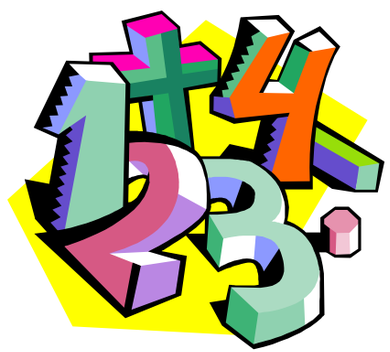
Pittsburg Unified School District

Fourth Grade

Teaching Guide for Mathematics
Core Curriculum: California Mathematics – Concepts, Skills, and Problem Solving



2014-2015

- Newly introduced standards are in **bold print**
- Standards with ~~strikethroughs~~ are not taught yet
- California Common Core Standards Booklet

California Mathematics Framework - Content and Practice Standards - Grades K-5

	Standards for Mathematical Practices							
	See Survival Kit for Explanation and Examples of Math Practices and Questions to Develop Mathematical Thinking							
Kinder **First** **Second** **Third** **Fourth** **Fifth**	**MP1: Make sense of problems and persevere in solving them.** • Find meaning in problems • Analyze, conjecture and plan solution pathways • Verify answers • Ask themselves the question: "Does this make sense?"	**MP2: Reason abstractly and quantitatively** • Make sense of quantities and their relationships in problems • Create coherent representations of problems	**MP3: Construct viable arguments and critique the reasoning of others.** • Understand and use information to construct arguments • Make and explore the truth of conjectures • Justify conclusions and respond to arguments of others.	**MP4: Model with mathematics.** • Apply mathematics to problems in everyday life • Identify quantities in a practical situation • Interpret results in the context of the situation and reflect on whether the results make sense Modeling IS NOT: • "I do," "now you do" • Using manipulatives (that is MP5) • A graph, equation, or function, you can use, but modeling is a process See Mathematics Framework: Appendix D Mathematical Modeling	**MP5: Use appropriate tools strategically** • Consider the available tools when solving problems • Are familiar with tools appropriate for grade or course (pencil and paper, concrete models, ruler, protractor, calculator, spreadsheet, computer programs, digital content located on a website, and other technological tools)	**MP6: Attend to precision** • Communicate precisely to others • Use clear definitions, state the meaning of symbols and are careful about specifying units of measure and labeling axes • Calculate accurately and efficiently	**MP7: Look for and make use of structure** • Discern patterns and structures • Can step back for an overview and shift perspective • See complicated things as single objects or as being composed of several objects	**MP8: Look for and express regularity in repeated reasoning** • Notice if calculations are repeated and look both for general methods and shortcuts • In solving problems, maintain oversight of the process while attending to detail • Evaluate the reasonableness of their immediate results • Understand application of patterns and see the structure in similar situations.

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California Mathematics Framework - Content and Practice Standards - Grades K-5

Mathematical Content Standards

[m] = major cluster; [s] = supporting cluster**;** [a] = additional cluster (See Mathematics Framework for explanations – page 3)

	Counting and Cardinality (CC)			Operations and Algebraic Thinking (OA)					
Kinder	**Know number names and the count sequence. [m]**	**Count to tell the number of objects. [m]**	**Compare numbers. [m]**			**Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from. [m]**			
First				**Represent and solve problems involving addition and subtraction. [m]**	**Understand and apply properties of operations and the relationship between addition and subtraction. [m]**	**Add and subtract within 20. [m]**	**Work with addition and subtraction equations. [m]**		
Second				**Represent and solve problems involving addition and subtraction. [m]**		**Add and subtract within 20. [m]**	Work with equal groups of objects to gain foundations for multiplication. [s]		
Third				**Represent and solve problems involving multiplication and division. [m]**	**Understand properties of multiplication and the relationship between multiplication and division. [m]**		**Multiply and divide within 100. [m]**	**Solve problems involving the four operations, and identify and explain patterns in arithmetic. [m]**	
Fourth							Gain familiarity with factors and multiples. [s]	**Use the four operations with whole numbers to solve problems. [m]** Generate and analyze patterns. [s]	
Fifth								Analyze patterns and relationships. [a]	Write and Interpret numerical expressions. [a]

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California Mathematics Framework - Content and Practice Standards - Grades K-5

