Claim 1: Concepts and Procedures
Students can explain and apply mathematical concepts and carry out mathematical procedures with precision and fluency.

Content Domain: **Measurement and Data**

Target I [m]: Geometric measurement: understand concepts of area and relate area to multiplication and to addition. (DOK 2)

Some tasks associated with this target should assess conceptual understanding of area as a measurable attribute of plane figures. All figures in such problems should be rectilinear and coverable without gaps or overlaps by a whole number of unit squares without having to dissect the unit squares (e.g., partition them into two triangles). Tasks in this group will generally involve finding areas by direct counting of unit squares, not by using multiplication or formulas, or otherwise reasoning about areas on this basis.

Other tasks should center on relating area to multiplication and addition. Most of these should involve the use of area models to represent whole-number products and the distributive property. For example, "Draw a picture to show why Amber can add 5 × 5 and 2 × 5 to find 7 × 5." Problems can involve finding areas of rectilinear figures by decomposing them into non-overlapping rectangles and adding the areas of the non-overlapping parts.

Standards:	**3.MD.C Geometric measurement: understand concepts of area and relate area to multiplication and to addition.**
3.MD.C, 3.MD.C.5, 3.MD.C.6, 3.MD.C.7, 3.OA.B, 3.OA.B.5 3.G.A, 3.G.A.2	**3.MD.C.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.C.6** Measure areas by counting unit squares (square cm, square m, square in., square ft, and improvised units). **3.MD.C.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. **c.** Use tiling to show in a concrete case that the area of a rectangle with whole-number side lengths *a* and *b* + *c* is the sum of *a* × *b* and *a* × *c*. Use area models to represent the distributive property 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.

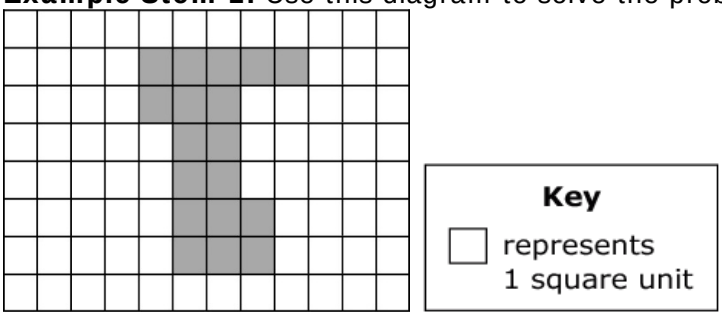
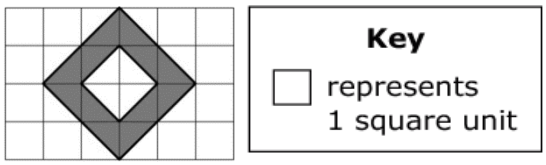
	3.OA.B Understand properties of multiplication and the relationship between multiplication and division. **3.OA.B.5** Apply properties of operations as strategies to multiply and divide. *Examples: If 6 × 4 = 24 is known, then 4 × 6 = 24 is also known. (Commutative property of multiplication.) 3 × 5 × 2 can be found by 3 × 5 = 15, then 15 × 2 = 30, or by 5 × 2 = 10, then 3 × 10 = 30. (Associative property of multiplication.) Knowing that 8 × 5 = 40 and 8 × 2 = 16, one can find 8 × 7 as 8 × (5 + 2) = (8 × 5) + (8 × 2) = 40 + 16 = 56. (Distributive property.)* **3.G.A Reason with shapes and their attributes.** **3.G.A.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 1/4 of the area of the shape.*
Related Below-Grade and Above-Grade Standards for Purposes of Planning for Vertical Scaling: 2.G.A, 2.G.A.2, 2.NBT.B, 2.NBT.B.6, 2.NBT.B.9 4.MD.A, 4.MD.A.3 4.G.A, 4.G.A.2	**Related Grade 2 Standards** **2.G.A Reason with shapes and their attributes.** **2.G.A.2** Partition a rectangle into rows and columns of same-size squares and count to find the total number of them. **2.NBT.B Use place value understanding and properties of operations to add and subtract.** **2.NBT.B.6** Add up to four two-digit numbers using strategies based on place value and properties of operations. **2.NBT.B.9** Explain why addition and subtraction strategies work, using place value and the properties of operations. **Related Grade 4 Standards** **4.MD.A Solve problems involving measurement and conversion of measurements.** **4.MD.A.3** Apply the area and perimeter formulas for rectangles in real-world and mathematical problems. *For example, find the width of a rectangular room given the area of the flooring and the length, by viewing the area formula as a multiplication equation with an unknown factor.* **4.G.A Draw and identify lines and angles, and classify shapes by properties of their lines and angles.** **4.G.A.2** Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of a specified size. Recognize right triangles as a category, and identify right triangles.

