Grade 4 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 [s]: 4.OA.B Gain familiarity with factors and multiples.
Standards included in Target B: 4.OA.B.4
Vertical Alignment
Achievement Level Descriptors
Evidence Required
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Materials
Attributes
Claim 1: Concepts and Procedures (DOK 1, 2) Question Banks
Claim 4 Modeling and Data Analysis Question Banks

Content Domain: Operations and Algebraic Thinking

Target B [s]: 4.OA.B Gain familiarity with factors and multiples.

Standards included in Target B: 4.OA.B.4

4.OA.B Gain familiarity with factors and multiples.

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.

Vertical Alignment

Related Grade 3 standards

3.OA.A Represent and solve problems involving multiplication and division.

3.OA.A.4 Determine the unknown whole number in a multiplication or division equation relating three whole numbers.

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

3.OA.C Multiply and divide within 100.

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 × 5 = 40, one knows 40 ÷ 5 = 8) or properties of operations. By the end of Grade 3, know from memory all products of two one-digit numbers.

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

3.NBT.A.3 Multiply one-digit whole numbers by multiples of 10 in the range 10–90 (e.g., 9 × 80, 5 × 60) using strategies based on place value and properties of operations.

Related Grade 5 Standards

5.NBT.B Perform operations with multi-digit whole numbers and with decimals to hundredths.

5.NBT.B.6 Find whole-number quotients of whole numbers with up to four-digit dividends and two-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.

5.NF.A Use equivalent fractions as a strategy to add and subtract fractions.

5.NF.A.1 Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators. For example, 2/3 + 5/4 = 8/12 + 15/12 = 23/12. (In general, a/b + c/d = (ad + bc)/bd.) 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.

Achievement Level Descriptors

Level 1 Students should be able to recognize that a whole number is a multiple of each of its factors.

Level 2 Students should be able to find factor pairs for whole numbers in the range of 1–100 that are multiples of 2 or 5 and determine whether a given whole number in the range of 1–100 is a multiple of a given one-digit number.

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Level 3 Students should be able to find all factor pairs for whole numbers in the range of 1–100 and determine whether a given whole number in the range of 1–100 is prime or composite.

Level 4 No Descriptor

Evidence Required

1. The student determines one or more factors or factor pairs for a given whole number (from 1 to 100).

2. The student recognizes that a whole number (from 1 to 100) is a multiple of each of its factors.

3. The student determines if a whole number (from 1 to 100) is a multiple of a given one-digit number.

4. The student determines if a whole number (from 1 to 100) is prime or composite.

Vocabulary
whole number, prime, composite, factor, factor pair, multiple

Response Types
Multiple Choice, single correct response; Drag and Drop; Matching Tables; Hot Spot; Fill-in Table

Materials
whole numbers from 1 to 100, tables, lists, sets, 100s chart

Attributes
Numbers used in this target must be in the range 1 to 100.

Claim 1: Concepts and Procedures (DOK 1, 2) Question Banks
Students can explain and apply mathematical concepts and carry out mathematical procedures with precision and fluency.

Claim 1 4.OA.B.4 DOK Level 1

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.

Evidence Required
The student determines one or more factors or factor pairs for a given whole number (from 1 to 100).

Question Type 1: The student is presented with a whole number and lists of whole number factors.

Which list has all of the factors of 36?

A. 1, 2, 3, 4, 6, 9, 12, 18, 36
B. 1, 2, 3, 6, 8, 9, 12, 16, 36
C. 1, 2, 4, 6, 8, 9, 16, 18, 36
D. 1, 2, 3, 5, 6, 9, 12, 18, 36

Question Type 2: The student is presented with a whole number and lists of pairs of whole number factors.

