<table>
<tr><td>Grade: 4

Unit 7- Operations Involving Fraction Concepts and Decimals</td><td colspan="2">Subject: Math
Time Frame: 24 days
Domains: Numbers and Operations – Fractions and Decimals</td></tr>
<tr><td>Standards</td><td>Content Standards
4.NF.2, 4.NF.3, 4. NF.4, 4.NF.5, 4.NF.6, 4.NF.7, 4.MD.2, 4.MD.4
http://www.corestandards.org/wp-content/uploads/Math_Standards.pdf</td><td>Practice Standards:
MP 1, 2, 3, 4, 5, 6, 7, 8</td></tr>
<tr><td>Enduring Understandings</td><td colspan="2">1. You can use fraction models to explain equivalent fractions.
2. You can create common denominators or numerators by comparing to benchmark fractions.
3. You can use symbols to compare fractions and justify conclusions using a visual model.
4. You can multiply a fraction and a whole number.
5. You can use decimal notation for fractions with denominators or 10 or 100.
6. You can compare two decimals to hundredths.</td></tr>
<tr><td>Essential Questions</td><td colspan="2">1. How can we use fraction models to explain equivalent fractions?
2. How do benchmark fractions help us find common numerators and denominators?
3. How can we justify our answers using visual models?
4. How can we solve problems involving addition and subtraction of fractions and mixed numbers?
5. How do we multiply fractions by whole numbers?
6. How do we add and subtract fractions greater than one and mixed numbers?
7. How are fractions and decimals related?</td></tr>
<tr><td>Vocabulary</td><td colspan="2">equivalent fractions, simplify, common denominator, tenths, hundredths, decimal number</td></tr>
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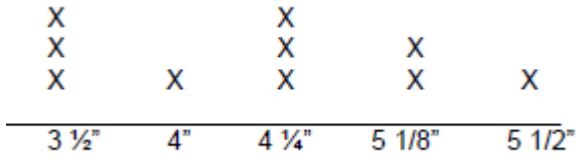
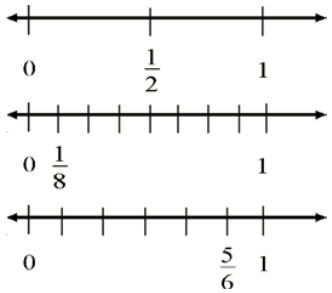
Priority and Supporting CCSS	Explanations and Examples*
4.MD.2. Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements 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.	**4.MD.2.** Examples: 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? Students may record their solutions using fractions or inches. (The answer would be 2/3 of a foot or 8 inches. Students are able to express the answer in inches because they understand that 1/3 of a foot is 4 inches and 2/3 of a foot is 2 groups of 1/3.) Addition: Mason ran for an hour and 15 minutes on Monday, 25 minutes on Tuesday, and 40 minutes on Wednesday. What was the total number of minutes Mason ran? 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? Multiplication: Mario and his 2 brothers are selling lemonade. Mario brought one and a half liters, Javier brought 2 liters, and Ernesto brought 450 milliliters. How many total milliliters of lemonade did the boys have? 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.

Priority and Supporting CCSS	Explanations and Examples*
4.MD.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.*	**4.MD.4.** Example: 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 $5\frac{1}{8}$" pencils are placed end to end, what would be their total length?

Priority and Supporting CCSS	Explanations and Examples*
4.NF.3. 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.** **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.*** **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.*** *Grade 4 expectations in this domain are limited to fractions with denominators 2, 3, 4, 5, 6, 8, 10, 12, and 100.	**4.NF.3.** 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 decompose the non-unit fraction into a combination of several unit fractions. 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. Example: $1\frac{1}{4} - \frac{3}{4} =$ __ $\frac{4}{4} + \frac{1}{4} = \frac{5}{4}$ $\frac{5}{4} - \frac{3}{4} = \frac{2}{4}$ or $\frac{1}{2}$ Example of word problem: • 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? 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. 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.

	Example: • Susan and Maria need 8 3/8 feet of ribbon to package gift baskets. Susan has 3 1/8 feet of ribbon and Maria has 5 3/8 feet of ribbon. How much ribbon do they have altogether? Will it be enough to complete the project? Explain why or why not. The student thinks: I can add the ribbon Susan has to the ribbon Maria has to find out how much ribbon they have altogether. Susan has 3 1/8 feet of ribbon and Maria has 5 3/8 feet of ribbon. I can write this as 3 1/8 + 5 3/8. I know they have 8 feet of ribbon by adding the 3 and 5. They also have 1/8 and 3/8 which makes a total of 4/8 more. Altogether they have 8 4/8 feet of ribbon. 8 4/8 is larger than 8 3/8 so they will have enough ribbon to complete the project. They will even have a little extra ribbon left, 1/8 foot. Example: • 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? 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. 

4.NF.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.	**4.NF.2.** Benchmark fractions include common fractions between 0 and 1 such as halves, thirds, fourths, fifths, sixths, eighths, tenths, twelfths, and hundredths. Fractions can be compared using benchmarks, common denominators, or common numerators. Symbols used to describe comparisons include <, >, =. Fractions may be compared using ½ as a benchmark.  Possible student thinking by using benchmarks: $\frac{1}{8}$ is smaller than $\frac{1}{2}$ because when 1 whole is cut into pieces, the pieces are much smaller than when 1 whole is cut into 2 pieces. Possible student thinking by creating common denominators: $\frac{5}{6} > \frac{1}{2}$ because $\frac{3}{6} = \frac{1}{2}$ and $\frac{5}{6} > \frac{3}{6}$ Fractions with common denominators may be compared using the numerators as a guide: $\frac{2}{6} < \frac{3}{6} < \frac{5}{6}$ Fractions with common numerators may be compared and ordered using the denominators as a guide: $\frac{3}{10} < \frac{3}{8} < \frac{3}{4}$

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<td>4.NF.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.</td>
<td>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.

<table>
<tr><th>Hundreds</th><th>Tens</th><th>Ones</th><th>•</th><th>Tenths</th><th>Hundredths</th></tr>
<tr><td></td><td></td><td></td><td>•</td><td>3</td><td>2</td></tr>
</table>
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.</td>
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<tr>
<td>4.NF.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</td>
<td>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.</td>
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Resources
Math Expressions – Unit 7, Lessons 1-13 Thinkcentral.com Soar to Success Math Intervention Mega Math Common Core Mathematics- Newmark Learning Book- Units-13-19 Xtramath.org Learnzillion.com Mobymax.com

Unit Assessments
Unit Test Quick Quizzes Formative Assessments Performance Task Assessments from other sources: https://grade4commoncoremath.wikispaces.hcpss.org/Assessing+4.NF.1 https://grade4commoncoremath.wikispaces.hcpss.org/Assessing+4.NF.2 https://grade4commoncoremath.wikispaces.hcpss.org/Assessing+4.NF.3 https://grade4commoncoremath.wikispaces.hcpss.org/Assessing+4.NF.4 https://grade4commoncoremath.wikispaces.hcpss.org/Assessing+4.NF.5 https://grade4commoncoremath.wikispaces.hcpss.org/Assessing+4.NF.6 https://grade4commoncoremath.wikispaces.hcpss.org/Assessing+4.NF.7 https://grade4commoncoremath.wikispaces.hcpss.org/Assessing+4.MD.2 https://grade4commoncoremath.wikispaces.hcpss.org/Assessing+4.MD.4

Technology: Videos, Websites, Links
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