DTE@ MATHEMATICS

Geometric Measurement and Spatial Reasoning in Elementary Mathematics Teaching
Session 4 Resource: Common Core State Standards – Area

Mathematics   Grade 2 Introduction

(4) Students describe and analyze shapes by examining their sides and angles. Students investigate, describe, and reason about decomposing and combining shapes to make other shapes. Through building, drawing, and analyzing two- and three-dimensional shapes, students develop a foundation for understanding area, volume, congruence, similarity, and symmetry in later grades.

From Grade 2 Introduction (p. 17)

Measurement and 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.

    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.

6. Measure areas by counting unit squares (square cm, square m, square in, square ft, and improvised units).

Measurement and Data   3.MD

7. Relate area to multiplication and addition.

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

    b. Multiply side lengths to find areas of rectangles with whole-number side lengths in real-world and mathematical problems; represent whole-number products as rectangular areas.

    c. Use tiling to show the area of a rectangle with whole-number side lengths a and $b + c$ is the sum of $a \times b$ and $a \times c$. Use area models to represent the distributive property.

    d. Recognize area as additive. Find areas of rectilinear figures by decomposing into non-overlapping rectangles and adding the areas of the non-overlapping parts, applying this technique to solve real world problems.

Measurement and Data   3.MD

Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures.

8. Solve real world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, and exhibiting rectangles with the same perimeter and different areas or with the same area and different perimeters.

Geometry   3.G

Reason with shapes and their attributes.

2. Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole. For example, partition a shape into 4 parts with equal area, and describe the area of each part as ¼ of the area of the shape.

Measurement and Data   4.MD

Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.

3. Apply the area and perimeter formulas for rectangles in real world and mathematical problems.

Number and Operations-Fractions 5.NF

4. Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction.

    a. Find the area of a rectangle with fractional side lengths by tiling it with unit squares of the appropriate unit fraction side lengths, and show that the area is the same as would be found by multiplying the side lengths. Multiply fractional side lengths to find areas of rectangles, and represent fraction products as rectangular areas.

Geometry   6.G

Solve real-world and mathematical problems involving area, surface area, and volume.

1. Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems.

Geometry   7.G

Draw, construct, and describe geometrical figures and describe the relationships between them.

1. Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.