

MA.4.NSO.1.1

Overarching Standard: *MA.4.NSO.1*: Understand place value for multi-digit numbers.

Benchmark of Focus

MA.4.NSO.1.1: Express how the value of a digit in a multi-digit whole number changes if the digit moves one place to the left or right.

Related Benchmark/Horizontal Alignment

- MA.4.NSO.2.5

Vertical Alignment

Previous Benchmarks **Next Benchmarks**

- MA.3.NSO.2.3
- MA.5.NSO.1.1

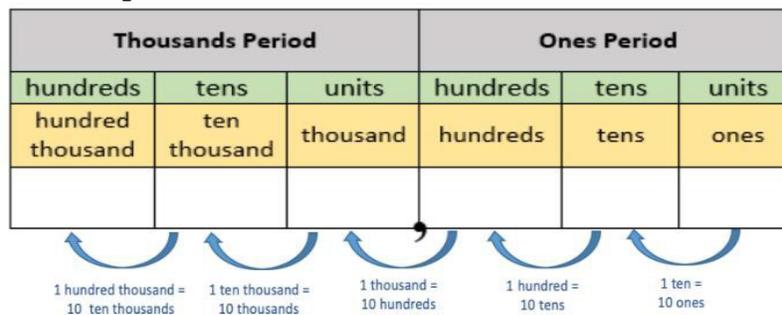
Terms from the K-12 Glossary

- Whole Number

Purpose and Instructional Strategies

The purpose of this benchmark is to extend students' understanding of place value to build a foundation for multiplying and dividing by 10. Students should work with the idea that the tens place is ten times as much as the ones place, and the ones place is 1/10 the size of the tens place. Work in this benchmark builds from student understanding of what happens when they multiply by a multiple of 10 (MA.3.NSO.2.3). Students use these patterns as they generalize place value relationships with decimals in Grade 5 (K12.MTR.5.1).

- Throughout instruction, teachers should have students practice this concept using place value charts, base-ten blocks and/or digit cards to manipulate and investigate place value relationships.



Common Misconceptions or Errors

- Students do not understand that when the digit moves to the left that it has increased a place value which is the same thing as multiplying by 10 and when the digit moves to the right that it has decreased a place value, which is the same thing as dividing by 10. It is important to have math discourse throughout instruction about why this is happening.

Strategies to Support Tiered Instruction

- Instruction includes opportunities to use a place value chart and manipulatives such as base-ten blocks to demonstrate how the value of a digit changes if the digit moves one place to the left or right. Have math discourse throughout instruction about why this is happening.
 - For example, the 5 in 543 is 10 times greater than the 5 in 156. Students write 543 and 156 in a place value chart like the one shown below and compare the value of the 5's (500 and 50) using the place value charts and equations. The teacher explains that the 5 in the hundreds place represents the value 500, which is 10 times greater than the value 50 represented by the 5 in the tens place. Use a place value chart to show this relationship while writing the equation $10 \times 50 = 500$ to reinforce this relationship. The teacher explains that the 5 in the tens place represents the value 50, which is 10 times less than the value 500 represented by the 5 in the hundreds place. Use a place value chart to show this relationship while writing the equation $500 \div 10 = 50$ to reinforce this relationship and repeat with other sets of numbers that have one digit in common such as 3,904 and 5,321.

Thousands Period			Ones Period		
hundreds	tens	ones	hundreds	tens	ones
hundred thousand	ten thousand	thousand	hundreds	tens	ones
			5	4	3
			1	5	6

- For example, $10 \times 1 = 10$ and $10 \times 10 = 100$. The teacher begins with a ones cube and explains to students that “we are going to model $10 \times 1 = 10$ using our base-ten blocks.” Students count out 10 ones cubes and exchange them for a ten rod. The teacher explains that the tens rod represents the value 10, which is 10 times greater than the value 1 represented by the ones cube. Write the equation $10 \times 1 = 10$ to reinforce this relationship and repeat this process to model $10 \times 10 = 100$. Then, students exchange a hundreds flat for 10 ten rods to model $100 \div 10 = 10$. The teacher explains that the value represented by a tens rod is 10 times less than the value represented by the hundreds flat and use a place value chart to show this relationship while writing the equation $100 \div 10 = 10$. To reinforce this relationship repeat this process to model $10 \div 10 = 1$.

Thousands Period			Ones Period		
hundreds	tens	ones	hundreds	tens	ones
hundred thousand	ten thousand	thousand	hundreds	tens	ones
					
					
					

$10 \times 10 = 100$
 10 tens = 1 hundred

$10 \times 1 = 10$
 10 ones = 1 ten

Questions to ask students:

How does the value of the digit 4 in 2,468 compare to the value of the 4 in 21,346?

- Sample answer that indicates understanding: *The value of the digit 4 in 2,468 is 400. The value of the 4 in 21,346 is 40. The value of the 4 in 2,468 is 10 times greater than the value of the 4 in 21,346.*

How does the value of the digit 3 in 738 compare to the value of the 3 in 27,385?

- Sample answer that indicates understanding: *The value of the 3 in 738 is 30. The value of the 3 in 27,385 is 300. The value of the 3 in 738 is one tenth of the value of the 3 in 27,385.*

How does place value connect to other math operations?

- Sample answer that indicates understanding: *The value of a digit in one place represents 10 times as much as it represents in the place value to the right. The value of a digit in one place represents one-tenth as much as it represents in the place value to the left.*

Instructional Tasks

Instructional Task 1

Paul and his family traveled 528 miles for their summer vacation. Wayne and his family traveled 387 miles for their summer vacation. How much greater is the digit eight in 387 than the digit eight in 528? Have students explain their answer and discuss what role, if any, the other digits play.

Instructional Items

Instructional Item 1

The clues below describe the 4 digits of a mystery number that contains the digits 3,4,7,8.

- The value of the 8 is 10 times the value of the 8 in 3,518.
- The value of the 7 is 10 times the value of the 7 in 1,723.
- The value of the 4 is $\frac{1}{10}$ the value of the 4 in 4,287.
- The missing place value is the 3.

What is the number?

- a. 7,483
- b. 8,743
- c. 7,834
- d. 4,738

Achievement Level Descriptors:

Benchmark		Context	Assessment Limits	
MA.4.NSO.1.1 Express how the value of a digit in a multi-digit whole number changes if the digit moves one place to the left or right.		Mathematical	Items will contain whole numbers within 1,000,000.	
ALD 2	ALD 3	ALD 4	ALD 5	
identifies the value of the digits in the 1s, 10s, 100s, 1000s to the 100,000 places.	expresses that a digit in one place represents 10 times as much as it represents in the place to its right.	expresses how the value of a digit in a multi-digit whole number changes if the digit moves one place to the left or right	expresses and explains how the value of a digit in a multi-digit whole number changes if the digit moves one place to the left or right.	

Additional Resources:

[CPALMS Resources](#)

Khan Academy: [Comparing Place Values](#)

LearnZillion: [Understanding the value of a Digit Using a Place Value Chart](#)

Resources/Tasks to Support Your Child at Home:

- Using a deck of cards, create a 6-digit number or using numbers in the newspaper, etc. have your child compare the place values using the language: "The 6 in the hundreds place is $\frac{1}{10}$ the value of the 6 in the thousands place." This can also be done by looking for numbers with the same digits to compare the place values.
- Example questions: Compare the value of the 2 in the following numbers: 2,345 and 5,278
 - How does the value of the 2 in the first number compare to the value of the 2 in the second number?
 - How does the value of the 2 in the second number compare to the value of the 2 in the first number?