	Mathematical Content Domains **[m] = major cluster;** [s] = supporting cluster**;** [a] = additional cluster							
	Number and Operations in Base Ten (NBT)				Number and Operations – Fractions (NF)			
Kinder		**Work with numbers 11-19 to gain foundations for place value. [m]**						
First	**Extend the counting sequence. [m]**	**Understand place value. [m]**	**Use place value understanding and properties of operations to add and subtract. [m]**					
Second		**Understand place value. [m]**	**Use place value understanding and properties of operations to add and subtract. [m]**					
Third			Use place value understanding and properties of operations to perform multi-digit arithmetic. [a]		**Develop understanding of fractions as numbers. [m]**			
Fourth		**Generalize place value understanding for multi-digit whole numbers. [m]**	**Use place value understanding and properties of operations to perform multi-digit arithmetic. [m]**		**Extend understanding of fraction equivalence and ordering. [m]**	**Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers. [m]**	**Understand decimal notation for fractions, and compare decimal fractions. [m]**	
Fifth		**Understand the place value system. [m]**		**Perform operations with multi-digit whole numbers and with decimals to hundredths. [m]**		**Use equivalent fractions as a strategy to add and subtract fractions. [m]**		**Apply and extend previous understandings of multiplication and division to multiply and divide fractions. [m]**

California Mathematics Framework - Content Standards - Grades K-5

Mathematical Content Domains

[m] = major cluster; [s] = supporting cluster**;** [a] = additional cluster

	Measurement and Data (MD)						Geometry		
Kinder	Describe and compare measurement attributes [a]	Classify objects and count the number of objects in each category [s]					Identify and describe shapes (squares, circles, triangles, rectangles, hexagons, cubes, cones, cylinders, and spheres) [a]	Analyze, compare, create, and compose shapes. [a]	
First	**Measure lengths indirectly and by iterating length units. [m]**		Tell and write time. [a]			Represent and interpret data. [s]		Reason with shapes and their attributes. [a]	
Second	**Measure and estimate lengths in standard units. [m]**		Work with time and money. [s]	**Relate addition and subtraction to length. [m]**		Represent and interpret data. [s]		Reason with shapes and their attributes. [a]	
Third	**Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects. [m]**				**Geometric measurement: understand concepts of area and relate area to multiplication and to addition. [m]** Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures. [a]	Represent and interpret data. [s]		Reason with shapes and their attributes. [s]	
Fourth	Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit. [s]				Geometric measurement: understand concepts of angle and measure angles. [a]	Represent and interpret data. [s]		Draw and identify lines and angles, and classify shapes by properties of their lines and angles. [a]	
Fifth	Convert like measurement units within a given measurement system. [s]				**Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition. [m]**	Represent and interpret data. [s]		Classify two-dimensional figures into categories based on their properties. [a]	Graph points on the coordinate plane to solve real-world and mathematical problems. [a]

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GRADE 4 - Standards - Assessment Map

		Old CA Standard	Benchmark Exam		
Operations and Algebraic Thinking (4.OA)		4.NS.1.0, 4.NS.4.0	**1**	**2**	**3**
Use the four operations with whole numbers to solve problems. [m]	1. Interpret a multiplication equation as a comparison, e.g., interpret 35 = 5 × 7 as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations.	New		X	X
	2. Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison.	4.AF.1.0		X	X
	3. Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.	4.NS.1.4, 4.AF.1.1	X	X	X
Gain familiarity with factors and multiples. [s]	4. Find all factor pairs for a whole number in the range 1–100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1–100 is a multiple of a given one-digit number. Determine whether a given whole number in the range 1–100 is prime or composite.	4.NS.4.1, 4.NS.4.2	X	X	X
Generate and analyze patterns. [s]	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.*	Partial: 7.AF.1.1	X	X	X
Number and Operations in Base Ten – numbers ≤ 1,000,000 (4.NBT)		4.NS.1.0, 4.NS.3.0			
Generalize place value understanding for multi-digit whole numbers. [m]	1. Recognize that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right. *For example, recognize that 700 ÷ 70 = 10 by applying concepts of place value and division.*	New	X	X	X
	2. Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form. Compare two multi-digit numbers based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.	4.NS.1.1, 4.NS.1.2	X	X	X
	3. Use place value understanding to round multi-digit whole numbers to any place.	4.NS.1.3	X	X	X
Use place value understanding and properties of operations to perform multi-digit arithmetic. [m]	4. Fluently add and subtract multi-digit whole numbers using the standard algorithm.	4.NS.3.1	X	X	X
	5. Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.	4.NS.3.2, 4.NS.3.3	X	X	X
	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.	4.NS.3.2, 4.NS.3.4	X	X	X

