MA.3.NSO.2.4

Overarching Standard: MA.3.NSO.2.1: *Add and subtract multi-digit whole numbers. Build an understanding of multiplication and division operations.*

Benchmark of Focus

MA.3.NSO.2.4: Multiply two whole numbers from 0 to 12 and divide using related facts with procedural reliability.

> *Example:* The product of 5 and 6 is 30.
> *Example:* The quotient of 27 and 9 is 3.

Benchmark Clarifications

Clarification 1: Instruction focuses on helping a student choose a method they can use reliably.

Related Benchmark/Horizontal Alignment

- MA.3.NSO.2.2
- MA.3.NSO.2.3
- MA.3.AR.2.2
- MA.3.AR.3.3
- MA.3.GR.2.4

Vertical Alignment

Previous Benchmarks	Next Benchmarks
MA.2.AR.3.2	MA.4.NSO.2.1 MA.4.NSO.2.2 MA.4.NSO.2.3 MA.4.NSO.2.4

Terms from the K-12 Glossary

- Expression
- Equation
- Factor
- Dividend
- Divisor
- Commutative property of multiplication
- Associative property of multiplication
- Distributive property of multiplication

Purpose and Instructional Strategies

The purpose of this benchmark is for students to utilize skills from the exploration stage of multiplication and division (MA.3.NSO.2.2) to develop an accurate, reliable method that aligns with the student's understanding and learning style. Procedural fluency of multiplication facts with factors up to 12 and their related division facts is not expected until Grade 4 (MTR.2.1, MTR.3.1).

- This benchmark provides the opportunity for students to generalize patterns they see within the tools used during the exploration stage (e.g., rectangular arrays, equal groups) to then identify multiplication and related division facts (MTR.4.1).

- Instruction that builds procedural reliability should connect multiplication understanding with the properties of multiplication (commutative, associative and distributive). The patterns students recognize help them relate facts to one another, and to use the related facts to find the products and quotients of unknown facts. In this benchmark, students should be able to explain how they know facts and how they can find products of unknown facts (MTR.5.1). For example, students should recognize that 4 x 6 and 6 x 4 have the same product of 24 and identify this pattern as evidence of the commutative property of multiplication. This can also be discovered through arrays for multiplication using objects or drawings, where students can observe that the arrays contain the same total number of squares, but the orientation of the array has just rotated so the rows and columns are switched as shown below (MTR.5.1).

4 x 6 = 24   6 x 4 = 24
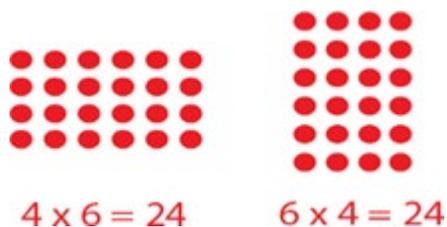
Common Misconceptions or Errors

- This benchmark does not support students' memorization of multiplication and division facts. Memorization does not indicate work toward multiplication and division fact fluency. Students should be able to explain how they know multiplication and division facts, and how they can find products and quotients of unknown facts.

Strategies to Support Tiered Instruction

- Instruction includes opportunities to experience the properties of multiplication and division. Students use and apply properties to build procedural fluency. Students should understand that multiplication and division both involve grouping equal sets of numbers or objects.
  - For example, the teacher shows students an array of 8 × 6 = 48 and has them describe what they see with rows and columns. This learning can be connected to the concept of "groups of" objects, 8 groups of 6 is the same as 8 jumps of 6 on the number line.

