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| **Prerequisite Skills**  **(Grade 3)** | **Unit Two Standards**  **Grade 4** | **Looking Ahead**  **(Grade 5)** |
| Solve two-step word problems using the four operations. Represent with equations, using a variable to stand for the unknown.  Assess the reasonableness of al computation and estimation strategies including rounding. | Operations and Algebraic Thinking 3: Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity.  Assess the reasonableness of answers using mental computation and estimation strategies including rounding.   * I can represent situations using variables to replace unknowns. * I can choose the correct operation to solve a word problem. * I can use mental math and estimation to determine whether my answer is reasonable. | Fluently multiply multi-digit whole numbers using the standard algorithm.  Find whole number quotients of whole numbers with up to 4 digit dividends and two-digit divisors, using strategies.  Add, subtract, multiply and divide decimals to hundredths. |
| Use place value understanding and properties of operations to perform multi-digit arithmetic. | Number and Operations in Base Ten 1: Recognize that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right. *For* *example, recognize that 700 ÷ 70 = 10 by applying concepts of place value* *and division.*   * I can explain that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right. | 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.  Use whole-number exponents to denote powers of 10. |
| Multiply one-digit whole numbers by multiples of 10 in the range 10–90 (e.g., 9 × 80, 5 × 60) using strategies based on place value and properties of operations. | Number and Operation in Base Ten 5**:** Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.   * I can illustrate multiplication using equations. * I can illustrate multiplication using area models and rectangles. * I can multiply multi-digit numbers. | Fluently multiply multi-digit whole numbers using the standard algorithm. |
| Tell and write time to nearest minute.  Measure and estimate liquid volume and mass  Add, subtract, multiply or divide one-step word problems involving mass or volume.  Generate measurement data by measuring lengths with rulers with halves and fourths. Show the data by making a line plot. | Measurement and Data 1: Know relative sizes of measurement units within one system of units including 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. *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), ...*   * I can explain the size of different units of measurement (lb., oz.; L, hrs., min, sec). * I can compare the different units within the same system of measurement (e.g. 1 ft. = 12 in; 1 lb. = 16 oz.). * I can convert larger units of measurement within the same system to smaller units and record conversions in a 2-column table. | Convert among different-sized standard measurement units and use these conversions to solve multi-step word problems.  Make a line plot to display a data set of measurements in fractions of a unit (1/2, ¼. 1/8). Use operations on fractions to solve problems involving information presented in line plots.  Unit 6 will focus on km, m, cm, kg, g. |

\*In standards that are repeated in several units, the I Can Statements represent a progression of skills to scaffold learning.

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| |  |  | | --- | --- | | **Standard** | **Learner Objectives** | | Operations and Algebraic Thinking 3:  Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies. | * I can represent situations using variables to replace unknowns. * I can choose the correct operations to solve a word problem. * I can use mental math and estimation to determine whether my answer is reasonable. |  |  |  |  | | --- | --- | --- | | **What does this standard mean the students will know and be able to do?** | | | | The focus in this standard is to have students use and discuss various strategies. It refers to **estimation** strategies, including using compatible numbers (numbers that sum to 10 or 100) or rounding. Problems should be structured so that all acceptable estimation strategies will arrive at a reasonable answer. Students need many opportunities solving multistep story problems using all four operations.  Estimation skills include identifying when estimation is appropriate, determining the level of accuracy needed, selecting the appropriate method of estimation, and verifying solutions or determining the reasonableness of situations using various estimation strategies. Estimation strategies include, but are not limited to:   |  | | --- | | **Front-End Estimation** **with Adjusting:** using the highest place value and estimating from the front end, making adjustments to the estimate by taking into account the remaining amounts. | | **Clustering Around an Average:** when the values are close together an average value is selected and multiplied by the number of values to determine an estimate. | | **Rounding and Adjusting:** students round down or round up and then adjust their estimate depending on how much the rounding affected the original values. | | **Using Friendly or Compatible Numbers (such as factors):** students seek to fit numbers together - rounding to factors and grouping numbers together that have round sums like 100 or 1000. | | **Using Easy to Compute Benchmark Numbers**: students select close whole numbers for fractions or decimals to determine an estimate. | |  | | | | | **Example:** On a vacation, your family travels 267 miles on the first day, 194 miles on the second day and 34 miles on the third day. How many miles did they travel total? | | | | **Student 1**  I first thought about 267 and 34. I noticed that their sum is about 300. Then I knew that 194 is close to 200. When I put 300 and 200 together, I get 500. | **Student 2**  I first thought about 194. It is really close to 200. I also have 2 hundreds in 267. That gives me a total of 4 hundreds. Then I have 67 in 267 and the 34. When I put 67 and 34 together that is really close to 100. When I add that hundred to the 4 hundreds that I already end up with 500. | **Student 3**  I rounded 267 to 300. I rounded 194 to 200. I rounded 34 to 30. When I added 300, 200 and 30,  I know my answer will be about 530. |  |  |  | | --- | --- | | **Lessons and Resources for Operations in Algebraic Thinking 3** | | | [CGI Story Bank](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/4th%20Grade/CGI%204th%20Grade%20Story%20Bank.docx) |  |  |  |  |  | | --- | --- | --- | | **Emphasized Standards for Mathematical Practice** | | | | [1. Make sense of problems and persevere in solving them.](http://elementarymath.dmschools.org/1-make-sense-of-problems-and-persevere-in-solving-them4.html) | [2. Reason abstractly and quantitatively.](http://elementarymath.dmschools.org/2-reason-abstractly-and-quantitatively2.html) | [4. Model with mathematics.](http://elementarymath.dmschools.org/4-model-with-mathematics1.html) | | [5. Use appropriate tools strategically.](http://elementarymath.dmschools.org/5-use-appropriate-tools-strategically1.html) | [6. Attend to precision.](http://elementarymath.dmschools.org/6-attend-to-precision5.html) | [7. Look for and make use of structure.](http://elementarymath.dmschools.org/7-look-for-and-make-use-of-structure5.html) | |