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Number and Operations – Fractions (with denominators 2, 3, 4, 5, 6, 10, 12, and 100) (4.NF)		4.NS.1.0			
Extend understanding of fraction equivalence and ordering. [m]	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.	Partial: 5.NS.1.2		X	X
	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.	Partial: 5.NS.2.3		X	X
Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers. [m]	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.	3: New 3a: New 3b: New 3c: 5.NS.2.3 3d: 5.NS.2.3		X	X
	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).* 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?*	4: 5.NS.2.4 4a: New 4b: New 4c: 5.NS.2.5		X	X
Understand decimal notation for fractions, and compare decimal fractions. [m]	5. Express a fraction with denominator 10 as an equivalent fraction with denominator 100, and use this technique to add two fractions with respective denominators 10 and 100.4 *For example, express 3/10 as 30/100, and add 3/10 + 4/100 = 34/100*	4.NS.1.7		X	X
	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.*	4.NS.1.6		X	X
	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 **the number line or another** visual model. **CA**	4.NS.1.2, 4.NS.1.7, 4.NS.1.9		X	X

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Measurement and Data (4.MD)		4.MG.1.0			
Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit. [a]	1. Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb, oz.; l, ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measure-ment equivalents in a two-column table. *For example, know that 1 ft is 12 times as long as 1 in. Express the length of a 4 ft snake as 48 in. Generate a conversion table for feet and inches listing the number pairs (1, 12), (2, 24), (3, 36), . . .*	Partial: 6.MG.2.1, 7.MG.1.1			X
	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.	5.MG.1.4			X
	3. Apply the area and perimeter formulas for rectangles in real-world and mathematical problems. *For example, find the width of a rectangular room given the area of the flooring and the length, by viewing the area formula as a multiplication equation with an unknown factor.*	4.AF.1.4, 4.MG.1.1, 4.MG.1.2, 4.MG.1.3, 4.MG.1.4	X	X	X
Represent and interpret data. [s]	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.SDAP.1.0, 4.SDAP.1.3			X
Geometric measurement: understand concepts of angle and measure angles. [a]	5. Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement: a. An angle is measured with reference to a circle with its center at the common endpoint of the rays, by considering the fraction of the circular arc between the points where the two rays intersect the circle. An angle that turns through 1/360 of a circle is called a "one-degree angle," and can be used to measure angles. b. An angle that turns through *n* one-degree angles is said to have an angle measure of *n* degrees.	4.MG.3.5 5b: New			X
	6 Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure.	5.MG.2.1			X
	7. Recognize angle measure as additive. When an angle is decomposed into non-overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts. Solve addition and subtraction problems to find unknown angles on a diagram in real-world and mathematical problems, e.g., by using an equation with a symbol for the unknown angle measure.	New			X
Geometry (4.G)		4.MG.1.0			
Draw and identify lines and angles, and classify shapes by properties of their lines and angles. [a]	1. Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.	4.MG.3.1			X
	2. Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of a specified size. Recognize right triangles as a category, and identify right triangles. **(Two-dimensional shapes should include special triangles, e.g., equilateral, isosceles, scalene, and special quadrilaterals, e.g., rhombus, square, rectangle, parallelogram, trapezoid.) CA**	4.MG.3.1, 4.MG.3.5, 4.MG.3.7, 4.MG.3.8			X
	3. Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded along the line into matching parts. Identify line-symmetric figures and draw lines of symmetry.	4.MG.3.4			X

