

<p><b>Claim 1:</b> Concepts and Procedures Students can explain and apply mathematical concepts and carry out mathematical procedures with precision and fluency.</p>	
<p>Content Domain: <b>Operations and Algebraic Thinking</b></p>	
<p><b>Target A [m]:</b> Represent and solve problems involving multiplication and division. (DOK 1)</p> <p>Tasks for this target require students to use multiplication and division <b>within</b> 100 using single-digit factors to solve straightforward, <b>one-step</b> contextual word problems in situations involving equal groups, arrays, and measurement quantities such as liquid volume and masses of objects. The majority of these problems should be of the equal groups and arrays situation types, with the more difficult measurement quantity situations in the minority. All of these tasks will code straightforwardly to standard 3.OA.A.3. Few of the tasks coding to this standard will make the method of solution a separate target of assessment.</p> <p>Non-contextual tasks that explicitly ask the student to determine the unknown number in a multiplication or division equation relating three whole numbers (3.OA.A.4) will support the development of items that provide a range of difficulty necessary for populating an adaptive item bank.</p> <p>The tasks coding to standards 3.OA.A.1 and 3.OA.A.2, which probe student understanding of the meanings of multiplication and division, will be assessed through Claim 4.</p>	
<p>Standards: 3.OA.A, 3.OA.A.3, 3.OA.A.4</p>	<p><b>3.OA.A Represent and solve problems involving multiplication and division.</b></p> <p><b>3.OA.A.1:</b> Interpret products of whole numbers, e.g., interpret <math>5 \times 7</math> as the total number of objects in 5 groups of 7 objects each. For example, describe a context in which a total number of objects can be expressed as <math>5 \times 7</math>.</p> <p><b>3.OA.A.2:</b> Interpret whole-number quotients of whole numbers, e.g., interpret <math>56 \div 8</math> as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are partitioned into equal shares of 8 objects each. For example, describe a context in which a number of shares or a number of groups can be expressed as <math>56 \div 8</math>.</p> <p><b>3.OA.A.3:</b> Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.</p> <p><b>3.OA.A.4:</b> Determine the unknown whole number in a multiplication or division equation relating three whole numbers. <i>For example, determine the unknown number that makes the equation true in each of the equations <math>8 \times ? = 48</math>, <math>5 = \square \div 3</math>, and <math>6 \times 6 = ?</math>.</i></p>
<p>Related Below-Grade and Above-Grade</p>	<p><b>Related Grade 2 standards</b></p>

<p>Standards for Purposes of Planning for Vertical Scaling:</p> <p>2.OA.A, 2.OA.A.1 2.OA.C, 2.OA.C.4 4.OA.A, 4.OA.A.3</p> <p>4.NBT.B, 4.NBT.B.5 4.NBT.B.6</p>	<p><b>2.OA.A Represent and solve problems involving addition and subtraction.</b></p> <p><b>2.OA.A.1:</b> Use addition and subtraction within 100 to solve one- and two-step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.</p> <p><b>2.OA.C Work with equal groups of objects to gain foundations for multiplication.</b></p> <p><b>2.OA.C.4:</b> Use addition to find the total number of objects arranged in rectangular arrays with up to 5 rows and up to 5 columns; write an equation to express the total as a sum of equal addends.</p> <p><b>Related Grade 4 Standards</b></p> <p><b>4.OA.A Use the four operations with whole numbers to solve problems.</b></p> <p><b>4.OA.A.3:</b> Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.</p> <p><b>4.NBT.C Use place value understanding and properties of operations to perform multi-digit arithmetic.</b></p> <p><b>4.NBT.C.5:</b> Multiply a whole number of up to four digits by a one-digit whole number and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.</p> <p><b>4.NBT.C.6:</b> Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.</p>
<p>DOK Level:</p>	<p>1</p>
<p><b>Achievement Level Descriptors:</b></p>	
<p><b>RANGE Achievement Level</b></p>	<p><b>Level 1</b> Students should be able to represent multiplication and division problems within 100 involving equal groups of objects.</p>