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| |  |  | | --- | --- | | **Standard** | **Learner Objectives** | | Number and Operations in Base Ten 1:  Recognize that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right. *For* *example, recognize that 700 ÷ 70 = 10 by applying concepts of place value* *and division.* | * I can explain that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right. |  |  | | --- | | **What does this standard mean the students will know and be able to do?** | | This standard calls for students to extend their understanding of place value related to multiplying and dividing by multiples of 10. In this standard, students should reason about the magnitude of digits in a number. Students should be given opportunities to reason and analyze the relationships of numbers that they are working with.  **Example:**  **How is the 2 in the number 582 similar to and different from the 2 in the number 528?**  Students should be familiar with and use place value as they work with numbers. Some activities that will help students develop understanding of this standard are:   * Investigate the product of 10 and any number, then justify why the number now has a 0 at the end. (7 x 10 = 70 because 70 represents 7 tens and no ones, 10 x 35 = 350 because the 3 in 350 represents 3 hundreds, which is 10 times as much as 3 tens, and the 5 represents 5 tens, which is 10 times as much as 5 ones.) While students can easily see the pattern of adding a 0 at the end of a number when multiplying by 10, they need to be able to justify why this works. * Investigate the pattern, 6, 60, 600, 6,000, 60,000, 600,000 by dividing each number by the previous number.   Provide multiple opportunities in the classroom setting and use real-world context for students to read and write multi-digit whole numbers. Students need to have opportunities to compare numbers with the same number of digits, e.g., compare 453, 698 and 215; numbers that have the same number in the leading digit position, e.g., compare 45, 495 and 41,223; and numbers that have different numbers of digits and different leading digits, e.g., compare 312, 95, 5245 and 10,002. |  |  |  |  |  | | --- | --- | --- | --- | | **Lessons and Resources for Number and Operations in Base Ten 1** | | | | | Additional focus needed on place value – each place is 10X the value of the place to the right | Unit 3 Inv 3 | [Quantile: MLC Multiplying by 100](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/4th%20Grade/Unit%202/Multiplying%20by%20100.pdf) | [Multiplying by 10, 100, 1000](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/4th%20Grade/Unit%202/Multiplying%20by%2010%20100%20100.pdf) |  |  |  |  | | --- | --- | --- | | **Emphasized Standards for Mathematical Practice** | | | | [2. Reason abstractly and quantitatively.](http://elementarymath.dmschools.org/2-reason-abstractly-and-quantitatively2.html) | [6. Attend to precision.](http://elementarymath.dmschools.org/6-attend-to-precision5.html) | [7. Look for and make use of structure.](http://elementarymath.dmschools.org/7-look-for-and-make-use-of-structure5.html) | |

