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| **Prerequisite Skills** **(Grade 3)** | **Unit Five Standards** **Grade 4** | **Looking Ahead** **(Grade 5)** |
| Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole.Understand a fraction as a number on the number line; represent fractions on a number line diagram. | Number and Operations in Fractions 1: Explain why a fraction *a*/*b* is equivalent to a fraction (*n* × *a*)/(*n* × *b*) by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions.* I can recognize and identify equivalent fractions.
* I can determine equivalent fractions using fraction models and explain why they can be called “equivalent”.
 | Add and subtract fractions with unlike denominators by replacing given fractions with equivalent fractions.Solve word problems involving addition and subtraction of fractions referring to the same whole, including unlike denominators. |
| Compare fractions by reasoning about size. Compare two fractions with the same numerator or the same denominator. | Number and Operations in Fractions 2: Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as 1/2. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.* I can record comparison results with symbols: <, >, =
* I can use benchmark fractions such as ½ for comparison purposes.
* I can compare two fractions with different numerators or different denominators.
* I can prove the results of a comparison of two fractions.
 | Use benchmark fractions and numbers sense of fractions to estimate mentally and assess the reasonableness of answers.  |
| Understand a fraction 1/*b* as the quantity formed by 1 part when *a* whole is partitioned into b equal parts; understand a fraction *a/b* as the quantity formed by *a* parts of size 1/b.Express whole numbers as fractions. | Number and Operations in Fractions 3a: Understand a fraction *a*/*b* with *a* > 1 as a sum of fractions 1/*b*. a. Understand addition and subtraction of fractions as joining and separating parts referring to the same whole.* I can add unit fractions (1/b) to get a fraction greater than one.
* I can add fractions.
* I can subtract fractions.
 | Add and subtract fractions with unlike denominators by replacing given fractions with equivalent fractions.Solve word problems involving addition and subtraction of fractions referring to the same whole, including unlike denominators by using models and equations. |
| Number and Operations in Fractions 3b: Understand a fraction *a*/*b* with *a* > 1 as a sum of fractions 1/*b*. b. Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation. Justify decompositions, e.g., by using a visual fraction model. *Examples: 3/8 = 1/8 + 1/8 + 1/8 ; 3/8 = 1/8 + 2/8; 2 1/8 = 1 + 1 + 1/8 = 8/8 + 8/8 + 1/8.** I can decompose a whole with fractional parts using the same denominator.
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| Understand a fraction 1/*b* as the quantity formed by 1 part when *a* whole is partitioned into b equal parts; understand a fraction *a/b* as the quantity formed by *a* parts of size 1/b.Express whole numbers as fractions. | Number and Operations in Fractions 3c + 3d: Understand a fraction *a*/*b* with *a* > 1 as a sum of fractions 1/*b*. c. Add and subtract mixed numbers with like denominators, e.g., by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction.* I can add and subtract mixed numbers by replacing each mixed number with an equivalent fraction.

 d. Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, e.g., by using visual fraction models and equations to represent the problem.* I can solve word problems involving fractions.
 | Add and subtract fractions with unlike denominators by replacing given fractions with equivalent fractions.Solve word problems involving addition and subtraction of fractions referring to the same whole, including unlike denominators. |

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| **Prerequisite Skills** **(Grade 3)** | **Unit Five Standards (Continued)** **Grade 4** | **Looking Ahead** **(Grade 5)** |
| Represent and solve problems involving multiplication of whole numbers. | Number and Operations in Fractions 4: Apply and extend previous understandings of multiplication to multiply a fraction by a whole number. a. Understand a fraction *a*/*b* as a multiple of 1/*b*. *For example, use a visual fraction model to represent 5/4 as the product 5 × (1/4), recording the conclusion by the equation 5/4 = 5 × (1/4).** I can use fraction models to show multiplication of fractions as repeated addition.

