OP F Use models to recognize that any fraction is a multiple of its unit fraction	
Grade	Curriculum Expectation
2	• regroup fractional parts into wholes, using concrete materials (e.g., combine nine fourths to form two wholes and one fourth);
4	• represent fractions using concrete materials, words, and standard fractional notation, and explain the meaning of the denominator as the number of the fractional parts of a whole or a set, and the numerator as the number of fractional parts being considered;
6	• represent, compare, and order fractional amounts with unlike denominators, including proper and improper fractions and mixed numbers, using a variety of tools and using standard fractional notation;
6	• determine and explain, through investigation using concrete materials, drawings, and calculators, the relationships among fractions, decimal numbers, and percents.
7	• divide whole numbers by simple fractions and by decimal numbers to hundredths, using concrete materials;
7	• use a variety of mental strategies to solve problems involving the addition and subtraction of fractions and decimals;
7	• add and subtract fractions with simple like and unlike denominators, using a variety of tools and algorithms;
7	• demonstrate, using concrete materials, the relationship between the repeated addition of fractions and the multiplication of that fraction by a whole number;
7	• determine, through investigation, the relationships among fractions, decimals, percents, and ratios;
8	• represent, compare, and order rational numbers;
8	• translate between equivalent forms of a number;
8	• use estimation when solving problems involving operations with whole numbers, decimals, percents, integers, and fractions, to help judge the reasonableness of a solution;
8	• represent the multiplication and division of fractions, using a variety of tools and strategies;
8	• solve problems involving addition, subtraction, multiplication, and division with simple fractions.
9D	• simplify numerical expressions involving integers and rational numbers, with and without the use of technology;
9D	• solve problems requiring the manipulation of expressions arising from applications of percent, ratio, rate, and proportion;
9P	• solve problems requiring the expression of percents, fractions, and decimals in their equivalent forms

OP G Recognize division is the inverse of multiplication and vise versa	
Grade	Curriculum Expectations
5	describe multiplicative relationships between quantities by using simple fractions and decimals (e.g., “If you have 4 plums and I have 6 plums, I can say that I have or 1.5 times as many plums as you have.”);
6	• determine and explain, through investigation using concrete materials, drawings, and calculators, the relationships among fractions, decimal numbers, and percents.
7	• divide whole numbers by simple fractions and by decimal numbers to hundredths, using concrete materials;
7	• determine, through investigation, the relationships among fractions, decimals, percents, and ratios;
8	• use estimation when solving problems involving operations with whole numbers, decimals, percents, integers, and fractions, to help judge the reasonableness of a solution;
8	• represent the multiplication and division of fractions, using a variety of tools and strategies;
8	• solve problems involving addition, subtraction, multiplication, and division with simple fractions.
9D	• simplify numerical expressions involving integers and rational numbers, with and without the use of technology;
9D	• solve problems requiring the manipulation of expressions arising from applications of percent, ratio, rate, and proportion;
9D	• determine, through investigation, various formulas for the slope of a line segment or to determine the slope of a line segment or a line;
9D	• identify, through investigation, properties of the slopes of lines and line segments (e.g., direction, positive or negative rate of change, steepness, parallelism, perpendicularity), using graphing technology to facilitate investigations, where appropriate
9P	• solve problems requiring the expression of percents, fractions, and decimals in their equivalent forms

OP H Use models to decompose fractions using unit fractions as a form of division	
Grade	Curriculum Expectations
1	• divide whole objects into parts and identify and describe, through investigation, equal-sized parts of the whole, using fractional names (e.g., halves; fourths or quarters).
3	• divide whole objects and sets of objects into equal parts, and identify the parts using fractional names (e.g., one half; three thirds; two fourths or two quarters), without using numbers in standard fractional notation.
6	• represent, compare, and order fractional amounts with unlike denominators, including proper and improper fractions and mixed numbers, using a variety of tools and using standard fractional notation;
6	• determine and explain, through investigation using concrete materials, drawings, and calculators, the relationships among fractions, decimal numbers, and percents.
7	• divide whole numbers by simple fractions and by decimal numbers to hundredths, using concrete materials;
7	• use a variety of mental strategies to solve problems involving the addition and subtraction of fractions and decimals;
7	• add and subtract fractions with simple like and unlike denominators, using a variety of tools and algorithms;
7	• determine, through investigation, the relationships among fractions, decimals, percents, and ratios;
8	• represent, compare, and order rational numbers;
8	• translate between equivalent forms of a number;
8	• use estimation when solving problems involving operations with whole numbers, decimals, percents, integers, and fractions, to help judge the reasonableness of a solution;
8	• represent the multiplication and division of fractions, using a variety of tools and strategies;
8	• solve problems involving addition, subtraction, multiplication, and division with simple fractions.