$$8 \times 6 = 48 \qquad (8 \times 3) + (8 \times 3)$$

$$6 \times 8 = 48$$
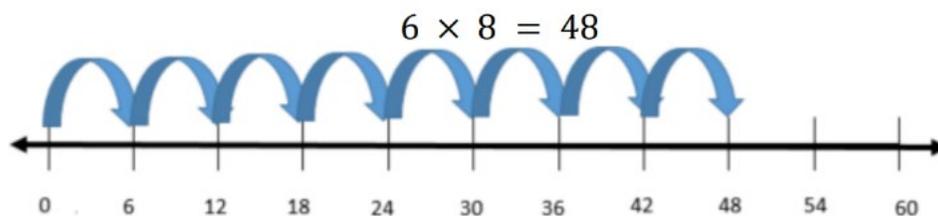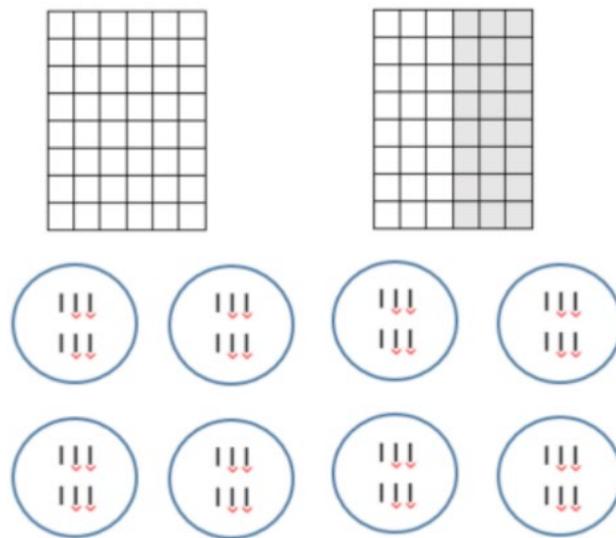
- Teacher provides opportunities to build and manipulate what a multiplication fact looks like and then relates how it looks as division.
  - For example, students model 3 x 4 as 3 rows of 4 with counters.
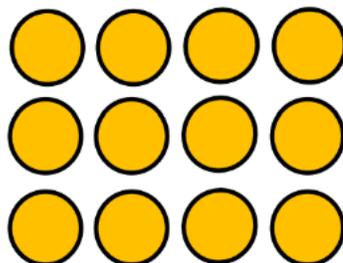
The teacher then relates the multiplication model to division by separating the rows into groups. 12 = 3 groups of 4 counters, or 12 divided by 3= 4.
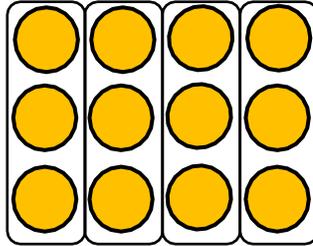
Questions to ask students:

How does the distributive property help you solve for facts that you might not know for example, 9 x 6?

- Students should be able to explain that if they do not know the product they can break apart the array into facts they do know to multiply and add to find the product.

How does the parentheses change the model when using the associative property?

- Students should explain that the expression within the parentheses is the array being modeled and the factor outside the parentheses shows how many times to model it. The model changes when the parentheses move because it changes what the array being modeled is.

What do you notice about the models made when you represent 4 x 6 and 6 x 4?

- Students should explain that the products stay the same but the way the model looks changes. The number of rows or group changes and the number in each row or group changes. (You can also say the array flips on it's side)

Use the distributive property to solve 9 x 12.

- Student should make an array and split it into two parts labeling each part appropriately. One factor should be broken apart and one factor should remain the same. Example answer 9 x 10 and 9 x 2 or 9 x 6 and 9 x 6. With the product of 108.

Instructional Tasks
Instructional Task 1

Part A. Show how to find the product of 6 x 7 in two different ways.

Part B. Identify the related division facts from your equation in Part A.

Instructional Task 2

Show Me Two Ways!

Show two ways to find the product for 2 x 3 x 4.

One way:	Another Way:

Explain what you notice about the order of the factors and the product when multiplying 3 factors.

Instructional Items

Instructional Item 1

What is the product of 11 and 4?

Instructional Item 2

Provide two division facts that have a quotient of 8.

Achievement Level Descriptors

Benchmark	Context	Assessment Limits
MA.3.NSO.2.4 Multiply two whole numbers from 0 to 12 and divide using related facts with procedural reliability. Example: The product of 5 and 6 is 30. Example: The quotient of 27 and 9 is 3. Clarification 1: Instruction focuses on helping a student choose a method they can use reliably. **Also Assesses**	Mathematical	Items assessing MA.3.NSO.2.2 must include a model.

MA.3.NSO.2.2 Explore multiplication of two whole numbers with products from 0 to 144, and related division facts. Clarification 1: Instruction includes equal groups, arrays, area models and equations. Clarification 2: Within the benchmark, it is the expectation that one problem can be represented in multiple ways and understanding how the different representations are related to each other. Clarification 3: Factors and divisors are limited to up to 12.			
ALD 2	**ALD 3**	**ALD 4**	**ALD 5**
explores multiplication of two single-digit whole numbers (using factors of 1, 2, or 5) and related division facts. multiplies and divides factors of 1, 2, or 5.	explores multiplication of two whole numbers with products from 0 to 100 and related division facts. multiplies and divides numbers with factors up to and including 10.	explores multiplication of two whole numbers with products from 0 to 144 and related division facts. multiplies two whole numbers from 0 to 12 and divides using related facts with procedural reliability.	multiplies two whole numbers from 0 to 12 and divides using related facts with procedural reliability; and identifies and corrects an error in an equation.

Additional Resources:

CPALMS Resource
Communitive Property Video for Kids
Multiplication and Division Game
Sundae Times: Multiplication Game

Resources/Tasks to Support Your Child at Home:

Distributive Property Practice

Communitive Property Practice
Associative Property Practice