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| |  |  | | --- | --- | | **Standard** | **Learner Objectives** | | Number and Operations in Base Ten 5:  Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models. | * I can illustrate multiplication using equations. * I can illustrate multiplication using area models and rectangles. * I can multiply multi-digit numbers. |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | **What does this standard mean the students will know and be able to do?** | | | | | | | Students who develop flexibility in breaking numbers apart (decomposing numbers) have a better understanding of the importance of place value and the distributive property in multi-digit multiplication. Students use base ten blocks, area models, partitioning, compensation strategies, etc. when multiplying whole numbers and use words and diagrams to explain their thinking. They use the terms factor and product when communicating their reasoning.  Multiple strategies enable students to develop fluency with multiplication and transfer that understanding to division**. Use of the standard algorithm for multiplication**  **and understanding why it works, is an expectation in the 5th grade.** This standard calls for students to **multiply numbers using a variety of strategies.** | | | | | | | **Example:**  **There are 25 dozen cookies in the bakery. What is the total number of cookies at the baker?** | | | | | | | **Student A**  25 x 12  I broke 25 up into 5 groups of 5  5 x 12 = 60  I have 5 groups of 5 in 25  60 x 5 = 300 | | **Student B**  25 x 12  I doubled 25 and cut 12 in half to get  50 x 50 x 6 = 300 | | **Student C**  25 x12  I broke 12 up into 10 and 2  25 x 10 = 250  25 x 2 = 50  250 +50 = 300 | | | **More Examples:** | | | | | | | To illustrate 154 x 6 students use base 10 blocks or use drawings to show 154 six times. Seeing 154 six times will lead them to understand the distributive property, 154 X 6 = (100 + 50 + 4) x 6 = (100 x 6) + (50 X 6) + (4 X 6) = 600 + 300 + 24 = 924. |  | | Students explain this strategy and the one below with base 10 blocks, drawings, or numbers. | |  |  |  |  | | --- | --- | | **Lessons and Resources for Number and Operations in Base Ten 5** | | | Unit 3 Inv 1, 3, 4 | Unit 8 Inv 1, 2 (prior to 2.4, teach 2.4A) |      |  |  |  |  |  | | --- | --- | --- | --- | --- | | **Emphasized Standards for Mathematical Practice** | | | | | | [2. Reason abstractly and quantitatively.](http://elementarymath.dmschools.org/2-reason-abstractly-and-quantitatively2.html) | [3. Construct viable arguments and critique the reasoning of others.](http://elementarymath.dmschools.org/3-construct-viable-arguments-and-critique-the-reasoning-of-others4.html) | [4. Model with mathematics.](http://elementarymath.dmschools.org/4-model-with-mathematics1.html) | [5. Use appropriate tools strategically.](http://elementarymath.dmschools.org/5-use-appropriate-tools-strategically1.html) | [7. Look for and make use of structure.](http://elementarymath.dmschools.org/7-look-for-and-make-use-of-structure5.html) | |

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| |  |  | | --- | --- | | **Standard** | **Learner Objective** | | Measurement and Data 1:  Know relative sizes of measurement units within one system of units including 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. *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), ...* | * I can explain the size of different units of measurement ( lb., oz, hrs., min, sec). * I can compare the different units within the same system of measurement (e.g. 1 lb. = 16 oz.). * I can convert larger units of measurement within the same system to smaller units and record conversions in a 2-column table. |  |  | | --- | | **What does this standard mean the students will know and be able to do?** | | The units of measure that have not been addressed in prior years are pounds, ounces, kilometers, milliliters, and seconds. Students’ prior experiences were limited to measuring length, mass, liquid volume, and elapsed time. Students did not convert measurements. Students need ample opportunities to become familiar with these new units of measure.  **Unit 2 should only focus on pounds, ounces, hours, minutes and seconds. The other units of measurement will be added in in Unit 6.**  Students may use a two-column chart to convert from larger to smaller units and record equivalent measurements. They make statements such as, if one foot is 12 inches, then 3 feet has to be 36 inches because there are 3 groups of 12.  Foundational understandings to help with measure concepts:   * Understand that larger units can be subdivided into equivalent units (partition). * Understand that the same unit can be repeated to determine the measure (iteration). * Understand the relationship between the size of a unit and the number of units needed (compensatory principal). | | **Example:** | |  |  |  |  | | --- | --- | | **Lessons and Resources for Measurement and Data 1** | | | Unit 7 Inv 3.5A, 3.5B (weight and time are addressed) | Additional focus needed on weight and time units, comparisons, and conversions |  |  |  |  | | --- | --- | --- | | **Emphasized Standards for Mathematical Practice** | | | | [2. Reason abstractly and quantitatively.](http://elementarymath.dmschools.org/2-reason-abstractly-and-quantitatively2.html) | [5. Use appropriate tools strategically.](http://elementarymath.dmschools.org/5-use-appropriate-tools-strategically1.html) | [6. Attend to precision.](http://elementarymath.dmschools.org/6-attend-to-precision5.html) | |

**Optional Whole Group Lesson Progression**

Unit Pacing: 6 weeks

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| **Resource** | **Location** | **Primary Focus** | **Standard** |
| Investigations | Unit 3   * Inv 1 * Inv 3 * Inv 4 | * I can illustrate multiplication using equations. * I can illustrate multiplication using area models and rectangles. * I can multiply multi-digit numbers. | 4.NBT.5  4.NBT.1 (Inv 3) |
| Investigations | Unit 8   * Inv 1 * Inv 2 (teach 2.4A before 2.4) | * I can illustrate multiplication using equations. * I can illustrate multiplication using area models and rectangles. * I can multiply multi-digit numbers. | 4.NBT.5 |
| Investigations | Unit 7   * Inv 3.5A, 3.5B | * I can explain the size of different units of measurement ( lb., oz, hrs., min, sec). * I can compare the different units within the same system of measurement (e.g. 1 lb. = 16 oz.). * I can convert larger units of measurement within the same system to smaller units and record conversions in a 2-column table. | 4.MD.1 |

**\*Unit pacing is approximate. Some lessons may take more than one day. Use teacher discretion based on student need when planning unit length.**