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| **Prerequisite Skills** **(Grade 3)** | **Unit Six Standards** **Grade 4** | **Looking Ahead** **(Grade 5)** |
| Understand a fraction as a number on the number line; represent fractions on a number line diagram. | Number and Operations in Fractions 5: Express a fraction with denominator 10 as an equivalent fraction with denominator 100, and use this technique to add two fractions with respective denominators 10 and 100. *For example, express 3/10 as* *30/100, and add 3/10 + 4/100 = 34/100.** I can rename and recognize a fraction with a denominator of 10 as a fraction with a denominator of 100.
* I can add two fractions with denominators 10 and 100 by finding equivalent fractions.
 | This work in fourth grade lays the foundation for performing operations with decimal numbers in fifth grade. |
| Number and Operations in Fractions 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** I can rename fractions with 10 and 100 in the denominator as decimals.
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| Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions. | Number and Operations in Fractions 7: Compare two decimals to hundredths by reasoning about their size.Recognize that comparisons are valid only when the two decimals refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual model.* I can compare two decimals.
* I can record the results of comparisons with the symbols >, <, = and justify.
 | Read, write (base ten numeral, word form and expanded form) and compare decimals to thousandths.Compare two decimals to thousandths.Use place value to round decimals to any place. |
| Tell and write time to nearest minute. Solve word problems involving addition and subtraction of time intervals in minutes.Measure and estimate liquid volumes and masses of objects.Add, subtract, multiply or divide one-step word problems involving mass or volume (same units) using a drawing to represent the problem.Generate measurement data by measuring lengths with rulers with halves and fourths. Show the data by making a line plot.Unit 2 focused on pounds, ounces, hours, minutes and seconds. | 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 (km, m; kg, g; lb., oz.; L, mL; 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.Convert among different-sized standard measurement units and use these conversions to solve multi-step word problems. |
| Measurement and Data 2: Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.* I can solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money.
* I can solve word problems involving measurement that include simple fractions or decimals.
* I can solve word problems that require expressing measurements given in a larger unit in terms of a smaller unit.

I can represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale. |

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| **Standard** | **Learner Objectives** |
| Number and Operations in Fractions 5: Express a fraction with denominator 10 as an equivalent fraction with denominator 100, and use this technique to add two fractions with respective denominators 10 and 100. *For example, express 3/10 as* *30/100, and add 3/10 + 4/100 = 34/100.* | * I can rename and recognize a fraction with a denominator of 10 as a fraction with a denominator of 100.
* I can add two fractions with denominators 10 and 100 by finding equivalent fractions.
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| **What does this standard mean the students will know and be able to do?** |
| This standard continues the work of equivalent fractions by having students change fractions with a 10 in the denominator into equivalent fractions that have a 100 in the denominator. In order to prepare for work with decimals, experiences that allow students to shade decimal grids (10x10 grids) can support this work. **Student experiences should focus on working with grids rather than algorithms.** Students can also use base ten blocks and other place value models to explore the relationship between fractions with denominators of 10 and denominators of 100. It is important that students make connections between fractions and decimals. They should be able to write decimals for fractions with denominators of 10 or 100. Have students say the fraction with denominators of 10 and 100 aloud. For example would ―four tenths‖ or 27/100 would be ―twenty-seven hundredths.‖ Also, have students represent decimals in word form with digits and the decimal place value, such as 4/10 would be 4 tenths. Students should be able to express decimals to the hundredths as the sum of two decimals or fractions. This is based on understanding of decimal place value. For example 0.32 would be the sum of 3 tenths and 2 hundredths. Using this understanding students can write 0.32 as the sum of two fractions (3/10 + 2/100) |
| **Examples/Models:** |
| Represent 3 tenths and 30 hundredths. | Represent 3 tenths and 30 hundredths. | Students make connections between fractions with denominators of 10 and 100 and the place value chart. By reading fraction names, students say 32/100 as thirty-two hundredths and rewrite this as 0.32 or represent it on a place value model.