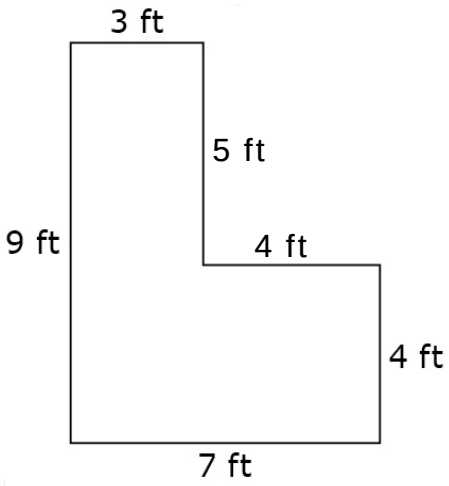
DOK Levels:	2
Achievement Level Descriptors:	
RANGE Achievement Level Descriptor (Range ALD) Target I: Geometric measurement: understand the concepts of area and relate area to multiplication and to addition.	**Level 1** Students should be able to recognize area as an attribute of plane figures and recognize that a square with side lengths of one unit is called a unit square.
	Level 2 Students should be able to find the area of a rectilinear figure by counting unit squares.
	Level 3 Students should be able to find the area of a rectilinear figure by multiplying side lengths and by decomposing a rectilinear figure into non-overlapping rectangles and adding them together.
	Level 4 Students should be able to find the area of a rectilinear figure in a word problem.
Evidence Required:	1. The student measures areas by counting unit squares. 2. The student finds areas of rectilinear figures by decomposing them into non-overlapping rectangles and adding the areas of the non-overlapping parts. 3. The student finds the area of a rectangle with whole-number side lengths by tiling it, and shows that the area is the same as would be found by multiplying the side lengths.
Allowable Response Types:	Equation/Numeric; Multiple Choice, single correct response
Allowable Stimulus Materials:	None
Construct-Relevant Vocabulary:	unit square, area, square unit, plane figure, square centimeter, square meter, square inch, square feet
Allowable Tools:	None
Target-Specific Attributes:	All figures in such problems should be rectilinear and coverable without gaps or overlaps by unit squares.
Non-Targeted Constructs:	None

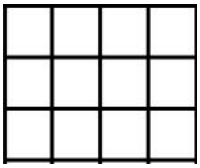
Accessibility Guidance:	Item writers should consider the following Language and Visual Element/Design guidelines[1] when developing items. Language Key Considerations: • Use simple, clear, and easy-to-understand language needed to assess the construct or aid in the understanding of the context • Avoid sentences with multiple clauses • Use vocabulary that is at or below grade level • Avoid ambiguous or obscure words, idioms, jargon, unusual names and references Visual Elements/Design Key Considerations: • Include visual elements only if the graphic is needed to assess the construct or it aids in the understanding of the context • Use the simplest graphic possible with the greatest degree of contrast, and include clear, concise labels where necessary • Avoid crowding of details and graphics Items are selected for a student's test according to the blueprint, which selects items based on Claims and targets, not task models. As such, careful consideration is given to making sure fully accessible items are available to cover the content of every Claim and target, even if some item formats are not fully accessible using current technology.[2]
Development Notes:	Some of the expectations in 3.MD.C.7 (such as using tiling to show that area of a rectangle with whole number side lengths is the same as would be found by multiplying the side lengths) may be more suitable for Claims 3 and 4 or for in-class assessments. Some parts of cluster, 3.MD.C, such as solving real-world problems in which areas of rectilinear figures are found by decomposing them into non-overlapping parts may be more suitable for Claims 2 and 4.