Pacing Summary – Grade 4			
Weeks	**Dates**	**# of Days**	**Units of Instruction**
1-3	8/20 – 9/3	10	Start Smart: Expectations and explore with manipulatives Place Value and Number Sense
3-5	9/4 – 9/19	12	Unit 1: Applying place value concepts in whole number addition and subtraction *Imbed for remainder of the year: Problem solving with whole numbers
6-7	9/22 – 10/3	10	Unit 2: Exploring multiples and factors
8-11	10/6 – 10/31	17	Unit 3: Using multiplication and division strategies with larger numbers ***Benchmark 1: Units 1-3 Assessment window 10/20 -10/31***
12	11/03 – 11/07	5	Unit 4: Multiplicative comparison
13-14	11/10 – 11/21	9	Unit 5: Decomposing and composing fractions for addition and subtraction
15-17	12/1 – 12/19	15	Unit 6: Understand fraction equivalence and comparison
18-19	1/05 – 1/16	10	Unit 7: Solving Addition and Subtraction Word Problems involving Fractions and Mixed Numbers
20-22	1/19 – 2/04	11	Unit 8: Multiplying Fractions by Whole Numbers
23-25	2/05 – 2/24	12	Unit 9: Comparing Decimal Fractions and Understanding Notation ***Benchmark 2: Units 1-9 Assessment window 2/17 - 2/27***
26-30	3/02 – 4/01	23	Unit 10: Measurement conversion and solving measurement problems using the four operations
31-33	4/13 - 4/28	12	Unit 11: Angle Measurement
33-35	4/29 – 5/15	13	Unit 12: Recognizing and Analyzing Attributes of 2-dimensional Shapes
36-38	5/18 - 6/05	14	Unit 13: Solving Problems with Whole Numbers* ***Benchmark 3: Units 1-15 Assessment window 5/18 - 5/29***
*This is a culminating unit and students have been working on solving problems with whole numbers since unit 1. All students have been taught these standards, but are now working on showing fluency. Therefore, they will be prepared to show proficiency of the standards on Benchmark 3. However, continue to work on problems for fluency until the end of the year.			
Resources for Pacing Guide: Dana Center – University of Austin, Texas, Ca DOE Mathematics Framework, and Ca DOE CCSS Mathematics Standards Booklet			

Start Smart: Expectations and Exploration with Manipulatives: Place Value and Number Sense						
Wks 1-3	Operations and Algebraic Thinking	Number and Operations in Base 10	Numbers and Operations - Fractions	Measurement and Data	Geometry	Mathematical Practices
August 20 – September 3 (10 days)		**NBT.1[m] Recognize that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right. *For example, recognize that 700 ÷ 70 = 10 by applying concepts of place value and division.*** **NBT.2[m] Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form. Compare two multi-digit numbers based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.** **NBT.3[m] Use place value understanding to round multi-digit whole numbers to any place.**				MP2 Reason abstractly and quantitatively. MP3 Construct viable arguments and critique reasoning of others. MP5 Use appropriate tools strategically. MP6 Attend to precision. MP7 Look for and make use of structure. MP8 Look for and express repeated reasoning.

During Start Smart, students will continue to develop their understanding of place value. In Grade 3, they learned about place value to 1,000. In Grade 4, students will extend to numbers less than or equal to 1,000,000.

Note: This is also a time for students to work with manipulatives regularly to build the rules and procedures of using them as a mathematics tool (MP5).

Below are suggested Lesson Resources. Refer to the Survival Kit for additional ideas and resources. Lessons can be taught separately, combined, or out of sequence to meet the needs of your students.

Students will continue from Grade 3 to develop the meaning of written quantities (**MP2**) and explore number patterns and structures in the number system **(MP7**). With reading and writing numbers, students will begin to notice repetitive actions , such as the role of the comma, and understand the quantity of the number, by saying it and writing it precisely (**MP2, MP3, MP6, MP8**).

Vocabulary	Lesson Resources		Manipulatives
Place Value: Ones through One Million Digit Period Estimate Round Standard form Word form Expanded form number line Is greater than (>) is less than (<) Is equal to (=) Unit Whole Period Value Product Quotient (Commutative, Associative, Identity, Zero) Property of x Distributive Property	**Chapter 1: Place Value and Number Sense** CCSS1 Place Value (Use instead of 1-1) Pg. 1-6 Explore 1-2 Math Activity: How Big is One Million? 1-2 Place Value Through Millions 1-4 Compare Whole Numbers 1-5 Order Whole Numbers 1-6 Round Whole Numbers **Use Problem Solving Sections as Problem of the Day, 1-2 daily HW word problem, Board Math, etc.** 1-3 PS Strategy: The Four-Step Plan 1-7 PS Strategy: Choose a Strategy 5-4 PS Skill: Choose an Operation 5-7 PS Investigation: Choose a Strategy (**Note -** It is ok if you do not complete all sections or problems in this unit. Imbed problems like these for the remainder of the year and they can also be used in Unit 14.)	**Chapter 5: Multiplication and Division Facts** Explore 5-1 Meaning of Multiplication and Division 5-1 Relate Multiplication and Division 5-2 Algebra: Multiplication and Division Properties 5-3 Multiply and Divide Facts through 5 5-5 Multiply and Divide Facts through 10 5-6 Multiply and Divide 11 and 12 **Note:** Chapter 5 is mostly basic facts from Grade 3. End Smart Start with these sections and it will continue in future units. Also, in this chapter, students will be using standards 4.NBT.5 and 4.OA.1, but the concepts are Grade 3 review and do not fully represent the Grade 4 standards. Therefore, the standards are not represented in the chart above, but will be in the unit when the concept is address more.	Place Value Charts Base 10 Blocks Place Value Cards Two-sided Counters
Number Talks	Make a 10 with 2-4 single digit addends Making Landmark Numbers (1 number away from a landmark/friendly number) Multiply Three Numbers (5-8)		
Key Dates	8/20 – First 9/1 – Labor Day		