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| Hundreds | Tens | Ones | . | Tenths | Hundredths |
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 | Students represent values such as 0.32 or 32/100 on a number line. 32/100 is more than 30/100 (or 3/10) and less than 40/100 (or 4/10). It is closer to 30/100 so it would be placed on the number line near that value. |

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| **Lessons and Resources for Number and Operations in Fractions 5** |

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| Unit 6 Inv 3.1, 3.3 |  |

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| **Emphasized Standards for Mathematical Practice** |
| [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) | [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 Fractions 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* | * I can rename fractions with 10 and 100 in the denominator as decimals.
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| **What does this standard mean the students will know and be able to do?** |
| Students make connections between fractions with denominators of 10 and 100 and the place value chart. By reading fraction names, students say 32/100 as thirty-two hundredths and rewrite this as 0.32 or represent it on a place value model as shown below.

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| **Hundreds** | **Tens**  | **Ones** | **●** | **Tenths** | **Hundredths** |
|  |  |  | **●** | **3** | **2** |

Students use the representations explored in 4.NF.5 to understand 32/100 can be expanded to 3/10 and 2/100. Students represent values such as 0.32 or 32/100 on a number line. 32/100 is more than 30/100 (or 3/10) and less than 40/100 (or 4/10). It is closer to 30/100 so it would be placed on the number line near that value. |

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| **Lessons and Resources for Number and Operations in Fractions 6** |

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| [Decimals on Grids](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/4th%20Grade/Unit%206/Decimals%20On%20Grids.docx) | [Base-Ten fractions to decimals](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/4th%20Grade/Unit%206/Base-Ten%20Fractions%20to%20Decimals.doc) | [Fill Two](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/4th%20Grade/Unit%206/Fill%20Two.docx) |
| [Decimals on friendly fraction line](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/4th%20Grade/Unit%206/Decimals_on_a_Friendly_Fraction_Line.doc) | [Friendly Fraction to decimals](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/4th%20Grade/Unit%206/Friendly%20Fractions%20to%20Decimals.doc) | Unit 6 Inv 3.1, 3.2, 3.3 |

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| **Emphasized Standards for Mathematical Practice** |
| [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) | [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 Fractions 7: Compare two decimals to hundredths by reasoning about their size.Recognize that comparisons are valid only when the two decimals refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual model. | I can compare two decimals to the same whole.I can record the results of comparisons with the symbols >, <, = and prove with a model.I can compare two decimals to hundredths by looking at their size. |

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| **What does this standard mean the students will know and be able to do?** |
| Students build area and other models to compare decimals. Through these experiences and their work with fraction models, they build the understanding that comparisons between decimals or fractions are only valid when the whole is the same for both cases. Each of the models below shows 3/10 but the whole on the right is much bigger than the whole on the left. They are both 3/10 but the model on the right is a much larger quantity than the model on the left.When the wholes are the same, the decimals or fractions can be compared. |  |
| **Example:** |
| Draw a model to show that 0.3 < 0.5. (Students would sketch two models of approximately the same size to show the area that represents three-tenths is smaller than the area that represents five-tenths. |  |

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| **Lessons and Resources for Number and Operations in Fractions 7** |

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| [Smaller to Larger](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/4th%20Grade/Unit%206/Smaller%20to%20Larger.docx) | [Decimals in between](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/4th%20Grade/Unit%206/Decimals%20In%20Between.docx) | [Capture Decimals](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/4th%20Grade/Unit%206/Capture%20Decimals.docx) |
| [Calculator decimal counting](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/4th%20Grade/Unit%206/Calculator_Decimal_Counting.doc) | Unit 6 Inv 3 |  |

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| **Emphasized Standards for Mathematical Practice** |
| [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) | [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 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.
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| **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 focused pounds, ounces, hours, minutes and seconds. The other units of measurement should be added in during 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).
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| **Example:**  |
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| **Lessons and Resources for Measurement and Data 1** |
| Review Unit 4 Inv 1 and Unit 7 Inv3.5A and 3.5B (be sure now to include all units of measurement) |  |

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| **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) |

