

## MA.5.NSO.1.1

**Overarching Standard:** *MA.5.NSO.1 Understand the place value of multi-digit numbers with decimals to the thousandths place.*

### Benchmark of Focus

MA.5.NSO.1.1: Express how the value of a digit in a multi-digit number with decimals to the thousandths changes if the digit moves one or more places to the left or right.

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### Related Benchmark/Horizontal Alignment

- MA.5.NSO.2.4/2.5
- MA.5.AR.2.1/2.2/2.3
- MA.5.M.1.1

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### Vertical Alignment

Previous Benchmarks	Next Benchmarks
MA.4.NSO.1.1	MA.6.NSO.2.1

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### Purpose and Instructional Strategies

This purpose of this benchmark is for students to reason about the magnitude of digits in a number. This benchmark extends the understanding from Grade 4 (MA.4.NSO.1.1), where students expressed their understanding that in multi-digit whole numbers, a digit in one place represents 10 times what it represents in the place to its right and  $\frac{1}{10}$  of what it represents in the place to its left. All of this work forms the foundation for arithmetic and algorithms with decimals which is completed in Grade 6 (MA.6.NSO.2.1).

- To help students understand the meaning of the 10 *times* and  $\frac{1}{10}$  *of* relationship, students can use base ten manipulatives or simply bundle classroom objects (e.g., paper clips, pretzel sticks). Students should name numbers and use verbal descriptions to explain the relationship between numbers (e.g., “6 is 10 times greater than 6 tenths, and 6 tenths is  $\frac{1}{10}$  of 6”). In addition to physical manipulatives, place value charts help students understand the relationship between digits in different places. (MTR.2.1)
- Instruction of this benchmark should connect with student work with whole numbers. For example, students who understand  $35 \times 2 = 70$  can reason that  $3.5 \times 2 = 7$  because 3.5 is  $\frac{1}{10}$  of 35, therefore its product with 2 will be  $\frac{1}{10}$  of 70. (MTR.5.1)

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### Common Misconceptions or Errors

- Students can misunderstand what “ $\frac{1}{10}$  of” a number represents. Teachers can connect  $\frac{1}{10}$  of to “ten times less” or “dividing by 10” to help students connect  $\frac{1}{10}$  of a number to 10 times greater.





- Students who use either rule “move the decimal point” or “shift the digits” without understanding when multiplying by a power of ten can easily make errors. Students need to understand that from either point of view, the position of the decimal point marks the transition between the ones and the tenths place.

## Strategies to Support Tiered Instruction

- Instruction includes the use of place value charts and models such as place value disks to demonstrate how the value of a digit changes if the digit moves one place to the left or right. Explicit instruction includes using place value understanding to make the connections between the concepts of “ $\frac{1}{10}$  of,” “ten times less” and “dividing by 10.” Place value charts are used to demonstrate that the decimal point marks the transition between the ones place and the tenths place.
  - For example, students multiply 4 by 10, then record 4 and the product of 40 in a place value chart. This process is repeated by multiplying 40 by 10 while asking students to explain what happens to the digit 4 each time it is multiplied by 10. Next, the teacher explains that multiplying by  $\frac{1}{10}$  is the same as dividing by 10. Students multiply 400 by  $\frac{1}{10}$  and record the product in their place value chart. The process is repeated, multiplying 40 by 4 by  $\frac{1}{10}$ . The teacher asks students to explain how the value of the 4 change when being multiplied by 10 and  $\frac{1}{10}$

tens	ones	tenths	hundredths	thousandths
		4		
	4			
4				
	4			
		4		
			4	
				4

- For example, instruction includes using a familiar context such as money, asking students to explain the value of each digit in \$33.33. Next, students represent 33.33 in a place value chart using place value disks. Then, students compare the value of the whole numbers (3 dollars and 30 dollars) and compare 0.3 and 0.03 (30 cents and 3 cents). The teacher asks, “How does the value of the three in the hundredths place compare to the value of the three in the tenths place?” and explains that the three in the hundredths place is  $\frac{1}{10}$  the value of the three in the tenths place and that multiplying by  $\frac{1}{10}$  is the same as dividing by 10.

Tens	ones	tenths	hundredths
			

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### Questions to ask students:

Describe the relationship between the ones and hundredths place on the place value chart?

