Unit 5
Fraction, Equivalence, Ordering, and Operations

Grade 4
Math

Description:

In Unit 5, fourth-grade students understand, recognize and generate equivalent fractions. Students compare fractions with different numerators and denominators. They create line plots and solve simple word problems involving the fractions found on the line plot. They add and subtract fractions with like denominators, for example, 3 fifths + 1 fifth = 4 fifths. Students begin with models such as the area model, manipulatives, and number lines, then progress to an equation. During this unit, students learn to multiply a fraction by a whole number. They also use models and equations to solve word problems involving addition and subtraction of fractions with like denominators and multiplication of a fraction by a whole number.

Louisiana Student Standards for Mathematics (LSSM)

Number and Operations-Fractions	
Extend understanding of fraction equivalence and ordering.	
4.NF.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. (Denominators are limited to 2, 3, 4, 5, 6, 8, 10, 12, and 100.)
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. (Denominators are limited to 2, 3, 4, 5, 6, 8, 10, 12, and 100.)
Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.	
4.NF.3	Understand a fraction a/b with a > 1 as a sum of fractions 1/b. (Denominators are limited to 2, 3, 4, 5, 6, 8, 10, 12, and 100.) a. Understand addition and subtraction of fractions as joining and separating parts referring to the same whole. *Example: 3/4 = 1/4 + 1/4 + 1/4.* 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.*
4.NF.4	Multiply a fraction by a whole number. (Denominators are limited to 2, 3, 4, 5, 6, 8, 10, 12, and 100.) 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).* 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.)* 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?*
Number and Operations in Based Ten	
B. Use place value understanding and properties of operations to perform multi-digit arithmetic.	
4.NBT.6	Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.
Measurement and Data	
Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit	
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 whole numbers and/or simple fractions (addition and subtraction of fractions with like denominators and multiplying a fraction times a fraction or a whole number), 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. *Note: Students in grade 4 will be assessed on multiplying a fraction and a whole number as indicated in the NF domain. Some students may be able to multiply a fraction by a fraction as a result of generating equivalent fractions; however, mastery of multiplying two fractions occurs in Grade 5.
Represent and interpret data	
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.*
Operations and Algebraic Thinking	
Use the four operations with whole numbers to solve problems	
4.OA.2	Multiply or divide to solve word problems involving multiplicative comparisons, by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison.
Generate and analyze patterns.	
4.OA.5	Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself. *For example, given the rule "Add 3" and the starting number 1, generate terms in the resulting sequence and observe that the terms appear to alternate between odd and even numbers. Explain informally why the numbers will continue to alternate in this way.*

Enduring Understandings:

- Fractions can be composed and decomposed from unit fractions.
- Fractions can be represented visually and in written form.
- Fractions of the same whole can be compared.
- Fractional numbers and mixed numbers can be added, subtracted, and multiplied.

Essential Questions:

- How can common numerators or denominators be created?
- How can equivalent fractions be identified?
- How can fractions with different numerators and different denominators be compared?
- How can fractions and mixed numbers be used interchangeably?
- How do we apply our understanding of fractions in everyday life?
- How can you use fractions to solve addition, subtraction, and multiplication problems?
- How can I model the multiplication of a whole number by a fraction?