

Grade 3 Mathematics Item Specification C1 TC

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| <p>Claim 1: Concepts and Procedures Students can explain and apply mathematical concepts and carry out mathematical procedures with precision and fluency.</p> | |
| <p>Content Domain: Operations and Algebraic Thinking</p> | |
| <p>Target C [m]: Multiply and divide within 100. (DOK 1)</p> <p>The primary purpose of tasks associated with this target is to assess fluency and/or memory within 100 using single-digit factors. We note that the standard connotation of the word “fluency” with regard to standards, such as 3.OA.C.7, means <i>“quickly and accurately.”</i></p> <p>An expansion of this concept would be useful to include both the ability to use certain facts and procedures with enough facility that using them does not slow down or derail the problem solver as he or she works on more complex problems, <i>and</i> the notion of conceptual fluency being able to use the relevant ideas or procedures in a wide range of contexts.</p> <p>In an adaptive framework, straight multiplication and division problems that assess students’ ability to multiply and divide within 100 using single-digit factors may serve as the assessment floor for the Operations and Algebraic Thinking domain.</p> | |
| <p>Standards: 3.OA.C, 3.OA.C.7</p> | <p>3.OA.C Multiply and divide within 100.</p> <p>3.OA.C.7 Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that $8 \times 5 = 40$, one knows $40 \div 5 = 8$) or properties of operations. By the end of Grade 3 know from memory all products of two one-digit numbers.</p> |
| <p>Related Below-Grade and Above-Grade Standards for Purposes of Planning for Vertical Scaling: 2.OA.B, 2.OA.B.2 4.OA.B, 4.OA.B.4</p> | <p>Related Grade 2 Standards</p> <p>2.OA.B Add and subtract within 20.</p> <p>2.OA.B.2 Fluently add and subtract within 20 using mental strategies. By the end of Grade 2 know from memory all sums of two one-digit numbers.</p> <p>Related Grade 4 Standards</p> <p>4.OA.B Gain familiarity with factors and multiples.</p> <p>4.OA.B.4 Find all factor pairs for a whole number in the range 1–100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1–100 is a multiple of a given one-digit number. Determine whether a given whole number in the range 1–100 is prime or composite.</p> |
| <p>DOK Levels:</p> | <p>1</p> |
| <p>Achievement Level Descriptors:</p> | |
| <p>RANGE Achievement Level Descriptors (Range ALD) Target C: Multiply</p> | <p>Level 1 Students should be able to multiply a one-digit number by 1, 2, and 5.</p> |
| | <p>Level 2 Students should be able to recall from memory all products of two one-digit numbers.</p> |
| | <p>Level 3 Students should be able to apply relevant strategies to</p> |

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| and divide within 100. | <p>fluently multiply and divide within 100, and recognize division as an unknown factor problem.</p> <p>Level 4 Students should be able to use relevant procedures to multiply or divide in a wide range of contexts.</p> |
| Evidence Required: | <ol style="list-style-type: none"> 1. The student accurately multiplies single-digit factors within 100. 2. The student accurately divides within 100 using single-digit divisors and single digit quotients. 3. The student connects multiplication and division to target fluencies. |
| Allowable Response Types: | Equation/Numeric; Matching Tables |
| Allowable Stimulus Materials: | |
| Construct-Relevant Vocabulary: | equation, multiply, divide, product, quotient, factor |
| Allowable Tools: | |
| Target-Specific Attributes: | Numbers required to solve multiplication or division problems must be within 100 and use single-digit factors. |
| Key Non-Targeted Constructs: | |
| Accessibility Guidance: | <p>Item writers should consider the following Language and Visual Element/Design guidelines¹ when developing items.</p> <p>Language Key Considerations:</p> <ul style="list-style-type: none"> • 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 <p>Visual Elements/Design Key Considerations:</p> <ul style="list-style-type: none"> • 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 <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</p> |

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>

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| | and target, even if some item formats are not fully accessible using current technology. ² |
| Development Notes: | None |