¼ + ¼ + ¼ + ¼ + ¼ = 5/4* I can multiply fractions by a whole number using models.

 b. Understand a multiple of *a*/*b* as a multiple of 1/*b*, and use this understanding to multiply a fraction by a whole number. *For example, use a visual fraction model to express 3 × (2/5) as 6 × (1/5), recognizing this product as 6/5. (In general, n × (a/b) = (n × a)/b.)** I can multiply a fraction by a whole number.

 c. Solve word problems involving multiplication of a fraction by a whole number, e.g., by using visual fraction models and equations to represent the problem. *For example, if each person at a party will*  *eat 3/8 of a pound of roast beef, and there will be 5 people at the party, how many pounds of roast beef will be needed? Between what two whole numbers does your answer lie?** I can solve word problems involving multiplication of a fraction by a whole number.
 | Multiply a fraction by a fraction or a whole number by a fraction.Compare the size of a product to the size of one factor on the basis of the size of the other factor without performing multiplication.Solve word problems involving multiplication of fractions and mixed numbers with visual models.Divide unit fraction by a whole number. Divide a whole number by a unit fraction. |
| Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units—whole numbers, halves, or quarters. | Measurement and Data 4: Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Solve problems involving addition and subtraction of fractions by using information presented in line plots. *For example from a line plot find and interpret the difference in length between the longest and shortest specimens in an insect collection.** I can analyze and interpret a line plot to solve problems involving addition and subtraction of fractions.
* I can create a line plot to display a data set of measurements given in fractions of a unit.
 | Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Use all operations on fractions for this grade to solve problems involving information presented in line plots. |

\*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** |
| Number and Operations in Fractions 1: Explain why a fraction *a*/*b* is equivalent to a fraction (*n* × *a*)/(*n* × *b*) by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions. | * I can recognize and identify equivalent fractions.
* I can determine equivalent fractions using fraction models and explain why they can be called “equivalent”.
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| **What does this standard mean the students will know and be able to do?** |
| This standard refers to visual fraction models. This includes area models, linear models (number lines) or it could be a collection/set models. This standard extends the work in third grade by using additional denominators (5, 10, 12, and 100). Students will begin to notice connections between the models and fractions in the way both the parts and wholes are counted and begin to generate a rule for writing equivalent fractions.Students should extend their understanding of unit fractions to compare two fractions with different numerators and different denominators. Students should use models to compare two fractions with different denominators by creating common denominators or numerators. The models should be the same (both fractions shown using fraction bars or both fractions using circular models) so that the models represent the same whole. The models should be represented in drawings. Students should also use benchmark fractions such as 1/2 to compare two fractions and explain their reasoning. The result of the comparisons should be recorded using ˃, ˂ and = symbols. |
| **Example:** |
| All the area models show 1/2. The second model shows 2/4 but also shows that 1/2 and 2/4 are equivalent fractions because their areas are equivalent. When a horizontal line is drawn through the center of the model, the number of equal parts doubles and size of the parts is halved. |  |

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| **Lessons and Resources for Number and Operations in Fractions 1** |

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| [Sharing Tasks](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/4th%20Grade/Unit%205/sharing_tasks.docx) | [Correct Shares](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/4th%20Grade/Unit%205/Correct%20Shares.docx) | [Finding Fair Shares](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/4th%20Grade/Unit%205/Finding%20Fair%20Shares.docx) |
| Unit 6 Inv 1.1, 1.2, 1.3 | [Cover Up](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/4th%20Grade/Unit%205/Cover%20Up.docx) | [Different Fillers](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/4th%20Grade/Unit%205/Different_Fillers.docx) |
| [Divide and Divide Again](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/4th%20Grade/Unit%205/Divide_and_Divide_Again.docx) | [Missing Number Equivalence](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/4th%20Grade/Unit%205/Missing%20Number%20Equivalencies.docx) | [Slicing Squares](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/4th%20Grade/Unit%205/Slicing%20Squares.docx) |

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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) | [7. Look for and make use of structure.](http://elementarymath.dmschools.org/7-look-for-and-make-use-of-structure5.html) | [8. Look for and express regularity in repeated reasoning.](http://elementarymath.dmschools.org/8-look-for-and-express-regularity-in-repeated-reasoning3.html) |

