths. (Lesson 8)**