<p><b>Descriptors (Range ALD)</b> Target A: Represent and solve problems involving multiplication and division.</p>	<p><b>Level 2</b> Students should be able to use multiplication and division within 100 to solve one-step problems using arrays, to interpret the meaning of multiplication of two whole numbers and to determine the unknown number in a multiplication equation relating three whole numbers.</p>
	<p><b>Level 3</b> Students should be able to select the appropriate operation (multiplication or division) within 100 to solve one-step problems involving measurement quantities of single-digit whole numbers and determine the unknown number in a division equation relating three whole numbers. They should be able to interpret the meaning of whole-number quotients of whole numbers.</p>
	<p><b>Level 4</b> Students should be able to use multiplication and division within 100 to solve one-step problems involving measurement quantities.</p>
<p>Evidence Required:</p>	<ol style="list-style-type: none"> <li>1. The student uses multiplication and division <b>within</b> 100 to solve straightforward one-step word problems in situations involving equal groups, arrays, and measurement quantities such as length, liquid volume and masses of objects.</li> <li>2. The student determines an unknown whole number in a multiplication or division equation relating three whole numbers with single-digit factors <b>within</b> 100.</li> </ol>
<p>Allowable Response Types:</p>	<p>Equation/Numeric</p>
<p>Allowable Stimulus Materials:</p>	<p>arrays, equal-group models, drawings, graphics of measuring tools (scale, balance, measuring cup)</p>
<p>Construct-Relevant Vocabulary:</p>	<p>multiply, divide, array, liquid volume, mass, equation, product, quotient, grams, kilograms, liters</p>
<p>Allowable Tools:</p>	<p>None</p>
<p>Target-Specific Attributes:</p>	<p>Numbers required to solve multiplication or division problems must be <b>within</b> 100 and use single-digit factors.</p>
<p>Non-Targeted Constructs:</p>	<p>None</p>
<p>Accessibility Guidance:</p>	<p>Item writers should consider the following Language and Visual Element/Design guidelines<sup>1</sup> when developing items.</p> <p>Language Key Considerations:</p> <ul style="list-style-type: none"> <li>• Use simple, clear, and easy-to-understand language needed to assess the construct or aid in the understanding of the context</li> <li>• Avoid sentences with multiple clauses</li> <li>• Use vocabulary that is at or below grade level</li> <li>• Avoid ambiguous or obscure words, idioms, jargon, unusual names and references</li> </ul>

<sup>1</sup> 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>

	<p>Visual Elements/Design Key Considerations:</p> <ul style="list-style-type: none"> <li>• Include visual elements only if the graphic is needed to assess the construct or it aids in the understanding of the context</li> <li>• Use the simplest graphic possible with the greatest degree of contrast, and include clear, concise labels where necessary</li> <li>• Avoid crowding of details and graphics</li> </ul> <p>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.<sup>2</sup></p>
Development Notes:	<p>The tasks coding to standards 3.OA.A.1 and 3.OA.A.2, which probe student understanding of the meanings of multiplication and division, will be assessed in Claim 4.</p> <p>Equal groups problems can also be stated in terms of columns, exchanging the order of A and B, so that the same array is described. For example: There are B columns of apples with A apples in each column. How many apples are there?</p> <p>Per the Content Specifications, only a few tasks coding to Standard 3.OA.A.3 will make the method of solution a separate target of assessment.</p>

<sup>2</sup> For more information about student accessibility resources and policies, refer to [http://www.smarterbalanced.org/wordpress/wp-content/uploads/2014/08/SmarterBalanced\\_Guidelines.pdf](http://www.smarterbalanced.org/wordpress/wp-content/uploads/2014/08/SmarterBalanced_Guidelines.pdf)