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| **Standard** | **Learner Objectives** |
| Number and Operations in Fractions 2: Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as 1/2. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model. | * I can record comparison results with symbols: <, >, =
* I can use benchmark fractions such as ½ for comparison purposes.
* I can compare two fractions with different numerators or different denominators.
* I can prove the results of a comparison of two fractions.
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| **What does this standard mean the students will know and be able to do?** |
| This standard calls students to compare fractions by creating visual fraction models or finding common denominators or numerators. **Students’ experiences should focus on visual fraction models rather than algorithms.** When tested, models may or may not be included. Students should learn to draw fraction models to help them compare and use reasoning skills based on fraction benchmarks. Students must also recognize that they must consider the size of the whole when comparing fractions (ie,1/2 and 1/8 of two medium pizzas is very different from1/2 of one medium and 1/8 of one large). Record the results of comparisons with symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model. |
| **Examples:** |
| **Use patterns blocks.** 1. If a red trapezoid is one whole, which block shows 1/3?2. If the blue rhombus is 1/3, which block shows one whole? 3. If the red trapezoid is one whole, which block shows 2/3? | Melisa used a 12 x 12 grid to represent 1 and Nancy used a 10 x 10 grid to represent 1. Each girl shaded grid squares to show ¼. How many grid squares did Melisa shade? How many grid squares did Nancy shade? Why did they need to shade different numbers of grid squares?***Possible solution:*** *Melisa shaded 36 grid squares; Nancy shaded 25 grid squares. The total number of little squares is different in the two grids, so 1/3 of each total number is different.* |
| **There are two cakes on the counter that are the same size. The first cake has ½ of it left. The second cake has 5/12 left. Which cake has more left?** |
| **Area Model:**The first cake has more left over. The second cake has 5/12 left which is smaller than ½. | **Number Line Model** | **Benchmark Fractions**I know that 6/12 equals 1/2. Therefore, the second cake which has 7/12 left is greater than 1/2. |

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| **Lessons and Resources for Number and Operations in Fractions 2** |

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| Unit 6 Inv 1.4 | [Choose, Explain, Test](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/4th%20Grade/Unit%205/Choose%2C%20Explain%2C%20Test.docx) | [Zero, One-half or One](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/4th%20Grade/Unit%205/Zero%2C%20One-Half%20or%20One.docx) |
| [Close Fractions](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/4th%20Grade/Unit%205/Close%20Fractions.docx) | [About How Much?](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/4th%20Grade/Unit%205/About%20How%20Much.docx)  |  |

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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 3a: Understand a fraction *a*/*b* with *a* > 1 as a sum of fractions 1/*b*. a. Understand addition and subtraction of fractions as joining and separating parts referring to the same whole. | * I can add unit fractions (1/b) to get a fraction greater than one.
* I can add fractions.
* I can subtract fractions.
 |
| **What does this standard mean the students will know and be able to do?** |
| A fraction with a numerator of one is called a unit fraction. When students investigate fractions other than unit fractions, such as 2/3, they should be able to join (compose) or separate (decompose) the fractions of the same whole.**Example: 2/3 = 1/3 + 1/3**Being able to visualize this decomposition into unit fractions helps students when adding or subtracting fractions. Students need multiple opportunities to work with mixed numbers and be able to decompose them in more than one way. Students may use visual models to help develop this understanding. |
| **Examples:** |
| A) 1 ¼ - ¾ = \_\_\_\_\_\_B) 4/4 + ¼ = 5/4C) 5/4 – ¾ = 2/4 or ½  | D) Mary and Lacey decide to share a pizza. Mary ate 3/6 and Lacey ate 2/6 of the pizza. How much of the pizza did the girls eat together?***Possible solution:*** *The amount of pizza Mary ate can be thought of a 3/6 or 1/6 and 1/6 and 1/6. The amount of* *pizza Lacey ate can be thought of a 1/6 and 1/6. The total amount of pizza they ate is 1/6 + 1/6 + 1/6 + 1/6 + 1/6* *or 5/6 of the whole pizza.* |

