MA.3.NSO.2.3

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

Benchmark of Focus
MA.3.NSO.2.3: Multiply a one-digit whole number by a multiple of 10, up to 90, or a multiple of 100, up to 900, with procedural reliability.

> *Example:* The product of 6 and 70 is 420.
> *Example:* The product of 6 and 300 is 1,800.

Benchmark Clarifications
Clarification 1: When multiplying one-digit numbers by multiples of 10 or 100, instruction focuses on methods that are based on place value.

Related Benchmark/Horizontal Alignment

MA.3.NSO.2.2
MA.3.NSO.2.4
MA.3.AR.1.1
MA.3.AR.1.2
MA.3.GR.2.2
MA.3.GR.2.4

Vertical Alignment

Previous Benchmarks
MA.2.NSO.2.2

Next Benchmarks
MA.4.NSO.2.2
MS.4.NSO.2.3

Terms from the K-12 Glossary

- Expression
- Equation
- Factor
- Whole Number

Purpose and Instructional Strategies

The purpose of this benchmark is for students to use place value reasoning to multiply single- digit factors (0-9) by multiples of 10 up to 90 (10, 20, 30, 40, 50, 60, 70, 80, 90) and multiples of 100 up to 900 (100, 200, 300, 400, 500, 600, 700, 800, 900). Because the expectation of this benchmark is at the procedural reliability level, students should develop accurate, reliable methods for multiplication that align with their understanding and learning style.

- Instruction should connect known facts of one-digit factors (e.g., 6 x 7), to then apply to products of one-digit numbers and multiples of 10 or 100 (e.g., 6 x 70, 60 x 7, 6 x 700, 600 x 7) (MTR.5.1).
- Teachers should use place value representations (e.g., pictures, diagrams, base ten blocks, place value chips) to show relationships between known facts and multiplying one-digit factors by multiples of 10 or 100. For example, 3 x 4 can be interpreted as 3 groups of 4 ones, or 12 ones. 3 x 40 can be represented as 3 groups of 4 tens, or 12 tens. 12 tens is equal to **120 ones**. 3 x 400 can be represented as 3 groups of 4 hundreds, or 12 hundreds. 12 hundreds is equal to 120 tens or **1,200 ones** (MTR.5.1).
- This standard lays the foundation for multi-digit multiplication. For benchmark 3.AR.1.1, students use the distributive property to multiply 34 x 8 as (30 x 8) + (4 x 8). This benchmark (3.NSO.2.3) helps students reason that 30 x 8 is the same as 3 tens x 8, or 24 tens (240).
- Instruction should not focus on "adding zeroes to the end" when multiplying one-digit factors by multiples of 10 and 100. For example, 7 x 50 should not be reduced to "7 x 5 with one zero at the end." This trick does not focus on place value methods, as Clarification #1 of the benchmark requires.

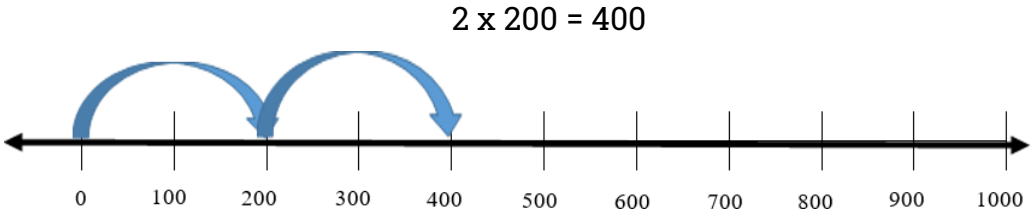
Common Misconceptions or Errors

- Students can quickly jump to the conclusion that they can "count zeroes" to determine the number of zeroes in the product (e.g., the product of 7 x 500 will have two zeroes because 500 has two zeroes). This can confuse students when the products of the known facts already end in zero (e.g., using 5 x 8 = 40 to multiply 5 x 80). Students who rely on this trick will often indicate that 5 x 80 = 40 because they see only one zero in the factors.

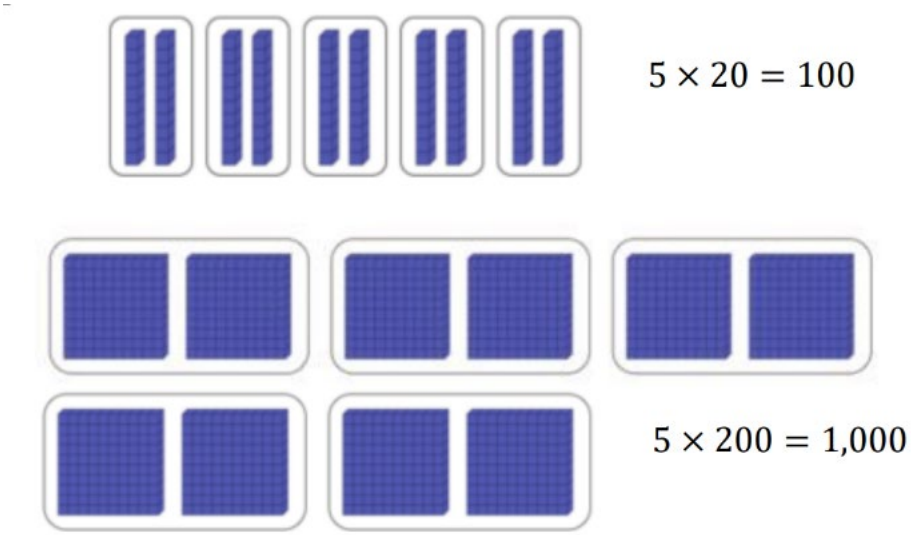
Strategies to Support Tiered Instruction

