

2 Units  
12 Lessons  
3 Fractions ExplorActions (Labs)

Unit / Lesson / Lab	Grade 5 Lesson Objective	CCSS	Manipulative(s)	Description
<b>Unit 1: Add and Subtract Fractions</b>				
Lesson 1	Add two proper fractions (unlike denominators).	5.NF.A.1	Fraction Circles	Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators. <i>For example, <math>2/3 + 5/4 = 8/12 + 15/12 = 23/12</math>. (In general, <math>a/b + c/d = (ad + bc)/bd</math>.)</i>
Lesson 2	Add two mixed numbers (unlike denominators).	5.NF.A.1	Fraction Towers Fraction Number Line (tick-marked double line)	Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators. <i>For example, <math>2/3 + 5/4 = 8/12 + 15/12 = 23/12</math>. (In general, <math>a/b + c/d = (ad + bc)/bd</math>.)</i>
Lesson 3	Subtract one fraction from another (unlike denominators).	5.NF.A.1	Fraction Circles	Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators. <i>For example, <math>2/3 + 5/4 = 8/12 + 15/12 = 23/12</math>. (In general, <math>a/b + c/d = (ad + bc)/bd</math>.)</i>
Lesson 4	Subtract one mixed number from another (unlike denominators).	5.NF.A.1	Fraction Towers Fraction Number Line (blank line)	Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators. <i>For example, <math>2/3 + 5/4 = 8/12 + 15/12 = 23/12</math>. (In general, <math>a/b + c/d = (ad + bc)/bd</math>.)</i>
Fractions ExplorAction 1 (Lab)	Investigate addition and subtraction with fractions using area models and number lines.	5.NF.A.1	Fraction Squares Fraction Towers Fraction Number Line (tick-marked double line)	Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators. <i>For example, <math>2/3 + 5/4 = 8/12 + 15/12 = 23/12</math>. (In general, <math>a/b + c/d = (ad + bc)/bd</math>.)</i>
Lesson 5	Solve word problems involving addition and subtraction of fractions and mixed numbers (including those with unlike denominators).	5.NF.A.2	Fraction Circles Fraction Towers Fraction Number Line (blank line)	Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, e.g., by using visual fraction models or equations to represent the problem. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers. <i>For example, recognize an incorrect result <math>2/5 + 1/2 = 3/7</math>, by observing that <math>3/7 &lt; 1/2</math>.</i>
<b>Unit 2: Multiply and Divide Fractions</b>				
Lesson 1	Solve word problems showing that a fraction is a division of the numerator by the denominator.	5.NF.B.3	Color Tiles	Interpret a fraction as division of the numerator by the denominator ( $a/b = a \div b$ ). Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers, e.g., by using visual fraction models or equations to represent the problem. <i>For example, interpret <math>3/4</math> as the result of dividing 3 by 4, noting that <math>3/4</math> multiplied by 4 equals 3, and that when 3 wholes are shared equally among 4 people each person has a share of size <math>3/4</math>. If 9 people want to share a 50-pound sack of rice equally by weight, how many pounds of rice should each person get? Between what two whole numbers does your answer lie?</i>
Lesson 2	Multiply a fraction by a whole number.	5.NF.B.4a	Fraction Towers Fraction Number Line (blank line)	Interpret the product $(a/b) \times q$ as a parts of a partition of $q$ into $b$ equal parts; equivalently, as the result of a sequence of operations $a \times q \div b$ . <i>For example, use a visual fraction model to show <math>(2/3) \times 4 = 8/3</math>, and create a story context for this equation. Do the same with <math>(2/3) \times (4/5) = 8/15</math>. (In general, <math>(a/b) \times (c/d) = ac/bd</math>.)</i>