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| **Lessons and Resources for Number and Operations in Fractions 3a**  |

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| Unit 6 Inv 1.1, 1.2, 1.5, 1.6, 1.7, 1.8A, 2.5 |  |

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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) |
| [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) | [8. Look for and express regularity in repeated reasoning.](http://elementarymath.dmschools.org/8-look-for-and-express-regularity-in-repeated-reasoning3.html) |

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| **Standard** | **Learner Objectives** |
| Number and Operations in Fractions 3b: Understand a fraction *a*/*b* with *a* > 1 as a sum of fractions 1/*b*. b. Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation. Justify decompositions, e.g., by using a visual fraction model. *Examples: 3/8 = 1/8 + 1/8 + 1/8 ; 3/8 = 1/8 + 2/8; 2 1/8 = 1 + 1 + 1/8 = 8/8 + 8/8 + 1/8.* | * I can decompose a whole with fractional parts using the same denominator.
 |
| **What does this standard mean the students will know and be able to do?** |
| Students should justify their breaking apart (decomposing) of fractions using visual fraction models. The concept of turning mixed numbers into improper fractions needs to be emphasized using visual fraction models.Converting an improper fraction to a mixed number is a matter of decomposing the fraction into a sum of a whole number and a number less than 1. Students can draw on their knowledge from third grade of whole numbers as fractions.  |
| **Examples:** |
|  |  | Knowing that 3/3 = 1, students see: |

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| **Lessons and Resources for Number and Operations in Fractions 3b** |

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| Unit 6 Inv 2.1 – 2.7A | [Finding Fractions](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/4th%20Grade/Unit%205/Finding%20Fractions.docx) | [Complete a whole](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/4th%20Grade/Unit%205/Complete%20a%20Whole%20%281%29.docx) |
| [More, less or equal to a whole](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/4th%20Grade/Unit%205/More%2C%20Less%20or%20Equal%20to%20One.docx) | [Top and Bottom Numbers](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/4th%20Grade/Unit%205/Top%20and%20Bottom%20Numbers%20%281%29.docx) | [Mixed Number Names](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/4th%20Grade/Unit%205/Mixed%20Number%20Names.docx) |
| [Fraction Concentration](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/4th%20Grade/Unit%205/Fraction%20Concentration%20%281%29.docx) | [Calculator Fraction Counting](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/4th%20Grade/Unit%205/Calculator%20Fraction%20Counting.docx) |  |

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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) |
| [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) | [8. Look for and express regularity in repeated reasoning.](http://elementarymath.dmschools.org/8-look-for-and-express-regularity-in-repeated-reasoning3.html) |

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| **Standard** | **Learner Objectives** |
| Number and Operations in Fractions 3c + 3d: Understand a fraction *a*/*b* with *a* > 1 as a sum of fractions 1/*b*. c. Add and subtract mixed numbers with like denominators, e.g., by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction. d. Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, e.g., by using visual fraction models and equations to represent the problem. | * I can add and subtract mixed numbers by replacing each mixed number with an equivalent fraction.
* I can solve word problems involving fractions.
 |
| **What does this standard mean the students will know and be able to do?** |
| A separate algorithm for mixed numbers in addition and subtraction is not necessary. Students will tend to add or subtract the whole numbers first and then work with the fractions using the same strategies they have applied to problems that contained only fractions.Mixed numbers are introduced for the first time in Fourth Grade. Students should have ample experiences of adding and subtracting mixed numbers where they work with mixed numbers or convert mixed numbers so that the numerator is equal to or greater than the denominator.Fourth Grade students should be able to decompose and compose fractions with the same denominator. They add fractions with the same denominator. Using the understanding gained from work with whole numbers of the relationship between addition and subtraction, they also subtract fractions with the same denominator. |
| **Example 3c:** | **Example 3c:** | **Example 3c:** | **Example 3d:** |
| Trevor has 4 1/8 pizzas left over from his soccer party. After giving some pizza to his friend, he has 2 4/8 of a pizza left. How much pizza did Trevor give to his friend?***Possible solution:*** *Trevor had 4 1/8 pizzas to start. This is 33/8 of a pizza. The x’s show the pizza he has left which is 2 4/8 pizzas or 20/8 pizzas. The shaded rectangles without the x’s are the pizza he gave to his friend which is 13/8 or 1 5/8 pizzas.* | Adding with the same denominator: | Subtracting with the same denominator: | A cake recipe calls for you to use ¾ cup of milk, ¼ cup of oil, and 2/4 cup of water. How much liquid was needed to make the cake? |