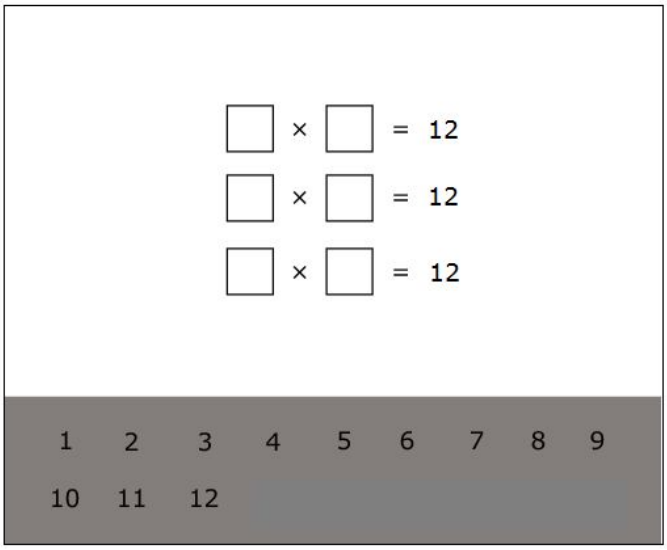
Which list has all of the factor pairs of 36?

A. 1 × 36, 2 × 18, 3 × 12, 4 × 9, 6 × 6
B. 1 × 36, 2 × 16, 3 × 12, 4 × 9, 6 × 8
C. 1 × 36, 2 × 18, 3 × 6, 4 × 8, 6 × 12
D. 1 × 36, 2 × 12, 3 × 9, 4 × 8, 6 × 6

Rubric: (1 point) The student identifies the correct list (e.g., A; A).
Response Type: Multiple Choice, single correct response

Question Type 3: The student is presented with a whole number in the range of 2–20 (excluding 4, 9, and 16) and a set of multiplication equations with boxes for all possible factor pairs, each having the given whole number as the product.

Drag numbers into the boxes to make factor pairs of 12.



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Rubric: (1 point) The student identifies all of the correct factor pairs (e.g., 1 × 12, 2 × 6, 3 × 4).
Response Type: Drag and Drop

Question Type 4: The student is presented with two whole numbers within the range of 1–100.

Which number is a factor of both 16 and 20?

A. 3
B. 4
C. 5
D. 8

Rubric: (1 point) The student identifies a common factor (e.g., B).
Response Type: Multiple Choice, single correct response

Question Type 5: The student is presented with two whole numbers.

Which numbers are factors of both 18 and 45?

A. 1, 2, 8
B. 1, 3, 9
C. 1, 4, 8
D. 1, 5, 9

Rubric: (1 point) The student identifies common factors of two whole numbers (e.g., B).
Response Type: Multiple Choice, single correct response

Question Type 6: The student is presented with a whole number in the range of 1–100 and multiplication equations equaling that whole number with unknown factors in a fill-in table.

Enter numbers into the boxes to make four different factor pairs of 54.

	×		= 54
	×		= 54
	×		= 54
	×		= 54

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Rubric: (1 point) The student identifies four different factor pairs of the number (e.g., 1 and 54, 2 and 27, 3 and 18, 6 and 9).

Note: Numbers may be in either order (e.g., 1 and 54 or 54 and 1).

Response Type: Fill-in Table

Question Type 6: The student is presented with a whole number and lists of whole number factors with one factor missing.

Which factor of 12 is missing in this list of numbers?

1, 2, 3, 4, __, 12

A. 5
B. 6
C. 8
D. 10

Rubric: (1 point) The student identifies the correct missing factor (e.g., B).
Response Type: Multiple Choice, single correct response

Question Type 7: The student is presented with a whole number and lists of whole number factors with one factor missing.

Which factor of 24 is missing in this list of numbers?

1, 2, 3, 4, 6, __, 12, 24

Rubric: (1 point) The student identifies the correct missing factor (e.g., 8).
Response Type: Equation/Numeric

Claim 1 4.OA.B.4 DOK Level 2

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.

Evidence Required:
The student recognizes that a whole number (from 1 to 100) is a multiple of each of its factors.

Question Type 1: The student is presented with a one-digit whole number and six additional whole numbers.