[1] For more information, refer to the General Accessibility Guidelines at: http://www.smarterbalanced.org/wordpress/wp-content/uploads/2012/05/TaskItemSpecifications/Guidelines/AccessibilityandAccommodations/GeneralAccessibilityGuidelines.pdf

[2] For more information about student accessibility resources and policies, refer to http://www.smarterbalanced.org/wordpress/wp-content/uploads/2014/08/SmarterBalanced_Guidelines.pdf

Task Model 1 **Response Type: Equation / Numeric** **DOK Level 2** **3.MD.C.6** Measure areas by counting unit squares (square cm, square m, square in., square ft, and improvised units). **Evidence Required:** 1. The student measures areas by counting unit squares. **Tools**: None	**Prompt Features:** The student is prompted to find the area of a figure by counting whole and/or half unit squares. **Stimulus Guidelines:** • Item difficulty can be adjusted via these example methods: o Student counts whole unit squares on a grid to determine total area, in square units, of a rectangular or non-rectangular shaped figure. o Student counts half and whole unit squares on a grid to determine total area, in square units, of a rectangular or non-rectangular shaped figure. o Student counts half unit squares on a grid to determine total area, in square units, of a rectangular or non-rectangular shaped figure. **TM1** **Stimulus:** The student is presented with a shaded figure in a grid and determines the total area, in square units, of the figure. **Example Stem 1:** Use this diagram to solve the problem.  Enter the area, in square units, of the shaded figure. **Example Stem 2:** Use this diagram to solve the problem.  Enter the area, in square units, of the shaded figure. **Rubric:** (1 point) The student correctly enters the area, in square units, of the shaded figure (e.g., 18; 6). **Response Type:** Equation/Numeric **Source:** Illustrative Mathematics: 3.MD Finding the Area of Polygons (http://www.illustrativemathematics.org/illustrations/1515)

Task Model 2 **Response Type: Equation / Numeric** **DOK Level 2** **3.MD.C.7d** Relate area to the operations of multiplication and addition. 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. **Evidence Required:** 2. The student finds areas of rectilinear figures by decomposing them into non-overlapping rectangles and adding the areas of the non-overlapping parts. **Tools**: None	**Prompt Features:** The student is prompted to enter the area of a rectilinear figure by decomposing it into non-overlapping rectangles and adding the areas of the non-overlapping parts. **Stimulus Guidelines:** • Item difficulty can be adjusted via these example methods: o Including (or not including) a dashed line to show how the figure can be decomposed into two rectangles. o Labeling some or all of the side lengths. **TM2** **Stimulus:** The student is presented with a non-overlapping rectilinear figure. **Example Stem:** This figure is made by joining two rectangles.  Enter the total area, in square feet, of the figure. **Rubric:** (1 point) The student enters the correct value (e.g., 43). **Response Type:** Equation/Numeric

Task Model 3 **Response Type: Multiple Choice, single correct response** **DOK Level 2** **3.MD.C.7a** 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. **Evidence Required:** 3. The student finds the area of a rectangle with whole-number side lengths by tiling it, and shows that the area is the same as would be found by multiplying the side lengths. **Tools**: None	**Prompt Features:** The student is prompted to select an expression that represents one way to find the area of a tiled rectangle. **Stimulus Guidelines:** • Item difficulty can be adjusted via these example methods: o Using single-digit side lengths. o Using double-digit side lengths. **TM3** **Stimulus:** The student is presented with a tiled rectangle made up of square units. **Example Stem:** This figure is tiled with square units.  Which expression could be used to find the area of this figure in square units? A. 3 + 4 B. 3 × 4 C. 3 + 3 + 4 + 4 D. 3 × 3 × 4 × 4 **Rubric:** (1 point) The student chooses the correct expression (e.g., B). **Response Type:** Multiple Choice, single correct response