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| **Lessons and Resources for Number and Operations in Fractions 3c + 3d** |

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| [Fraction Story Bank](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/4th%20Grade/Unit%205/Fraction%20Story%20Bank.docx) |  |

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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) |
| [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) | [8. Look for and express regularity in repeated reasoning.](http://elementarymath.dmschools.org/8-look-for-and-express-regularity-in-repeated-reasoning3.html) |

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| **Standard** | **Learner Objective** |
| Number and Operations in Fractions 4: Apply and extend previous understandings of multiplication to multiply a fraction by a whole number. a. Understand a fraction *a*/*b* as a multiple of 1/*b*. *For example, use a visual fraction model to represent 5/4 as the product 5 × (1/4), recording the conclusion by the equation 5/4 = 5 × (1/4).* | * I can use fraction models to show multiplication of fractions as repeated addition. ¼ + ¼ + ¼ + ¼ + ¼ = 5/4
* I can multiply fractions by a whole number using models.
 |
|  b. Understand a multiple of *a*/*b* as a multiple of 1/*b*, and use this understanding to multiply a fraction by a whole number. *For example, use a visual fraction model to express 3 × (2/5) as 6 × (1/5), recognizing this product as 6/5. (In general, n × (a/b) = (n × a)/b.)* | * I can multiply a fraction by a whole number.
 |
|  c. Solve word problems involving multiplication of a fraction by a whole number, e.g., by using visual fraction models and equations to represent the problem. *For example, if each person at a party will*  *eat 3/8 of a pound of roast beef, and there will be 5 people at the party, how many pounds of roast beef will be needed? Between what two whole numbers does your answer lie?* | * I can solve word problems involving multiplication of a fraction.
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| **What does this standard mean the students will know and be able to do?** |
| Students need many opportunities to work with problems in context to understand the connections between models and corresponding equations. Contexts involving a whole number times a fraction lend themselves to modeling and examining patterns. This standard builds on students’ work of adding fractions and extending that work into multiplication (4a).This standard extends the idea of multiplication as repeated addition 4b) Students are expected to use and create visual fraction models to multiply a whole number by a fraction.This standard calls for students to use visual fraction models (Area, Linear and Set Models) to solve word problems related to multiplying a whole number by a fraction (4c). |
| **Example 4a:** | **Example 4b:**  | **Example 4c:** |
| If each person at a party eats 3/8 of a pound of roast beef, and there are 5 people at the party, how many pounds of roast beef are needed? Between what two whole numbers does your answer lie? | 3 x (2/5) = 2/5 + 2/5 + 2/5 = 6/5 = 6 X (1/5) | **Student 1**Draws a number line to show 4 jumps of ½.**Student 2**Draws and area model showing 4 pieces of ½ joined together to equal 2.**Student 3**Draws an area model representing 4 X ½ on a grid, dividing each row into ½ to represent the multiplier. |

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| **Lessons and Resources for Number and Operations in Fractions 4** |

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| Unit 6 Inv3A.1, 3A.2, 3A.3 | [Fraction Story Bank](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/4th%20Grade/Unit%205/Fraction%20Story%20Bank.docx) |

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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) |
| [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) | [8. Look for and express regularity in repeated reasoning.](http://elementarymath.dmschools.org/8-look-for-and-express-regularity-in-repeated-reasoning3.html) |