Unit 1 – Applying Place Value Concepts in Whole Number Addition and Subtraction

Wks 3-5	Operations and Algebraic Thinking	Number and Operations in Base 10	Numbers and Operations - Fractions	Measurement and Data	Geometry	Mathematical Practices
September 5 - 19 (12 days)	**OA.3[m] Solve multistep word problems posed with whole numbers and having whole-number answers ~~using the four operations~~, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.**	NBT.1[m] Recognize that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right. *For example, recognize that 700 ÷ 70 = 10 by applying concepts of place value and division.* NBT.2[m] Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form. Compare two multi-digit numbers based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons. NBT.3[m] Use place value understanding to round multi-digit whole numbers to any place. **NBT.4[m] ~~Fluently~~ add and subtract multi-digit whole numbers using the standard algorithm.**				MP1 Make sense of problems and persevere in solving them. MP2 Reason abstractly and quantitatively. MP4 Model with mathematics. MP5 Use appropriate tools strategically. MP6 Attend to precision. MP8 Look for and express regularity in repeated reasoning.

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In this unit, students will develop and practice efficient addition and subtraction of multi-digit whole numbers while developing place value concepts.

NOTE: Students in Grade 4 will be expected to add and subtract using the standard algorithm. In previous grades, students will not be required to use the standard algorithm. Instead they will have added or subtracted using place value understanding and modified algorithms.

Below are suggested Lesson Resources. Refer to the Survival Kit for additional ideas and resources. Lessons can be taught separately, combined, or out of sequence to meet the needs of your students.

Students use the structure of the base-ten system to generalize their strategies and to discuss reasonableness of their computations and work toward fluency (**MP6, MP8**). Students will model with mathematics when solving word problems (**MP4**). When solving word problems, students will make sense of them and reason about how they connect to addition and subtraction (**MP1, MP2**) and they may use manipulatives to solve them (**MP5**).

Vocabulary	Lesson Resources		Manipulatives
Trade, Regroup, Exchange, Add, Sum, Addend, Subtract, Difference, Minuend, Subtrahend, Exact, Operation, Equation, Expression	**Chapter 2: Addition and Subtraction** 2-1 Algebra: Addition Properties and Subtraction Rules 2-2 Estimate Sums and Differences 2-4 Add Multi-Digit Numbers Explore 2-5 Math Activity for 2-5: Subtract Numbers 2-5 Subtract Multi-digit Numbers 2-7 Subtract Across Zeros **Problem Solving Sections:** 2-3 PS Skill: Estimate or Exact Answer 2-6 PS Investigation: Choose a Strategy CCSS2 Solve Multi-step Word Problems (+ and -) Pg 7-12 (**Note -** It is ok if you do not complete all PS sections or problems in this unit. Imbed problems like these for the remainder of the year and they can also be used in Unit 14.)	**Chapter 3: Algebra: Use Addition and Subtraction** 3-1 Addition and Subtraction Expressions Explore 3-2 Algebra Activity for 3-2: Addition and Subtraction Equations 3-2 Solve Equations Mentally (**Note –** The concepts in these Ch 3 sections are now a CCSS Grade 3 standard. Teach for this year, Grade 4 students will not have had this in Grade 3. Additionally, teach to get ready for unit 2.)	Base-ten blocks Two-color counters Place value charts
Number Talks	Adding Doubles and Near Doubles: 2 to 3-digit numbers Adding by Breaking Each Number into Its Place Value (No regrouping): 2 to 3-digit numbers Multiply single digit by two digit		
Key Dates			

