

# Eureka Acceleration Tool: Grade 5

## Module 1, Topic A

To become mathematically proficient, students **must** access on-grade-level content. This document aims to help teachers who use the Eureka curriculum to ensure readiness for students before and during on-grade-level work, creating opportunities for timely support directly connected to the new learning.

### About this Topic

#### Focus Standards:

5.NBT.A.1: Recognize that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and  $1/10$  of what it represents in the place to its left.

5.NBT.A.2: Explain and apply patterns in the number of zeros of the product when multiplying a number by powers of 10. Explain and apply patterns in the values of the digits in the product or the quotient, when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10. *For example,  $10^0 = 1$ ,  $10^1 = 10$  ... and  $2.1 \times 10^2 = 210$ .*

5.MD.A.1: Convert among different-sized standard measurement units within a given measurement system, and use these conversions in solving multi-step, real-world problems (e.g., convert 5 cm to 0.05 m; 9 ft to 108 in).

#### Topic Overview per the Eureka Curriculum

Topic A begins with a conceptual exploration of the multiplicative patterns of the base ten system. This exploration extends the place value work done with multi-digit whole numbers in Grade 4 to larger multi-digit whole numbers and decimals. Students use place value disks and a place value chart to build the place value chart from millions to thousandths. They compose and decompose units crossing the decimal with a view toward extending their knowledge of the *10 times as large* and *1/10 as large* relationships among whole number places to that of adjacent decimal places. This concrete experience is linked to the effects on the product when multiplying any number by a power of ten. For example, students notice that multiplying 0.4 by 1,000 shifts the position of the digits to the left three places, changing the digits' relationships to the decimal point and producing a product with a value that is  $10 \times 10 \times 10$  as large (400.0) (**5.NBT.2**). Students explain these changes in value and shifts in position in terms of place value. Additionally, students learn a new and more efficient way to represent place value units using exponents (e.g., 1 thousand =  $1,000 = 10^3$ ) (**5.NBT.2**). Conversions among metric units such as kilometers, meters, and centimeters give students an opportunity to apply these extended place value relationships and exponents in a meaningful context by exploring word problems in the last lesson of Topic A (**5.MD.1**).

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## Module 1, Topic A

### Overview

Eureka Acceleration Tools include:

1. a diagnostic assessment to help teachers determine the misunderstandings or gaps in mathematical knowledge related to a specific Topic in the Eureka curriculum
2. guidance for teachers to analyze student work on the diagnostic assessment
3. suggested materials for targeted remedial instruction

Note: The use of this guidance is not intended to delay students' engagement with on-grade-level learning. On-grade-level learning should be the focus of instructional time and be treated as an opportunity for students to "finish" learning previous skills and deepen conceptual understanding.

### Diagnostic Assessment

The diagnostic assessment is designed to be administered to targeted students prior to beginning instruction on the given Topic. When appropriate, it is broken into parts (Part A, Part B, and so on); each part addresses a different prerequisite standard and contains three problems. If a student correctly answers at least 2 out of the 3 problems, it can be assumed that he/she is ready to engage with the new content of the Topic with little to no support needed prior to engaging with the Topic. The diagnostic assessment is designed in this way so that teachers can determine the "entry point" to remedial instruction and/or opportunities for unfinished learning within the context of the new learning. The entry points and opportunities for unfinished learning will vary between students.

### Guidance for Acceleration

The Acceleration Guidance is designed for teacher use. When appropriate, it is also broken into parts (Part A, Part B, and so on) and correlates to the parts on the diagnostic assessment. Each part contains the following:

1. **The focus standard:** The focus standards are strategically chosen to address prerequisite skills and are purposefully arranged in the order that students typically master the skills and knowledge.
2. **Why this is important for current grade level work:** This section describes how the work of the prerequisite standard relates to the standard(s) addressed in the Topic of instruction.
3. **Using the diagnostic assessment to identify gaps:** This section identifies common errors students make on the diagnostic assessment items.
4. **Acceleration Resources for Targeted Instruction:** The resources pinpoint specific Eureka lessons and parts of lessons for teachers to use to address gaps in mathematical knowledge. Using Eureka materials to address acceleration ensures alignment to the standards, consistency in approach to learning, and similarities in strategies for solving problems.

## Diagnostic Assessment: Grade 5

### Eureka Module 1, Topic A

Part A: 4.NBT.A.1:

1. Write a number where the value of the 4 is ten times the value of the 4 in the number 62,347.
2. Write a number where the value of the 2 is ten times the value of the 2 in the number 62,347.
3. Write a number where the value of the 6 is ten times the value of the 6 in the number 62,347.

Part B: 4.NBT.A.2:

4. Write the following number in expanded form: 12,497
5. Write the following number in expanded form: 64,025
6. Write the following number in standard form:  $(4 \times 100,000) + (9 \times 1,000) + (6 \times 100) + (7 \times 10) + (5 \times 1)$

Part C: 4.NF.C.6:

7. What is the decimal form of the fraction  $\frac{3}{10}$ ?
8. What is the decimal form of the fraction  $\frac{8}{100}$ ?
9. What is the fraction form of 0.90?