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| **Standard** | **Learner Objectives** |
| Measurement and Data 4: Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Solve problems involving addition and subtraction of fractions by using information presented in line plots. *For example from a line plot find and interpret the difference in length between the longest and shortest specimens in an insect collection.* | * I can analyze and interpret a line plot to solve problems involving addition and subtraction of fractions.
* I can create a line plot to display a data set of measurements given in fractions of a unit.
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| **What does this standard mean the students will know and be able to do?** |
| This standard provides a context for students to work with fractions by measuring objects to an eighth of an inch. Students are making a line plot of this data and then adding and subtracting fractions based on data in the line plot.Have students create line plots with fractions of a unit (1/2, 1/4 , 1/8) and plot data showing multiple data points for each fraction. |
| **Example:** |
| Students measured objects in their desk to the nearest ½, ¼, or 1/8 inch. They displayed their data collected on a line plot. How many object measured ¼ inch? ½ inch? If you put all the objects together end to end what would be the total length of all the objects. Ten students in Room 31 measured their pencils at the end of the day. They recorded their results on the line plot below.Possible questions:* What is the difference in length from the longest to the shortest pencil?
* If you were to line up all the pencils, what would the total length be?
* If the 5 1/8‖ pencils are placed end to end, what would be their total length?
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| **Lessons and Resources for Measurement and Data 4** |

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| Unit 6 Inv 2.7A | Unit 9 Inv 3.1, 3.2 | [The Pencil Survey](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/4th%20Grade/Unit%205/The%20Pencil%20Survey.pdf) | [Under the Same Roof](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/4th%20Grade/Unit%205/Under%20the%20Same%20Roof.pdf) |

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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) | [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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**Optional Whole Group Lesson Progression**

Unit Pacing: 5 weeks

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| **Resource** | **Location** | **Primary Focus** | **Standard** |
| ***Basic concepts*** |
| Investigations | Unit 6* Inv 1.1, 1.2, 1.3
 |  | Foundation for 4.NF.1 |
| Sharepoint | [Sharing Tasks](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/4th%20Grade/Unit%205/sharing_tasks.docx)[Correct Shares](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/4th%20Grade/Unit%205/Correct%20Shares.docx)[Finding Fair Shares](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/4th%20Grade/Unit%205/Finding%20Fair%20Shares.docx) | Begin by dividing one brownie among different numbers of children to focus on the unit fractions. Continue to increase the difficulty by posing problems in which the left over brownie has to be divided into halves and fourths then move to thirds. These lessons may be done repeatedly over the course of a few days. | Foundation for 4.NF.1 |
| ***Comparing*** |
| Investigations | Unit 6Inv 1.4 | * I can record comparison results with symbols: <, >, =
* I can use benchmark fractions such as ½ for comparison purposes.
* I can compare two fractions with different numerators or different denominators.
* I can prove the results of a comparison of two fractions.
 | 4.NF.2 |
| DMPS Math Websites | [Zero, One-half or One](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/4th%20Grade/Unit%205/Zero%2C%20One-Half%20or%20One.docx)[Close Fractions](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/4th%20Grade/Unit%205/Close%20Fractions.docx)[About How Much?](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/4th%20Grade/Unit%205/About%20How%20Much.docx)[Choose, Explain, Test](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/4th%20Grade/Unit%205/Choose%2C%20Explain%2C%20Test.docx) | Prior to the Zero, One-Half or One activity, you may need to give students experiences with ½ so they can determine the given fraction is less than or greater than ½. See teacher notes listed with the activity. Do these activities simultaneously for several days.* I can record comparison results with symbols: <, >, =
* I can use benchmark fractions such as ½ for comparison purposes.
* I can compare two fractions with different numerators or different denominators.
* I can prove the results of a comparison of two fractions.
 | 4.NF.2 |
| ***Equivalence*** |
| Sharepoint | [Cover Up](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/4th%20Grade/Unit%205/Cover%20Up.docx) | Have students make the pieces and explain the game. Students may play the game multiple times throughout the unit.* I can decompose a whole with fractional parts using the same denominator.
 | 4.NF.3b |
| Sharepoint | [Different Fillers](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/4th%20Grade/Unit%205/Different_Fillers.docx)[Divide and Divide Again](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/4th%20Grade/Unit%205/Divide_and_Divide_Again.docx)[Missing Number Equivalence](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/4th%20Grade/Unit%205/Missing%20Number%20Equivalencies.docx)[Slicing Squares](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/4th%20Grade/Unit%205/Slicing%20Squares.docx) | These activities explore fraction equivalence prior to teaching the algorithm.* I can recognize and identify equivalent fractions.
* I can determine equivalent fractions using fraction models and explain why they can be called “equivalent”.
 | 4.NF.1 |
| ***Fractional Parts Counting*** |
| Investigations | Unit 6Inv 2.1 – 2.7A (condense activities and use as needed) | * I can decompose a whole with fractional parts using the same denominator.
 | 4.NF.3b |
| Sharepoint | [Complete a whole](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/4th%20Grade/Unit%205/Complete%20a%20Whole%20%281%29.docx)[More, less or equal to a whole](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/4th%20Grade/Unit%205/More%2C%20Less%20or%20Equal%20to%20One.docx)[Top and Bottom Numbers](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/4th%20Grade/Unit%205/Top%20and%20Bottom%20Numbers%20%281%29.docx)[Mixed Number Names](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/4th%20Grade/Unit%205/Mixed%20Number%20Names.docx)[Calculator Fraction Counting](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/4th%20Grade/Unit%205/Calculator%20Fraction%20Counting.docx)[Finding Fractions](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/4th%20Grade/Unit%205/Finding%20Fractions.docx) | Repeat activities multiple times as needed. In Top and bottom Numbers, include explanation of 1/b as written in the standard.* I can decompose a whole with fractional parts using the same denominator.
 | 4.NF.3b |