Decide whether each number is a multiple of 6, a factor of 6, or neither. Each number may be matched to more than one description. Click in the table to respond.

	Multiple of 6	Factor of 6	Neither a Multiple Nor a Factor of 6
1			
2			
3			
6			
8			
12			

Rubric: (3 points) The student correctly fills in all three columns (e.g., Multiple column: 6, 12; Factor column: 1, 2, 3, 6; Neither column: 8), with no incorrect fill-ins.
(2 points) Partial credit is possible for correctly filling in two of the three columns (e.g., Multiple column and Neither column filled in correctly, but Factor column not filled in correctly), with no incorrect fill-ins on the two columns (e.g., Multiple and Neither).
(1 point) Partial credit is possible for correctly filling in one of the three columns (e.g., Multiple column filled in correctly but Factor and Neither column not filled in correctly), with no incorrect fill-ins on the one column (e.g., Multiple).

Response Type: Hot Spot or Matching Tables

Claim 1 4.OA.B.4 DOK Level 2

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.

Evidence Required:
The student determines if a whole number (from 1 to 100) is a multiple of a given one-digit number.

Question Type 1: The student is presented with a one-digit whole number.

Select the list of numbers that are all multiples of 8.

A. 8, 18, 24, 44
B. 8, 26, 44, 62
C. 16, 32, 48, 64
D. 40, 48, 54, 76

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Rubric: (1 point) The student correctly identifies the multiples of a one-digit number (e.g., C).
Response Type: Multiple Choice, single correct response

Question Type 2: Which number is a multiple of both 2 and 5?

A. 7
B. 14
C. 40
D. 52

Rubric: (1 point) The student correctly identifies the multiple of two one-digit numbers (e.g., C).
Response Type: Multiple Choice, single correct response

Claim 1 4.OA.B.4 DOK Level 2

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.

Evidence Required: The student determines if a whole number (from 1 to 100) is prime or composite.

Question Type 1;

The student is presented with three whole numbers.

Decide whether each number is prime or composite. Click in the table to respond.

	Prime	Composite
17		
52		
87		

Rubric: (1 point) The student identifies all numbers as prime or composite (e.g., P, C, C).
Response Type: Matching Tables

Claim 4 Modeling and Data Analysis Question Banks

Claim Descriptors and Targets

Students can analyze complex, real-world scenarios and can construct and use mathematical models to interpret and solve problems.

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Example 1

A bag of 5 apples at the grocery store has a mass of 825 grams. The largest apple has a mass of 185 grams.

What is a reasonable estimate for the mass, in grams, of the smallest apple in the bag? Select Yes for each reasonable mass and No for each mass that is not reasonable.

	Yes	**No**
50 grams		
100 grams		
150 grams		
200 grams		

Rubric: (1 point) The student selects numbers that are reasonable estimates for the mass of the smallest apple. The student could select just 150 since an argument can be made that if the apples are fairly similar in size, then 150 is the only reasonable estimate, but if they vary a lot, then 100 would be reasonable as well. 200 would not be possible as that is larger than the largest apple, and 50 is not possible because that would require at least one other apple to be 197 grams. (There are three correct response patterns: {100}, {150}, or {100, 150}).

Response Type: Matching Table

Example 2

Which situation is represented by the equation 4 × 3 = □?

A. A kitten weighs 4 pounds. A puppy weighs 3 times as much as the kitten.

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How much does the puppy weigh?
B. A kitten weighs 4 pounds. A puppy weighs 3 pounds more than the kitten.
How much do they weigh altogether?
C. A kitten weighs 4 pounds. A puppy weighs 3 pounds more than the kitten.
How much does the puppy weigh?
D. A kitten weighs 4 pounds. A puppy weighs 3 times as much as the kitten.
How much do they weigh altogether?

Rubric: (1 point) The student correctly identifies the context that represents the multiplication equation as a multiplicative comparison (A).
Response Type: Multiple Choice, single correct response