## Diagnostic Assessment: Grade 5

### Eureka Module 1, Topic A

Part D: 4.MD.A.1:

**10.** Complete the following table.

1 kilometer	=	_____ meters
1 meter	=	_____ centimeters
1 kilogram	=	_____ grams
1 liter	=	_____ milliliters

**11.** Complete the following table.

2 kilometers	=	_____ meters
3 meters	=	_____ centimeters

**12.** Complete the following table.

2,000 grams	=	_____ kilograms
5,000 milliliters	=	_____ liters

## Diagnostic Assessment Key: Grade 5 Eureka Module 1, Topic A

Solutions:

1. 400 (sample)
2. 20,000 (sample)
3. 600,000 (sample)
4.  $(1 \times 10,000) + (2 \times 1,000) + (4 \times 100) + (9 \times 10) + (7 \times 1)$
5.  $(6 \times 10,000) + (4 \times 1,000) + (2 \times 10) + (5 \times 1)$
6. 409,671
7. 0.3
8. 0.08
9.  $\frac{90}{100}$
10. 1,000 (meters)  
100 (centimeters)  
1,000 (grams)  
1,000 (milliliters)
11. 2,000 (meters)  
300 (centimeters)
12. 2 (kilograms)  
5 (liters)

## Acceleration Guidance: Grade 5 Eureka Module 1, Topic A

**Part A Focus:** 4.NBT.A.1 Recognize that in a multi-digit whole number less than or equal to 1,000,000, a digit in one place represents ten times what it represents in the place to its right. *For example, (1) recognize that  $700 \div 70 = 10$ ; (2) in the number 7,246, the 2 represents 200, but in the number 7,426 the 2 represents 20, recognizing that 200 is ten times as large as 20, by applying concepts of place value and division.*

<b>Why this is important for current grade level work:</b> This standard calls for students to understand the value of a digit in one place represents ten times what it represents in the place to its right. In Grade 5 students extend their understanding to explore the relationship between a digit in one place and what it would represent in the place to its left, extending the relationship to include decimal place values. The most important look-fors here are the accuracy of the student’s answer. The questions scaffold in difficulty.			<b>Acceleration Resources for Targeted Instruction:</b>  <u>4th Grade, Module 1, Topic A, Lesson(s) 2 - 3</u>  Use the Concept Development portion of each Lesson and a sampling of problems from the Problem Set focused on conceptual understanding.		
<b>Using the Diagnostic Assessment to identify gaps:</b> <table><tr><td><b>Problem 1:</b> Students may misinterpret the item and identify the place value of the 4 in the given number. This does not necessarily point to a gap in understanding of place value.</td><td><b>Problem 2:</b> Students should understand the relationship between places, and use the patterns of multiplying by ten to write a number that has the digit 2 in the ten-thousands place. Look for students who need to draw a place-value chart. This highlights an opportunity to move students to a more efficient, abstract understanding of place value and the relationships between digits.</td><td><b>Problem 3:</b> Look for students who do not add the hundred-thousands place to his/her answer. This might show a lack of understanding of place value and the concept of ten times greater.</td></tr></table>				<b>Problem 1:</b> Students may misinterpret the item and identify the place value of the 4 in the given number. This does not necessarily point to a gap in understanding of place value.	<b>Problem 2:</b> Students should understand the relationship between places, and use the patterns of multiplying by ten to write a number that has the digit 2 in the ten-thousands place. Look for students who need to draw a place-value chart. This highlights an opportunity to move students to a more efficient, abstract understanding of place value and the relationships between digits.
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## Acceleration Guidance: Grade 5 Eureka Module 1, Topic A

**Part B Focus:** 4.NBT.A.2 Read and write multi-digit whole numbers less than or equal to 1,000,000 using base-ten numerals, number names, and expanded form. Compare two multi-digit numbers based on meanings of the digits in each place, using  $>$ ,  $=$ , and  $<$  symbols to record the results of comparisons.

<b>Why this is important for current grade level work:</b> Since students will be representing place value units using exponents in Grade 5, they must understand the relationship between the standard and expanded form of numbers. Place value work extends in Grade 5 to larger multi-digit whole numbers and decimals. Look for students who do not use multiplication in their expanded form. While this does not necessarily show a gap in understanding, it does show a place where the students’ understanding may not readily connect to the on grade-level work. The problems scaffold in difficulty.			<b>Acceleration Resources for Targeted Instruction:</b>  <u>4th Grade, Module 1, Topic A, Lesson(s) 3 - 4</u>  Use the Concept Development portion of this Lesson and a sampling of problems from the Problem Set focused on conceptual understanding.		
<b>Using the Diagnostic Assessment to identify gaps:</b> <table><tr><td><b>Problem 4:</b> Students may recognize the pattern for writing numbers in expanded form and write the answer correctly. This shows an understanding of the pattern of expanded form.</td><td><b>Problem 5:</b> This problem has a zero in the hundreds place. Look for students who incorrectly represent the hundreds place. This shows a gap in their fundamental understanding of expanded form.</td><td><b>Problem 6:</b> Look for students who write the answer as 49,675, when the correct answer is 409,675. This shows a gap in their fundamental understanding of place value.</td></tr></table>				<b>Problem 4:</b> Students may recognize the pattern for writing numbers in expanded form and write the answer correctly. This shows an understanding of the pattern of expanded form.	<b>Problem 5:</b> This problem has a zero in the hundreds place. Look for students who incorrectly represent the hundreds place. This shows a gap in their fundamental understanding of expanded form.
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## Acceleration Guidance: Grade 5 Eureka Module 1, Topic A