**Optional Whole Group Lesson Progression (Continued)**

Unit Pacing: 5 weeks

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| **Resource** | **Location** | **Primary Focus** | **Standard** |
| ***Operations of Fractions*** |
| Investigations | Unit 6* 1.6, 1.7, 1.8A
 | * I can add and subtract mixed numbers by replacing each mixed number with an equivalent fraction.
* I can solve word problems involving fractions.
 | 4.NF.3c4.NF.3d |
| [Fraction Story Bank](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/4th%20Grade/Unit%205/Fraction%20Story%20Bank.docx) | Addition of Fractions Word ProblemsSubtraction of Fractions Word Problems | Begin with simple fractions then continue to fractions whose sum is greater than 1 and include mixed numbers. * I can add and subtract mixed numbers by replacing each mixed number with an equivalent fraction.
* I can solve word problems involving fractions.
 | 4.NF.3c4.NF.3d |
| Investigations | Unit 6* Inv 3A.1, 3A.2, 3A.3
 | * I can use fraction models to show multiplication of fractions as repeated addition. ¼ + ¼ + ¼ + ¼ + ¼ = 5/4
* I can multiply fractions by a whole number using models.
* I can multiply a fraction by a whole number.
* I can solve word problems involving multiplication of a fraction.
 | 4.NF.4 |
| [Fraction Story Bank](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/4th%20Grade/Unit%205/Fraction%20Story%20Bank.docx) | Multiplication of Fractions Word Problems | Use repeated addition to reach multiplication. The algorithm for multiplying fractions will not be taught.* I can use fraction models to show multiplication of fractions as repeated addition. ¼ + ¼ + ¼ + ¼ + ¼ = 5/4
* I can multiply fractions by a whole number using models.
* I can multiply a fraction by a whole number.
* I can solve word problems involving multiplication of a fraction.
 | 4.NF.4 |
| Investigations | Unit 9* Inv 3.1, 3.2
 | * I can analyze and interpret a line plot to solve problems involving addition and subtraction of fractions.
* I can create a line plot to display a data set of measurements given in fractions of a unit.
 | 4. MD.4 |

**\*The progression reflects more lessons/activities than time allows for one activity per day. Many activities listed would be best used as routines rather than whole group lessons. Use teacher discretion based on student need when planning unit length.**