- Instruction includes opportunities to connect grouping numbers by multiples in different ways.
    - For example, students may place the following facts on the hundreds chart: 1 × 10, 2 × 10, 3 × 10, 4 × 10, 5 × 10, 6 × 10, 7 × 10, 8 × 10 and 9 × 10. The teacher asks students what patterns they notice.

- Instruction includes opportunities to use a number line. Students skip count by multiples on the number line. This will support a conceptual understanding of what is happening with the numbers, instead of focusing on the "zero trick."



- Instruction includes opportunities to connect grouping numbers by multiples.
    - For example, students use manipulatives to show that 5 groups of 20 is 100 and 5 groups of 200 is 1,000. Teacher should be explicit about the multiples and not point out the zeros trick.



Questions to ask students:

- **What place value can we look at to determine the product?**
    - Students should identify the zeroes in the ones or tens place value after identifying the basic fact of the number.
- **How does our basic facts relate to multiplying by multiples of 10?**
    - Student should be able to relate multiplying by multiples of 10 to skip counting by 10 on a hundred chart. Struggling students can practice skip counting by tens by moving down a place value chart from any given number and adding 10 more or 10 less.

- **How can we represent these expressions with a base ten model? a quick pic model?**
    - Students can use an equal group using base ten blocks to represent the equation, they then can create a pictorial model in their notebook to show what their manipulative model looks like. It is important to reiterate to students that when they are multiplying by multiples of ten they are showing rods or flats in their model.
- **Why is just adding zeroes to the end of the number not the best strategy?**
    - Students should be able to explain that they can miscount zeroes. This question should be asked when solving an equation where the base fact has a multiple of 10 for example 4 x 5 = 20. If you ask students what is 4 x 500, they might say 200 because they are counting the zeroes from the original product and then adding only one more zero. This question is best used as an error analysis.
- **Tisha has 7 boxes of potatoes. Each box has 300 potatoes in it. How many potatoes does Tisha have in total?**
    - Students should be able to identify their best multiplication strategy and have a product of 2,100.

Instructional Tasks
Instructional Task 1

The table below shows the costs for entry at the Sunnyland Amusement Park.

Type of Ticket	**Cost per person**
Adult (ages 13 and 54)	$30
Child (ages 3 to 12)	$10
Senior (ages 55 and up)	$20
Children 2 and under	Free

a. How much does entry cost for nine adults? Write an equation to show the total cost?

b. Write an expression that shows the total cost for one senior and one 2-year-old child to attend Sunnyland Amusement Park.

c. The Suarez Family purchases 2 adult tickets, 1 senior ticket and 1 ticket for their 6- year-old daughter. Write an equation to show the total cost of entry for the family.

d. Which cost of entry is less expensive, 2 seniors or 3 children? Explain how you know using words, a picture or equations.

Instructional Items

Instructional Item 1

Write two different equations using a one-digit whole number and a multiple of 10 that show a product of 120.

_____ x _____ = 120 _____ x _____ = 120

Instructional Item 2

Write two different equations using a one-digit whole number and a multiple of 100 that show a product of 2,400.

_____ x _____ = 2,400 _____ x _____ = 2,400

Achievement Level Descriptors

Benchmark	Context	Assessment Limits
MA.3.NSO.2.3 Multiply a one-digit whole number by a multiple of 10, up to 90, or a multiple of 100, up to 900, with procedural reliability. Example: The product of 6 and 70 is 420. Example: The product of 6 and 300 is 1,800. Clarification 1: When multiplying one-digit numbers by multiples of 10 or 100, instruction focuses on methods that are based on place value.	Mathematical	N/A

ALD 2	ALD 3	ALD 4	ALD 5

multiplies one-digit whole numbers by 10	multiplies one-digit whole numbers by multiples of 10 in the range 10 to 90.	multiplies one-digit whole numbers by a multiple of 10, up to 90, or a multiple of 100, up to 900 with procedural reliability.	multiplies one-digit whole numbers by a multiple of 10, up to 90, or a multiple of 100, up to 900, with procedural reliability; and identifies and corrects an error in an equation.

Additional Resources:

CPALMS Resource

Explaining Multiplication Using Multiples of Ten

How are These Two Problems Related?

Multiplying by Multiples of Ten

Packages of 50

Resources/Tasks to Support Your Child at Home:

Multiplying by Multiples of Ten Practice

Multiplying By Multiplies of Ten

Multiplying by 10s, 100s, or 1000s (content limit is 10 and 100)