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Lesson 3	Multiply a fraction by a fraction.	5.NF.B.4a	Fraction Squares	Interpret the product $(a/b) \times q$ as a parts of a partition of $q$ into $b$ equal parts; equivalently, as the result of a sequence of operations $a \times q \div b$ . For example, use a visual fraction model to show $(2/3) \times 4 = 8/3$ , and create a story context for this equation. Do the same with $(2/3) \times (4/5) = 8/15$ . (In general, $(a/b) \times (c/d) = ac/bd$ .)
Lesson 3	Multiply a fraction by a fraction.	5.NF.B.4b	Fraction Squares	Find the area of a rectangle with fractional side lengths by tiling it with unit squares of the appropriate unit fraction side lengths, and show that the area is the same as would be found by multiplying the side lengths. Multiply fractional side lengths to find areas of rectangles, and represent fraction products as rectangular areas.
Fractions ExplorAction 1 (Lab)	Investigate multiplication of a fraction by a fraction using area and linear models.	5.NF.B.4b	Color Tiles Fraction Towers Fraction SAFE-T Ruler	Find the area of a rectangle with fractional side lengths by tiling it with unit squares of the appropriate unit fraction side lengths, and show that the area is the same as would be found by multiplying the side lengths. Multiply fractional side lengths to find areas of rectangles, and represent fraction products as rectangular areas.
Fractions ExplorAction 1 (Lab)	Investigate multiplication of a fraction by a fraction using area and linear models.	5.NF.B.5a	Color Tiles Fraction Towers Fraction SAFE-T Ruler	Interpret multiplication as scaling (resizing), by: Comparing the size of a product to the size of one factor on the basis of the size of the other factor, without performing the indicated multiplication.
Fractions ExplorAction 1 (Lab)	Investigate multiplication of a fraction by a fraction using area and linear models.	5.NF.B.5b	Color Tiles Fraction Towers Fraction SAFE-T Ruler	Interpret multiplication as scaling (resizing), by: Explaining why multiplying a given number by a fraction greater than 1 results in a product greater than the given number (recognizing multiplication by whole numbers greater than 1 as a familiar case); explaining why multiplying a given number by a fraction less than 1 results in a product smaller than the given number; and relating the principle of fraction equivalence $a/b = (n \times a)/(n \times b)$ to the effect of multiplying $a/b$ by 1.
Lesson 4	Solve word problems involving multiplication of fractions and whole numbers.	5.NF.B.6	Fraction Circles Fraction Squares Fraction Towers Fraction Number Line (blank line)	Solve real world problems involving multiplication of fractions and mixed numbers, e.g., by using visual fraction models or equations to represent the problem.
Lesson 5	Divide a unit fraction by a whole number.	5.NF.B.7a	Fraction Towers	Interpret division of a unit fraction by a non-zero whole number, and compute such quotients. For example, create a story context for $(1/3) \div 4$ , and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that $(1/3) \div 4 = 1/12$ because $(1/12) \times 4 = 1/3$ .
Lesson 6	Divide a whole number by a unit fraction.	5.NF.B.7b	Fraction Towers	Interpret division of a whole number by a unit fraction, and compute such quotients. For example, create a story context for $4 \div (1/5)$ , and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that $4 \div (1/5) = 20$ because $20 \times (1/5) = 4$ .
Fractions ExplorAction 2 (Lab)	Use an area model to investigate division involving whole numbers and unit fractions.	5.NF.B.7a	Color Tiles Fraction SAFE-T Ruler	Interpret division of a unit fraction by a non-zero whole number, and compute such quotients. For example, create a story context for $(1/3) \div 4$ , and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that $(1/3) \div 4 = 1/12$ because $(1/12) \times 4 = 1/3$ .
Fractions ExplorAction 2 (Lab)	Use an area model to investigate division involving whole numbers and unit fractions.	5.NF.B.7b	Color Tiles Fraction SAFE-T Ruler	Interpret division of a whole number by a unit fraction, and compute such quotients. For example, create a story context for $4 \div (1/5)$ , and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that $4 \div (1/5) = 20$ because $20 \times (1/5) = 4$ .

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Lesson 7	Solve word problems involving division of unit fractions by whole numbers and division of whole numbers by unit fractions.	5.NF.B.7c	Fraction Towers Fraction Circles Fraction Squares	Solve real world problems involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions, e.g., by using visual fraction models and equations to represent the problem. <i>For example, how much chocolate will each person get if 3 people share 1/2 lb of chocolate equally? How many 1/3-cup servings are in 2 cups of raisins?</i>