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| **Standard** | **Learner Objective** |
| Measurement and Data 2: Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale. | * I can solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money.
* I can solve word problems involving measurement that include simple fractions or decimals.
* I can solve word problems that require expressing measurements given in a larger unit in terms of a smaller unit.
* I can represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.
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| **What does this standard mean the students will know and be able to do?** |
| This standard includes multi-step word problems related to expressing measurements from a larger unit in terms of a smaller unit (e.g., feet to inches, meters to centimeter, dollars to cents).**Students should have ample opportunities to use number line diagrams to solve word problems.**Number line diagrams that feature a measurement scale can represent measurement quantities. Examples include: ruler, diagram marking off distance along a road with cities at various points, a timetable showing hours throughout the day, or a volume measure on the side of a container. |
| **Example A:**  | **Example B:** | **Example C:**  | **Example D:** |
| Debbie and 10 friends are planning for a pizza party. They purchased 3 quarts of milk. If each glass holds 8oz will everyone get at least one glass of milk? | Subtraction: A pound of apples costs $1.20. Rachel bought a pound and a half of apples. If she gave the clerk a $5.00 bill, how much change will she get back? | **Division/fractions:** Susan has 2 feet of ribbon. She wants to give her ribbon to her 3 best friends so each friend gets the same amount. How much ribbon will each friend get? | At 7:00 a.m. Melisa wakes up to go to school. It takes her 8 minutes to shower, 9 minutes to get dressed and 17 minutes to eat breakfast. How many minutes does she have until the bus comes at 8:00 a.m.? Use the number line to help solve the problem. |

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| **Lessons and Resources for Measurement and Data 2** |

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| Unit 6 Inv 3.1, 3.4, 3.5, 3.6 | Teacher teams need to create story problems similar to the examples above to help students gain more experience with MD.2. |

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| **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) |

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**Optional Whole Group Lesson Progression**

Unit Pacing: 6 weeks

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| **Resource** | **Location** | **Primary Focus** | **Standard** |
| Investigations | Unit 6* Inv 3
 | * I can rename and recognize a fraction with a denominator of 10 as a fraction with a denominator of 100.
* I can add two fractions with denominators 10 and 100 by finding equivalent fractions.
* I can rename fractions with 10 and 100 in the denominator as decimals.
* I can compare two decimals to the same whole.
* I can record the results of comparisons with the symbols >, <, = and prove with a model.
* I can compare two decimals to hundredths by looking at their size.
 | 4.NF.54.NF.64.NF.7 |
| Sharepoint | [Decimals in between](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/4th%20Grade/Unit%206/Decimals%20In%20Between.docx)[Capture Decimals](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/4th%20Grade/Unit%206/Capture%20Decimals.docx)[Calculator decimal counting](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/4th%20Grade/Unit%206/Calculator_Decimal_Counting.doc) | Teach activities as lessons and repeat in small group and workshop as needed.* I can compare two decimals to the same whole.
* I can record the results of comparisons with the symbols >, <, = and prove with a model.
* I can compare two decimals to hundredths by looking at their size.
 | 4.NF.7 |
| Sharepoint | [Friendly Fraction to decimals](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/4th%20Grade/Unit%206/Friendly%20Fractions%20to%20Decimals.doc)[Decimals on friendly fraction line](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/4th%20Grade/Unit%206/Decimals_on_a_Friendly_Fraction_Line.doc) | Teach activities as lessons and repeat in small group and workshop as needed.* I can rename fractions with 10 and 100 in the denominator as decimals.
 | 4.NF.6 |
| Investigations | Review Unit 4 Inv 1 and Unit 7 Inv 3.5A and 3.5B (be sure now to include all units of measurement) | * 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 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.
 | 4.MD.1 |
| Investigations | Unit 6 Inv 3.1, 3.4, 3.5, 3.6 | * I can solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money.
* I can solve word problems involving measurement that include simple fractions or decimals.
* I can solve word problems that require expressing measurements given in a larger unit in terms of a smaller unit.
* I can represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.
 | 4.MD.2 |
| Teacher teams need to create story problems similar to the examples above to help students gain more experience with MD.1 and MD.2. |

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