

Grade 3 Target B

Domain, Target, Standards, DOK, Vertical Alignments, Achievement Levels, Evidence Required, Vocabulary, Response Types, Materials, Attributes, Question Types, and Question Banks (Examples)

[Content Domain: Operations and Algebraic Thinking](#)

[Target B \[m\]: 3.OA.B Understand properties of multiplication and the relationship between multiplication and division.](#)

[Standards included in Target B: 3.OA.A.5, 3.OA.A.6](#)

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Content Domain: Operations and Algebraic Thinking

Target B [m]: 3.OA.B Understand properties of multiplication and the relationship between multiplication and division.

Standards included in Target B: 3.OA.A.5, 3.OA.A.6

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 $6 \times 4 = 24$ is known, then $4 \times 6 = 24$ is also known. (Commutative Property of Multiplication.) $3 \times 5 \times 2$ can be found by $3 \times 5 = 15$, then $15 \times 2 = 30$, or by $5 \times 2 = 10$, then $3 \times 10 = 30$. (Associative Property of Multiplication.) Knowing that $8 \times 5 = 40$ and $8 \times 2 = 16$, one can find 8×7 as $8 \times (5 + 2) = (8 \times 5) + (8 \times 2) = 40 + 16 = 56$. (Distributive Property.)

3.OA.6: Understand division as an unknown-factor problem. For example, find $32 \div 8$ by finding the number that makes 32 when multiplied by 8.

Vertical Alignment

Related Grade 2 standards

2.NBT.B Use place value understanding and properties of operations to add and subtract.

These pages were adapted from open source documents available on the Smarter Balanced Website: <http://www.smarterbalanced.org/assessments/development/> August 2016

2.NBT.5 Fluently add and subtract within 100, using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.

2.NBT.6 Add up to four two-digit numbers, using strategies based on place value and properties of operations.

2.NBT.7 Add and subtract within 1000, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.

2.NBT.9 Explain why addition and subtraction strategies work, using place value and the properties of operations.

2.G.A Reason with shapes and their attributes.

2.G.A.2 Partition a rectangle into rows and columns of same sized squares, and count to find the total number of them.

Related Grade 4 Standards

4.NBT.B Use place value understanding and properties of operations to perform multi-digit arithmetic.

4.NBT.B.5 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.

4.NBT.B.6 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.

Achievement Level Descriptors

Level 1 No Descriptor

Level 2 Students should be able to apply the Commutative Property of Multiplication to mathematical problems with one digit factors.

Level 3 Students should be able to apply the Commutative and Associative Properties of Multiplication and the Distributive Property within 100. They should be able to understand the relationship between multiplication and division when solving an unknown factor problem.

Level 4 Students should be able to communicate a deep understanding of the Commutative and Associative Properties of Multiplication, and the relationship between multiplication and division.

Evidence Required

1. The student uses the properties of operations (Commutative Property of Multiplication,

Associative Property of Multiplication, and Distributive Property) as strategies to multiply and divide.

2. The student will represent division as an unknown-factor problem.

Vocabulary

divide, equation, multiply, factor, equal, operation, product, quotient, expression

Response Types

Multiple Choice, single correct response; Matching Tables; Equation/Numeric

Materials

Area models will be used and should reflect the appropriate property and have a product or dividend within 100 using singledigit factors.

Unknown quantities within equations should be represented by a box (), “n”, or “?” in place of the missing factor, product, divisor, dividend, or quotient.

Attributes

Use multiplication and division within 100 using single-digit factors.

Claim 1: Concepts and Procedures (DOK 1) Question Banks

Students can explain and apply mathematical concepts and carry out mathematical procedures with precision and fluency.

Claim 1 3.OA.B.5 DOK Level 1

3.OA.B.5: Apply properties of operations as strategies to multiply and divide. Examples: If $6 \times 4 = 24$ is known, then $4 \times 6 = 24$ is also known. (Commutative Property of Multiplication.) $3 \times 5 \times 2$ can be found by $3 \times 5 = 15$, then $15 \times 2 = 30$, or by $5 \times 2 = 10$, then $3 \times 10 = 30$. (Associative Property of Multiplication.) Knowing that $8 \times 5 = 40$ and $8 \times 2 = 16$, one can find 8×7 as $8 \times (5 + 2) = (8 \times 5) + (8 \times 2) = 40 + 16 = 56$. (Distributive Property.)

Evidence Required

The student uses the properties of operations (Commutative Property of Multiplication, Associative Property of Multiplication, and Distributive Property of Multiplication) as strategies to multiply and divide.

Question Type 1: The student is presented with an equation that encourages use of one or more properties to find an unknown value.

1. What unknown number makes the equation true?

$$8 \times 6 = 6 \times \square$$

2. What unknown number makes the equation true?

$$8 \times 6 = 8 \times \square \times 2$$

3. What unknown number makes the equation true?

$$5 \times 9 = 5 \times 10 - \square$$

4. What unknown number makes the equation true?

$$5 \times 8 = 10 \times 8 \div \square$$

5. Chris arranges 6 pictures into equal rows of 2 pictures.

How many rows are there?

6. What unknown number makes the equation true?

$$8 \times 7 = 5 \times 7 + \square \times 7$$

Rubric: (1 point) (1 point) The student identifies the correct unknown number for each equation (e.g., 8; 3; 5; 2; 6; 3).