<p><b>Task Model 1a</b></p> <p><b>Response Type:</b> Equation/Numeric</p> <p><b>DOK Level 1</b></p> <p><b>3.OA.A.3</b> Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.</p> <p><b>Evidence Required:</b> 1. The student uses multiplication and division <b>within</b> 100 to solve straightforward one-step word problems in situations involving equal groups, arrays, and measurement quantities such as length, liquid volume and masses of objects.</p> <p><b>Tools:</b> None</p>	<p><b>Prompt Features:</b> The student is prompted to solve a one-step contextual word problem.</p> <p><b>Stimulus Guidelines:</b></p> <ul style="list-style-type: none"> <li>• Products for multiplication problems must be <b>within</b> 100 and single-digit factors.</li> <li>• Item difficulty can be adjusted via these example methods:             <ul style="list-style-type: none"> <li>○ Student solves for the unknown product.</li> <li>○ Student solves for the unknown factor.</li> </ul> </li> </ul> <p><b>TM1a</b> <b>Stimulus:</b> The student is presented with a one-step word problem for a situation involving an <b>array</b> composed of objects familiar to 8–9 year olds.</p> <p><b>Example Stem 1:</b> There are 3 rows of pictures with 2 pictures in each row. How many pictures are there?</p> <p><b>Example Stem 2:</b> The pictures on a page in a picture album are in 3 rows and 2 columns. How many pictures are on the page?</p> <p><b>Example Stem 3:</b> Tim has 6 pictures arranged into 3 equal rows on a page. How many pictures are in each row?</p> <p><b>Example Stem 4:</b> Claire arranges 6 pictures into an array with 3 rows. How many columns of pictures are in the array?</p> <p><b>Example Stem 5:</b> Chris arranges 6 pictures into equal rows of 2 pictures. How many rows are there?</p> <p><b>Example Stem 6:</b> Lisa arranges 6 pictures into an array with 2 columns. How many rows of pictures are in the array?</p> <p><b>Rubric:</b> (1 point) The student correctly enters the solution (e.g., 6; 6; 2; 2; 3; 3).</p> <p><b>Response Type:</b> Equation/Numeric</p>
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<p><b>Task Model 1b</b></p> <p><b>Response Type:</b> Equation/Numeric</p> <p><b>DOK Level 1</b></p> <p><b>3.OA.A.3</b> Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.</p> <p><b>Evidence Required:</b> 1. The student uses multiplication and division <b>within</b> 100 to solve straightforward one-step word problems in situations involving equal groups, arrays, and measurement quantities such as length, liquid volume and masses of objects.</p> <p><b>Tools:</b> None</p>	<p><b>Prompt Features:</b> The student is prompted to solve a one-step contextual word problem.</p> <p><b>Stimulus Guidelines:</b></p> <ul style="list-style-type: none"> <li>• Dividends for division problems must be <b>within</b> 100 and single-digit divisors.</li> <li>• Item difficulty can be adjusted via these example methods:             <ul style="list-style-type: none"> <li>○ Student solves for the unknown product (multiplication problem where the number of items and groups are given).</li> <li>○ Student solves for the unknown group size (division problem where the total number of items and number of groups are given).</li> <li>○ Student solves for the unknown number of groups (division problem where the total number of items and the number of items in each group are given).</li> </ul> </li> </ul> <p><b>TM1b</b> <b>Stimulus:</b> The student is presented with a one-step word problem for a situation involving <b>equal groups</b> composed of objects familiar to 8–9 year olds.</p> <p><b>Example Stem 1:</b> There are 3 bags with 9 blocks in each bag. How many blocks are there in all?</p> <p><b>Example Stem 2:</b> Mary has 27 blocks. She puts them into 3 bags. Each bag has an equal number of blocks.  How many blocks are in each bag?</p> <p><b>Example Stem 3:</b> Mary has 27 blocks. She can put 9 blocks in each bag.  How many bags does she need for all 27 blocks?</p> <p><b>Rubric:</b> (1 point) The student enters the correct solution (e.g., 27; 9; 3).</p> <p><b>Response Type:</b> Equation/Numeric</p>
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<p><b>Task Model 1c</b></p> <p><b>Response Type:</b> Equation/Numeric</p> <p><b>DOK Level 1</b></p> <p><b>3.OA.A.3</b> Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.</p> <p><b>Evidence Required:</b> 1. The student uses multiplication and division <b>within</b> 100 to solve straightforward one-step word problems in situations involving equal groups, arrays, and measurement quantities such as length, liquid volume and masses of objects.</p> <p><b>Tools:</b> None</p>	<p><b>Prompt Features:</b> The student is prompted to solve a one-step contextual word problem.</p> <p><b>Stimulus Guidelines:</b></p> <ul style="list-style-type: none"> <li>Indicate that the objects are exactly the same.