- Sample answer that indicates understanding: When you are in the ones place on the place value chart and you move to the right one place, that is the tenths. It is ten times less than/  $1/10$  of the ones. If you go one more spot to the right to the hundredths that is a hundred times less than one or  $1/100$ . You can also go the other way. The ones place is two place values to the left of the hundredths. That is 100 times greater.

Explain how the value of 8 in 3.82 relates to the 8 in 3.28

- Sample answer that indicates understanding: The eight in three and eighty-two hundredths is ten times the value of the eight in three and twenty-eight hundredths.
- Sample answer that indicates an incomplete understanding or a misconception: 3.82 is .54 more than 3.28 or just stating what "place" value each number is in (tenths vs hundredths)

Describe the relationship between the 4 in 4.532 with the 4 in 0.453.

- Sample answer that indicates understanding: The 4 in 0.453 is one-tenth of the value of the 4 in the decimal 4.532. The four in 4.532 is 10 times the value of the 4 in 0.453.
- Sample answer that indicates an incomplete understanding or a misconception: Student simply states what place value the number is in.

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## Instructional Tasks

### *Instructional Task 1*

At the Sunshine Candy Store, salt water taffy costs \$0.18 per piece.

Part A. How much would 10 pieces of candy cost?

Part B. How much would 100 pieces of candy cost?

Part C. How much would 1000 pieces of candy cost?

Part D. At the same store, you can buy 100 chocolate coins for \$89.00. How much does each chocolate coin cost? Explain how you know.

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## Instructional Items

### *Instructional Item 1*

Which statement correctly compares 0.034 and 34?

- a. 0.034 is 10 times the value of 34.
- b. 0.034 is  $\frac{1}{10}$  the value of 34.
- c. 0.034 is  $\frac{1}{100}$  the value of 34.
- d. 0.034 is  $\frac{1}{1000}$  the value of 34.

### *Instructional Item 2*

What number is 100 times the value of 45.03?

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## Achievement Level Descriptors:

Benchmark		Context	Assessment Limits
MA.5.NSO.1.1 Express how the value of a digit in a multi-digit number with decimals to the thousandths changes if the digit moves one or more places to the left or right.		Mathematical	N/A
ALD 2	ALD 3	ALD 4	ALD 5
recognizes that a digit in one place represents 10 times as much as it represents in the place to its right or $\frac{1}{10}$ as much as it represents in the place to its left, with a decimal.	expresses how the value of a digit in a multi-digit number with decimals to the hundredths changes if the digit moves one or more places to the left or right.	expresses how the value of a digit in a multi-digit number with decimals to the thousandths changes if the digit moves one or more places to the left or right.	identifies an error and expresses how the value of a digit in a multi-digit number with decimals to the thousandths changes if the digit moves one or more places to the left or right.

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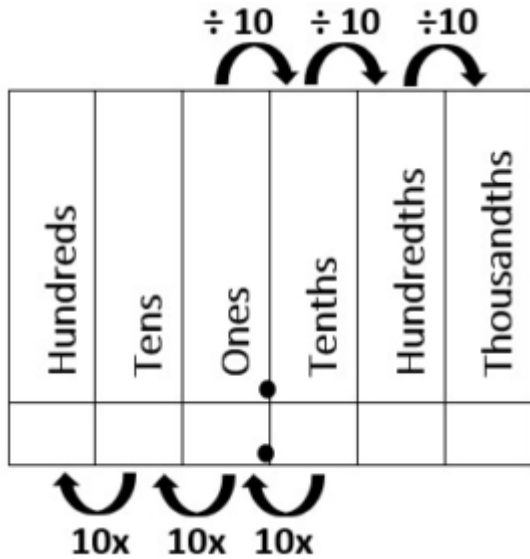
## Additional Resources:

[CPALMS Resource](#)

Khan Academy: [Multiplying and dividing decimals by 10](#)

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**Resources/Tasks to Support Your Child at Home:**



- Look at the digit in the hundreds place. Create a new number where the value of the digit in the ten thousands place is 100 times the value of this digit.

**274,953    New Number: \_\_\_\_\_**

- Read the number 576.37. Compare the 2 sevens. Explain what you notice.
- Agree or Disagree? 0.80 is one tenth the value of 80? Explain your reasoning with words, pictures, and/or symbols.
- LearnZillion: [Recognize Place Value Relationships by Multiplying and Dividing by Ten](#)
- Learnzillion: [Understanding that a Digit in One Place is 1/10 the Value of a Digit to the Left](#)