**Part C Focus:** 4.NF.C.6 Use decimal notation for fractions with denominators 10 or 100. *For example, rewrite 0.62 as 62/100; describe a length as 0.62 meters; locate 0.62 on a number line diagram; represent 62/100 of a dollar as \$0.62.*

<b>Why this is important for current grade level work:</b> When multiplying and dividing by powers of 10, students must have a conceptual understanding of place value and the connection between fractions and decimals. These questions ask students to represent a fraction as a decimal and to represent a decimal as a fraction. These items ensure students have the necessary understanding of decimal notation for fractions to connect to the target standard.			<b>Acceleration Resources for Targeted Instruction:</b>  <u>4th Grade, Module 6, Topic A, Lesson(s) 1 - 3</u>  Use the Concept Development portion of each Lesson and a sampling of problems from the Problem Set focused on conceptual understanding.		
<b>Using the Diagnostic Assessment to identify gaps:</b> <table><tr><td><b>Problem 7:</b> Look for students who misrepresent 3/10 as a decimal. This shows a gap in conceptual understanding of place value.</td><td><b>Problem 8:</b> Look for students who misrepresent the fraction as a decimal, not understanding the hundredths place. This shows a gap in their understanding of decimal notation for fractions.</td><td><b>Problem 9:</b> Students may represent .90 as 9/10 or 90/100. Students representing the decimal correctly as a fraction should be considered ready for the target standard.</td></tr></table>				<b>Problem 7:</b> Look for students who misrepresent 3/10 as a decimal. This shows a gap in conceptual understanding of place value.	<b>Problem 8:</b> Look for students who misrepresent the fraction as a decimal, not understanding the hundredths place. This shows a gap in their understanding of decimal notation for fractions.
<b>Problem 7:</b> Look for students who misrepresent 3/10 as a decimal. This shows a gap in conceptual understanding of place value.	<b>Problem 8:</b> Look for students who misrepresent the fraction as a decimal, not understanding the hundredths place. This shows a gap in their understanding of decimal notation for fractions.	<b>Problem 9:</b> Students may represent .90 as 9/10 or 90/100. Students representing the decimal correctly as a fraction should be considered ready for the target standard.			



## Acceleration Guidance: Grade 5 Eureka Module 1, Topic A

**Part D Focus:** 4.MD.A.1 Know relative sizes of measurement units within one system of units including ft, in; km, m, cm; kg, g; lb, oz.; l, ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two-column table. (Conversions are limited to one-step conversions.) *For example, know that 1 ft is 12 times as long as 1 in. Express the length of a 4 ft snake as 48 in. Generate a conversion table for feet and inches listing the number pairs (1, 12), (2, 24), (3, 36), ...*

<b>Why this is important for current grade level work:</b> In Lesson 4 students begin to connect their work with place value to their work with metric conversions. This connection will help finish the learning for some students, while deepening the understanding of others through a direct application of place value understanding. Accurate answers to these problems show basic understanding of metric measurement and conversions. The problems scaffold in difficulty.			<b>Acceleration Resources for Targeted Instruction:</b>  <u>4th Grade, Module 2, Topic A, Lesson(s) 1 - 3</u>  Use the Concept Development portion of each Lesson and a sampling of problems from the Problem Set focused on conceptual understanding and/or procedural skill and fluency.		
<b>Using the Diagnostic Assessment to identify gaps:</b> <table><tr><td><b>Problem 10:</b> Some students may not remember the correct conversions for all items in the table. This does not mean they do not understand the concept of converting metric measurements.</td><td><b>Problem 11:</b> Students whose answers represent accurate conversions understand the concept of expressing measurement of a larger unit in terms of a smaller unit, i.e., kilometers to meters.</td><td><b>Problem 12:</b> While this item is beyond the explicit expectations of the target Grade 4 standard, it will help you identify which students are ready to engage with the new concepts of Grade 5.</td></tr></table>				<b>Problem 10:</b> Some students may not remember the correct conversions for all items in the table. This does not mean they do not understand the concept of converting metric measurements.	<b>Problem 11:</b> Students whose answers represent accurate conversions understand the concept of expressing measurement of a larger unit in terms of a smaller unit, i.e., kilometers to meters.
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