Unit 2 – Exploring multiples and factors

Wks 6-7	Operations and Algebraic Thinking	Number and Operations in Base 10	Numbers and Operations - Fractions	Measurement and Data	Geometry	Mathematical Practices
September 22 – October 3 (10 days)	OA.3[m] Solve multistep word problems posed with whole numbers and having whole-number answers **using the four operations**, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding. **OA.4 Find all factor pairs for a whole number in the range 1–100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1–100 is a multiple of a given one-digit number. Determine whether a given whole number in the range 1–100 is prime or composite.** **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.***	NBT.1[m] Recognize that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right. *For example, recognize that 700 ÷ 70 = 10 by applying concepts of place value and division.* NBT.2[m] Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form. Compare two multi-digit numbers based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons. NBT.3[m] Use place value understanding to round multi-digit whole numbers to any place. NBT.4[m] ~~Fluently~~ add and subtract multi-digit whole numbers using the standard algorithm.				MP3 Construct viable arguments and critique the reasoning of others. MP7 Look for and make use of structure.

- Newly introduced standards are in **bold print**
- Standards with ~~strikethroughs~~ are not taught yet
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In this unit, students will develop understanding of multiples and factors, applying their understanding of multiplication from Grade 3. This understanding lays a strong foundation for generalizing strategies learned from previous grades to develop, discuss, and use efficient, accurate, and generalize computational strategies involving multi-digit numbers. These concepts and the terms "prime" and "composite" are new to Grade 4, so they are introduced early in the year to give students ample time to develop and apply this understanding.

NOTE: Students use manipulatives to determine whether a number is prime or composite. This may be done by using arrays. Although there are shape patterns in arrays, the focus of this unit is number patterns. Shape patterns for OA.5 will be addressed in unit 13.

Below are suggested Lesson Resources. Refer to the Survival Kit for additional ideas and resources. Lessons can be taught separately, combined, or out of sequence to meet the needs of your students.

The focus of this unit is not necessarily to become fluent in finding all the factor pairs, but to use students' understanding of the concept and language to discuss the structures of multiples and factors (**MP3, MP7**).

Vocabulary	**Lesson Resources**			**Manipulatives**
Factors, Multiples, Rule, Equation, Prime, Composite, Operations	**Chapter 3: Algebra – Use Addition and Subtraction** 3-4 Algebra: Find a Rule **Chapter5: Multiplication and Division Facts** 5-9 Factors and Multiples 5-10 Prime and Composite Numbers	**Chapter6: Algebra – Use Multiplication and Division** 6-3 Order of Operations Explore 6-4 Multiplication and Division Equations 6-4 Solve Equations Mentally 6-6 Algebra: Find a Rule	**Problem Solving Sections:** 3-3 PS Skill: Missing and Extra Information 3-5 PS Strategy: Choose a Strategy 6-2 PS Strategy: Work Backwards 6-5 PS Investigation: Choose a Strategy (**Note -** It is ok if you do not complete all PS sections or problems in this unit. Imbed problems like these for the remainder of the year and they can also be used in Unit 14.)	Unit Cubes Two-sided counters
Number Talks	Adding Up in Chunks: 2 to 3-digit numbers Ex: 36 + 24 can be chunked as 36 + 20 = 56. Then 56 + 4 = 60.			
Key Dates				

Unit 3 – Using multiplication and division strategies with larger numbers

Wks 8-11	Operations and Algebraic Thinking	Number and Operations in Base 10	Numbers and Operations - Fractions	Measurement and Data	Geometry	Mathematical Practices
October 6 - 31 (17 days)	OA.3[m] Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding. OA.4 Find all factor pairs for a whole number in the range 1–100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1–100 is a multiple of a given one-digit number. Determine whether a given whole number in the range 1–100 is prime or composite. 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.*	NBT.1[m] Recognize that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right. *For example, recognize that 700 ÷ 70 = 10 by applying concepts of place value and division.* NBT.2[m] Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form. Compare two multi-digit numbers based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons. NBT.3[m] Use place value understanding to round multi-digit whole numbers to any place. NBT.4[m] ~~Fluently~~ add and subtract multi-digit whole numbers using the standard algorithm. **NBT.5[m] Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.** **NBT.6[m] 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.**		**MD.3 Apply the area and perimeter formulas for rectangles in real-world and mathematical problems. *For example, find the width of a rectangular room given the area of the flooring and the length, by viewing the area formula as a multiplication equation with an unknown factor.***		MP1 Make sense of problems and persevere in solving them. MP2 Reason abstractly and quantitatively. MP4 Model with mathematics. MP5 Use appropriate math tools strategically. MP6 Attend to precision. MP7 Look for and make use of structure. MP8 Look for and express regularity in repeated reasoning.