</li> <li>Products for multiplication problems and dividends for division problems must be <b>within</b> 100 and single-digit factors.</li> </ul> <p><b>TM1c</b> <b>Stimulus:</b> The student is presented with a word problem involving <b>measurement quantities</b> such as length, liquid volume, or mass of objects familiar to 8–9 year olds.</p> <p><b>Example Stem 1:</b> A penny has a mass of 3 grams.  What is the mass, in grams, of 4 pennies?</p> <p><b>Example Stem 2:</b> There are 48 liters of water in a water tank. The water is shared equally into 8 containers.  How many liters of water are in each container?</p> <p><b>Example Stem 3:</b> Sarah has 72 inches of string. She cuts the string into pieces that are 9 inches long.  How many pieces of string does Sarah have?</p> <p><b>Rubric:</b> (1 point) The student enters the correct solution (e.g., 12; 6; 8).</p> <p><b>Response Type:</b> Equation/Numeric</p>
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<p><b>Task Model 2a</b></p> <p><b>Response Type:</b> Equation/Numeric</p> <p><b>DOK Level 1</b></p> <p><b>3.OA.A.4</b> Determine the unknown whole number in a multiplication or division equation relating three whole numbers. <i>For example, determine the unknown number that makes the equation true in each of the equations <math>8 \times ? = 48</math>, <math>5 = \square \div 3</math>, and <math>6 \times 6 = ?</math>.</i></p> <p><b>Evidence Required:</b> 2. The student determines an unknown whole number in a multiplication or division equation relating three whole numbers with single-digit factors <b>within</b> 100.</p> <p><b>Tools:</b> None</p>	<p><b>Prompt Features:</b> The student is prompted to identify an unknown whole number in a multiplication equation.</p> <p><b>Stimulus Guidelines:</b></p> <ul style="list-style-type: none"> <li>• Item difficulty can be adjusted via these example methods:             <ul style="list-style-type: none"> <li>○ Unknown is the product.</li> <li>○ Unknown is the second factor.</li> <li>○ Unknown is the first factor.</li> <li>○ Product is listed first in equation and unknown is first/second factor.</li> </ul> </li> </ul> <p><b>TM2a</b> <b>Stimulus:</b> The student is presented with a multiplication equation with an unknown factor or product represented by a box (<math>\square</math>) or "?".</p> <p><b>Example Stem 1:</b> What unknown number makes this equation true?</p> $8 \times \square = 56$ <p><b>Example Stem 2:</b> What unknown number makes this equation true?</p> $63 = \square \times 7$ <p><b>Example Stem 3:</b> What unknown number makes this equation true?</p> $7 \times 5 = ?$ <p><b>Rubric:</b> (1 point) The student correctly identifies the unknown product (e.g., 7; 9; 35).</p> <p><b>Response Type:</b> Equation/Numeric</p>
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<p><b>Task Model 2b</b></p> <p><b>Response Type:</b> Equation/Numeric</p> <p><b>DOK Level 1</b></p> <p><b>3.OA.A.4</b> Determine the unknown whole number in a multiplication or division equation relating three whole numbers. <i>For example, determine the unknown number that makes the equation true in each of the equations <math>8 \times ? = 48</math>, <math>5 = \square \div 3</math>, and <math>6 \times 6 = ?</math>.</i></p> <p><b>Evidence Required:</b> 2. The student determines an unknown whole number in a multiplication or division equation relating three whole numbers with single-digit factors <b>within</b> 100.</p> <p><b>Tools:</b> None</p> <p><b>Version 3 Update:</b> Added new Example Stem to TM2b</p>	<p><b>Prompt Features:</b> The student is prompted to identify an unknown whole number in a division equation.</p> <p><b>Stimulus Guidelines:</b></p> <ul style="list-style-type: none"> <li>• Item difficulty can be adjusted via these example methods:       <ul style="list-style-type: none"> <li>○ Unknown is the quotient.</li> <li>○ Unknown is the divisor.</li> <li>○ Unknown is the dividend.</li> <li>○ Quotient is listed first in equation and unknown is dividend.</li> </ul> </li> </ul> <p><b>TM2b</b></p> <p><b>Stimulus:</b> The student is presented with a division equation with an unknown number represented by either a box (<math>\square</math>) or "?".</p> <p><b>Example Stem 1:</b> What unknown number makes this equation true?</p> <p><math>24 \div 4 = ?</math></p> <p><b>Example Stem 2:</b> What unknown number makes this equation true?</p> <p><math>56 \div \square = 8</math></p> <p><b>Example Stem 3:</b> What unknown number makes this equation true?</p> <p><math>\square \div 7 = 8</math></p> <p><b>Example Stem 4:</b> What unknown number makes this equation true?</p> <p><math>4 = \square \div 6</math></p> <p><b>Rubric:</b> (1 point) The student correctly identifies the unknown dividend (e.g., 6; 7; 56; 24).</p> <p><b>Response Type:</b> Equation/Numeric</p>
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