Response Type: Equation/Numeric

Question Type 2: The student is presented with a multiplication expression with two to four factors.

	Yes	No
$5 \times (5 + 4)$		
$(5 \times 5) + 4$		
$(5 \times 5) + (5 \times 4)$		

Rubric: (1 point) The student correctly responds to each choice (e.g., YNY).

Response Type: Matching Tables

Claim 1 3.OA.B.6 DOK Level 1

3.OA.6: Understand division as an unknown-factor problem. For example, find $32 \div 8$ by finding the number that makes 32 when multiplied by 8.

Evidence Required:

The student will represent division as an unknown-factor problem.

Question Type 1: The student is presented with a division equation with an unknown quotient.

1. Which equation has the same unknown value as $8 \div 2 = \square$?

A. $8 \times \square = 2$

B. $2 \times \square = 8$

C. $\square \div 2 = 8$

D. $\square \div 8 = 2$

2. Which equation has the same unknown value as $27 \div 3 = \square$?

A. $27 \times \square = 3$

B. $\square = 3 \times 27$

C. $\square \times 3 = 27$

D. $3 \times 27 = \square$

3. Which equation has the same unknown value as $48 \div 6 = \square$?

A. $48 \times \square = 6$

B. $6 \times \square = 48$

C. $\square \div 6 = 48$

D. $\square \div 48 = 6$

Rubric: (1 point) The student identifies the correct equation (e.g., B; C; B).

Response Type: Multiple Choice, single correct response

Claim 3 Communicating Reasoning Question Banks[Claim Descriptors and Targets](#)

Students can clearly and precisely construct viable arguments to support their own reasoning and to critique the reasoning of others.

Example 1

Marquis said, "The more number you multiply, the greater the product." Then he wrote:

$$2 \times 8 = 16$$

$$2 \times 5 \times 5 = 50$$

$$2 \times 3 \times 5 \times 2 = 60$$

$$60 > 50 > 16$$

Give an example of a product of two numbers that is greater than $2 \times 5 \times 5$.

$$[\] \times [\] > (2 \times 5 \times 5)$$

Enter the numbers in the two response boxes.

Rubric: (1 point) The student enters two numbers in the response boxes whose product is greater than 50. (e.g., 7 and 8).

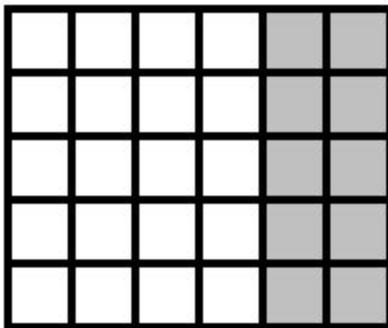
Response Type: Equation/numeric

Example 2

Bev Said, "I can find 5×6 by adding 5×4 and 5×2 ."

She wrote this equation and drew this picture to show her thinking

$$5 \times 6 = 5 \times 4 + 5 \times 2$$



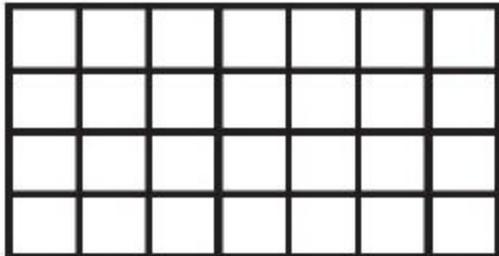
Mel wrote this equation: $4 \times 7 = 4 \times 3 + 4 \times 4$

Is this equation true? Click on Yes or No.

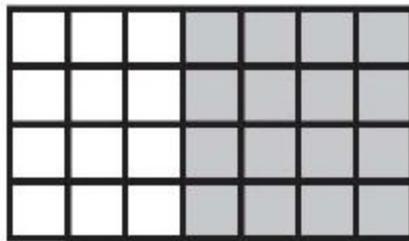
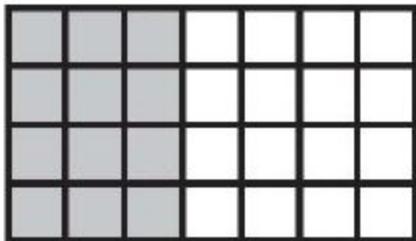
Yes

No

Click on the squares to draw a picture that supports your answer.



Rubric: (1 point) The student identifies the equation as true and clicks to shade either a 4 x 3 rectangle or a 4 x 4 rectangle; see examples below.



Response Type: Hotspot

Example 3

A 20 meter rope is cut into 4 pieces. Jenny says you can find the length of each piece by finding $20 \div 4$.

What statement best describes Jenny's claim?

- A. Jenny's claim is false. She should add 4 and 20 instead.
- B. Jenny's claim is false. She should multiply 4 and 20 instead.
- C. Jenny's claim is true if you assume that each piece is 4 meters long.
- D. Jenny's claim is true you assume that the pieces are all equal in length.

Rubric: (1 point) The student selects the correct statement (e.g., D).

Response Type: Multiple Choice, single correct response

Example 4

n is a whole number and $n \times 5 = 5$.

Identify which values of n make this equation true.

	True	False
When $n = 0$		
When $n = 1$		
When $n = 5$		
This is never true		

Rubric: (1 point) The student identifies the correct values of n (F, T, F, F)

Response Type: Matching Table