OP I Multiply any fraction by a whole number using models and symbols	
Grade	Curriculum Expectations
6	• represent, compare, and order fractional amounts with unlike denominators, including proper and improper fractions and mixed numbers, using a variety of tools and using standard fractional notation;
6	• determine and explain, through investigation using concrete materials, drawings, and calculators, the relationships among fractions, decimal numbers, and percents.
7	• use a variety of mental strategies to solve problems involving the addition and subtraction of fractions and decimals;
7	• add and subtract fractions with simple like and unlike denominators, using a variety of tools and algorithms;
7	• demonstrate, using concrete materials, the relationship between the repeated addition of fractions and the multiplication of that fraction by a whole number;
7	• determine, through investigation, the relationships among fractions, decimals, percents, and ratios;
8	• represent, compare, and order rational numbers;
8	• translate between equivalent forms of a number;
8	• use estimation when solving problems involving operations with whole numbers, decimals, percents, integers, and fractions, to help judge the reasonableness of a solution;
8	• represent the multiplication and division of fractions, using a variety of tools and strategies;
8	• solve problems involving addition, subtraction, multiplication, and division with simple fractions.
9D	• simplify numerical expressions involving integers and rational numbers, with and without the use of technology;
9D	• solve problems requiring the manipulation of expressions arising from applications of percent, ratio, rate, and proportion;
9D	• determine, through investigation, various formulas for the slope of a line segment or to determine the slope of a line segment or a line;
9P	• solve problems requiring the expression of percents, fractions, and decimals in their equivalent forms

OP J Divide a fraction by a like-denominator unit fraction using models and symbols	
Grade	Curriculum Expectations
6	• represent, compare, and order fractional amounts with unlike denominators, including proper and improper fractions and mixed numbers, using a variety of tools and using standard fractional notation;
7	• use a variety of mental strategies to solve problems involving the addition and subtraction of fractions and decimals;
7	• add and subtract fractions with simple like and unlike denominators, using a variety of tools and algorithms;
8	• represent, compare, and order rational numbers;
8	• translate between equivalent forms of a number;
8	• use estimation when solving problems involving operations with whole numbers, decimals, percents, integers, and fractions, to help judge the reasonableness of a solution;
8	• represent the multiplication and division of fractions, using a variety of tools and strategies;
8	• solve problems involving addition, subtraction, multiplication, and division with simple fractions.
9D	• simplify numerical expressions involving integers and rational numbers, with and without the use of technology;
9D	• solve problems requiring the manipulation of expressions arising from applications of percent, ratio, rate, and proportion;
9D	• determine, through investigation, various formulas for the slope of a line segment or to determine the slope of a line segment or a line;
9P	• solve problems requiring the expression of percents, fractions, and decimals in their equivalent forms

OP K Divide a fraction by a like-denominator fraction, with a whole number result	
Grade	Curriculum Expectations
7	• use a variety of mental strategies to solve problems involving the addition and subtraction of fractions and decimals;
7	• add and subtract fractions with simple like and unlike denominators, using a variety of tools and algorithms;
8	• use estimation when solving problems involving operations with whole numbers, decimals, percents, integers, and fractions, to help judge the reasonableness of a solution;
8	• represent the multiplication and division of fractions, using a variety of tools and strategies;
8	• solve problems involving addition, subtraction, multiplication, and division with simple fractions.
9D	• simplify numerical expressions involving integers and rational numbers, with and without the use of technology;
9D	• solve problems requiring the manipulation of expressions arising from applications of percent, ratio, rate, and proportion;
9D	• determine, through investigation, various formulas for the slope of a line segment or to determine the slope of a line segment or a line;
9P	• solve problems requiring the expression of percents, fractions, and decimals in their equivalent forms