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

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| <p>Task Models 1a,b</p> <p>Response Type: Equation/Numeric</p> <p>DOK Level 1</p> <p>3.OA.C.7 Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that $8 \times 5 = 40$, one knows $40 \div 5 = 8$) or properties of operations. By the end of Grade 3 know from memory all products of two one-digit numbers.</p> <p>Evidence Required: 1. The student accurately multiplies single-digit factors within 100.</p> <p>Tools: None</p> | <p>Prompt Features: The student finds the product of a whole number multiplication equation.</p> <p>Stimulus Guidelines:</p> <ul style="list-style-type: none"> • Problems are presented as equations with a box (\square) for the unknown product. • No more than two factors are in a multiplication problem. • Factors for multiplication equations must be single-digit numbers. <p>TM1a Stimulus: The student is presented with one whole number multiplication equation presented horizontally.</p> <p>Example Stem: Enter the unknown number that makes the equation true.</p> <p>$1 \times 8 = \square$</p> <p>Rubric: (1 point) The student enters the correct product (e.g., 8).</p> <p>Response Type: Equation/Numeric</p> <p>TM1b Stimulus: The student is presented with two whole number multiplication equations presented horizontally.</p> <p>Example Stem: Enter the unknown numbers that make each equation true.</p> <p>$9 \times 3 = \square$ $4 \times 7 = \square$</p> <p>Enter the first unknown number in the first response box. Enter the second unknown number in the second response box.</p> <p>Rubric: (1 point) The student enters the correct products (e.g., 27, 28). No partial credit is available for this task model.</p> <p>Response Type: Equation/Numeric (2 response boxes)</p> |
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| <p>Task Model 1c</p> <p>Response Type: Multiple choice, multiple correct response</p> <p>DOK Level 1</p> <p>3.OA.C.7 Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that $8 \times 5 = 40$, one knows $40 \div 5 = 8$) or properties of operations. By the end of Grade 3 know from memory all products of two one-digit numbers.</p> <p>Evidence Required: 1. The student accurately multiplies single-digit factors within 100.</p> <p>Tools: None</p> <p>Version 3 Update: Added new TM1c</p> | <p>Prompt Features: The student finds whole number factors of a given product.</p> <p>Stimulus Guidelines:</p> <ul style="list-style-type: none"> • No more than two factors are in a multiplication problem. • Factors for multiplication equations must be single-digit numbers. <p>Stimulus: The student is presented with a number that is a product of two one-digit factors.</p> <p>Example Stem: Select all expressions that equal the given product.</p> <p style="text-align: center;">24</p> <p>A. 6×4 B. 7×3 C. 9×2 D. 3×8 E. 4×5</p> <p>Rubric: (1 point) The student selects the correct expressions (e.g., A, D).</p> <p>Response Type: Multiple choice, multiple correct response</p> |
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| <p>Task Model 2</p> <p>Response Type: Equation/Numeric</p> <p>DOK Level 1</p> <p>3.OA.C.7 Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that $8 \times 5 = 40$, one knows $40 \div 5 = 8$) or properties of operations. By the end of Grade 3 know from memory all products of two one-digit numbers.</p> <p>Evidence Required: 2. The student accurately divides within 100 using single-digit divisors and single-digit quotients.</p> <p>Tools: None</p> | <p>Prompt Features: The student finds the quotient of a whole number division equation.</p> <p>Stimulus Guidelines:</p> <ul style="list-style-type: none"> • Problems are presented as equations with a box (\square) for the unknown quotient. • Dividends for division problems must be within 100. • The quotient is a single-digit number. <p>TM2a Stimulus: The student is presented with one whole number division equation presented horizontally.</p> <p>Example Stem: Enter the number in the box that makes the equation true.</p> <p>$16 \div 2 = \square$</p> <p>Rubric: (1 point) The student enters the correct quotient (e.g., 8).</p> <p>Response Type: Equation/Numeric</p> <p>TM2b Stimulus: The student is presented with two whole number division equations presented horizontally.</p> <p>Example Stem: Enter the unknown numbers that make each equation true.</p> <p>$9 \div 3 = \square$ $28 \div 7 = \square$</p> <p>Enter the first unknown number in the first response box. Enter the second unknown number in the second response box.</p> <p>Rubric: (1 point) The student enters the correct quotients (e.g., 3, 4).</p> <p>Response Type: Equation/Numeric (2 response boxes)</p> |
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| <p>Task Model 3</p> <p>Response Type: Matching Tables</p> <p>DOK Level 1</p> <p>3.OA.C.7 Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that $8 \times 5 = 40$, one knows $40 \div 5 = 8$) or properties of operations. By the end of Grade 3 know from memory all products of two one-digit numbers.</p> <p>Evidence Required: 3. The student connects multiplication and division to target fluencies.</p> <p>Tools: None</p> | <p>Prompt Features: The student identifies equivalent expressions showing the relationship between multiplication and division.</p> <p>Stimulus Guidelines:</p> <ul style="list-style-type: none"> • In choosing expressions for each side of the equation: <ul style="list-style-type: none"> ○ Focus on the relationship between multiplication and division: $a \times b = d \div c$ ○ Focus on multiplication expressions where one of the factors in each true equation would be a multiple of a factor on the other side: $a \times b = d \times c$ ○ Focus on a multiplication equation that demonstrates the Commutative Property of Multiplication: $a \times b = b \times a$. • Multiplication and division are within 100, with factors from 0 to 10. <p>TM3a Stimulus: The student is presented with three equations that each contains one multiplication expression and one division expression.</p> <p>Example Stem: Decide whether each equation is true or false. Click True or False for each equation.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th></th> <th>True</th> <th>False</th> </tr> </thead> <tbody> <tr> <td>$3 \times 6 = 18 \div 2$</td> <td></td> <td></td> </tr> <tr> <td>$4 \times 9 = 36 \div 4$</td> <td></td> <td></td> </tr> <tr> <td>$2 \times 5 = 20 \div 2$</td> <td></td> <td></td> </tr> </tbody> </table> <p>Rubric: (1 point) The student answers all three of the equations by correctly identifying each as True or False (e.g., FFT).</p> <p>Response Type: Matching Tables</p> <p>TM3b Stimulus: The student is presented with three equations that contain pairs of factors on each side of the equation.</p> <p>Example Stem: Decide whether each equation is true or false. Click True or False for each equation.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th></th> <th>True</th> <th>False</th> </tr> </thead> <tbody> <tr> <td>$5 \times 6 = 10 \times 3$</td> <td></td> <td></td> </tr> <tr> <td>$4 \times 9 = 3 \times 6$</td> <td></td> <td></td> </tr> <tr> <td>$8 \times 4 = 4 \times 8$</td> <td></td> <td></td> </tr> </tbody> </table> <p>Rubric: (1 point) The student answers all three of the equations by correctly identifying each as True or False (e.g., TFT).</p> <p>Response Type: Matching Tables</p> | | True | False | $3 \times 6 = 18 \div 2$ | | | $4 \times 9 = 36 \div 4$ | | | $2 \times 5 = 20 \div 2$ | | | | True | False | $5 \times 6 = 10 \times 3$ | | | $4 \times 9 = 3 \times 6$ | | | $8 \times 4 = 4 \times 8$ | | |
|--|--|-------|------|-------|--------------------------|--|--|--------------------------|--|--|--------------------------|--|--|--|------|-------|----------------------------|--|--|---------------------------|--|--|---------------------------|--|--|
| | True | False | | | | | | | | | | | | | | | | | | | | | | | |
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