OP L Multiply fractions where the numerator of one fraction is the denominator of the other using models	
Grade	Curriculum Expectations
8	• use estimation when solving problems involving operations with whole numbers, decimals, percents, integers, and fractions, to help judge the reasonableness of a solution;
8	• represent the multiplication and division of fractions, using a variety of tools and strategies;
8	• solve problems involving addition, subtraction, multiplication, and division with simple fractions.
9D	• simplify numerical expressions involving integers and rational numbers, with and without the use of technology;
9D	• solve problems requiring the manipulation of expressions arising from applications of percent, ratio, rate, and proportion;
9D	• determine, through investigation, various formulas for the slope of a line segment or to determine the slope of a line segment or a line;
9P	• solve problems requiring the expression of percents, fractions, and decimals in their equivalent forms

OP M Divide a fraction by a smaller friendly denominator fraction with a whole number result	
Grade	Curriculum Expectations
8	• represent, compare, and order rational numbers;
8	• use estimation when solving problems involving operations with whole numbers, decimals, percents, integers, and fractions, to help judge the reasonableness of a solution;
8	• represent the multiplication and division of fractions, using a variety of tools and strategies;
8	• solve problems involving addition, subtraction, multiplication, and division with simple fractions.
9D	• simplify numerical expressions involving integers and rational numbers, with and without the use of technology;
9D	• solve problems requiring the manipulation of expressions arising from applications of percent, ratio, rate, and proportion;
9D	• determine, through investigation, various formulas for the slope of a line segment or to determine the slope of a line segment or a line;
9P	• solve problems requiring the expression of percents, fractions, and decimals in their equivalent forms

OP N Multiply fractions using models and symbols	
Grade	Curriculum Expectations
8	• use estimation when solving problems involving operations with whole numbers, decimals, percents, integers, and fractions, to help judge the reasonableness of a solution;
8	• represent the multiplication and division of fractions, using a variety of tools and strategies;
8	• solve problems involving addition, subtraction, multiplication, and division with simple fractions.
9D	• simplify numerical expressions involving integers and rational numbers, with and without the use of technology;
9D	• solve problems requiring the manipulation of expressions arising from applications of percent, ratio, rate, and proportion;
9D	• determine, through investigation, various formulas for the slope of a line segment or to determine the slope of a line segment or a line;
9P	• solve problems requiring the expression of percents, fractions, and decimals in their equivalent forms

OP O Divide a fraction by a like denominator fraction a non-whole number result	
Grade	Curriculum Expectations
8	• use estimation when solving problems involving operations with whole numbers, decimals, percents, integers, and fractions, to help judge the reasonableness of a solution;
8	• represent the multiplication and division of fractions, using a variety of tools and strategies;
8	• solve problems involving addition, subtraction, multiplication, and division with simple fractions.
9D	• simplify numerical expressions involving integers and rational numbers, with and without the use of technology;
9D	• solve problems requiring the manipulation of expressions arising from applications of percent, ratio, rate, and proportion;
9D	• determine, through investigation, various formulas for the slope of a line segment or to determine the slope of a line segment or a line;
9P	• solve problems requiring the expression of percents, fractions, and decimals in their equivalent forms

OP P Divide fractions with unlike-denominators with a visually recognizable result using models	
Grade	Curriculum Expectations
8	• use estimation when solving problems involving operations with whole numbers, decimals, percents, integers, and fractions, to help judge the reasonableness of a solution;
8	• represent the multiplication and division of fractions, using a variety of tools and strategies;
8	• solve problems involving addition, subtraction, multiplication, and division with simple fractions.
9D	• simplify numerical expressions involving integers and rational numbers, with and without the use of technology;
9D	• solve problems requiring the manipulation of expressions arising from applications of percent, ratio, rate, and proportion;
9D	• determine, through investigation, various formulas for the slope of a line segment or to determine the slope of a line segment or a line;
9P	• solve problems requiring the expression of percents, fractions, and decimals in their equivalent forms

OP Q Divide fractions using models and symbols	
Grade	Curriculum Expectations
8	• use estimation when solving problems involving operations with whole numbers, decimals, percents, integers, and fractions, to help judge the reasonableness of a solution;
8	• represent the multiplication and division of fractions, using a variety of tools and strategies;
8	• solve problems involving addition, subtraction, multiplication, and division with simple fractions.
9D	• simplify numerical expressions involving integers and rational numbers, with and without the use of technology;
9D	• solve problems requiring the manipulation of expressions arising from applications of percent, ratio, rate, and proportion;
9D	• determine, through investigation, various formulas for the slope of a line segment or to determine the slope of a line segment or a line;
9P	• solve problems requiring the expression of percents, fractions, and decimals in their equivalent forms