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In this unit, students continue using computational and problem-solving strategies, with a focus on building conceptual understanding of multiplication of larger numbers and division with remainders. Area and perimeter of rectangles provide one context for developing such understanding.

NOTE: This is the first time students are expected to interpret remainders. MD.3 provides the context of area and perimeter of rectangles to use for problem solving, which connects to multiplying one-digit by two-digit and two-digit by two-digit using the area model. This is the first time students will be introduced to formulas and make sense of them by using their prior knowledge of area and perimeter from previous grades. Students DO NOT have to multiply or divide using the standard algorithm.

Below are suggested Lesson Resources. Refer to the Survival Kit for additional ideas and resources. Lessons can be taught separately, combined, or out of sequence to meet the needs of your students.

Students make sense of multi-step problems (**MP1**) and reason about how the formulas connect to the context (**MP2**). The use of generalized strategies and formulas provides an opportunity to investigate and use regularity in repeated reasoning (**MP8**). With the use of base-ten blocks or drawings (**MP5**), students abstract the problem and see it being broken down (**MP2**). Students attend to precision when calculating and drawing diagrams accurately (**MP7**). When using the area model for multiplication, students can illustrate the distributive property (**MP7**), which also connects 4.NBT.5 and 4.MD.3. Students solving problems using area and perimeter (**MP4**).

Vocabulary		Lesson Resources			Manipulatives
Multiply	Area	**Chapter 7: Multiply by One-Digit Numbers**	**Chapter 9: Divide by One-Digit Numbers**	**Chapter 11: Geometry and Measurement**	Base-ten blocks
Factors	Perimeter	7-1 Multiples of 10, 100, and 1,000	Explore 9-1: Model Division	11-3 Measurement: Perimeter	Graph paper
Product	Length	7-4 Multiply Two-Digit Numbers	9-1 Division with remainders	11-5 Measurement: Area	Cm paper
Array	Width	7-6 Multiply Multi-Digit Numbers	CCSS6 Interpret Remainders Pg. 31-36	Extend 11-5 Area and Perimeter	Inch paper
Expanded notation	Square feet	7-7 Multiply Across Zeros	9-2 Divide Multiples of 10, 100, 1000	11-7 Measurement: Area of Complex Figures (moved to Grade 3, so teach just this year).	
Divide	Linear feet		9-4 Estimate Quotients		
Divisor	Formulas	**Chapter 8: Multiply by Two-Digit Numbers**	9-5 Two-Digit Quotients		
Dividend	Units	8-1 Multiply by Tens	9-7 Three-Digit Quotients		
Quotient		8-2 Estimate Products	9-8 Quotients with Zeros		
Remainder		Explore 8-4: Multiply Two-Digit Numbers	9-9 Divide Greater Numbers **(**up to 4 digit dividends only)		
Reasonable		8-4 Multiply Two-Digit Numbers			
Estimate			**Problem Solving Sections:**	**Problem Solving Sections:**	
		Problem Solving Sections:	9-3 PS Strategy: Guess and Check	11-4 PS Strategy: Solve a Simpler Problem	
		7-2 PS Skills: Reasonable Answers	9-6 PS Investigation: Choose a Strategy	11-6 PS Investigation: Choose a Strategy	
		7-5 PS Investigation: Choose a Strategy	CCSS7 Solve Multistep Word Problems (÷)	(**Note -** It is ok if you do not complete all PS sections or problems in this unit. Imbed problems like these for the remainder of the year and they can also be used in Unit 14.)	
		8-3 PS Strategy: Act It Out			
		8-6 PS Strategy: Choose a Strategy			
		CCSS5 Solve Multi-Step Word Problems (x); Pg 25-30			
Number Talks		Find My Rule Equations: True or False			
Key Dates		10/13: Staff Development Day		**END OF TRIMESTER INSTRUCTION** Benchmark 1: Units 1-3 Assessment window 10/20 – 31	

Unit 4 – Multiplicative comparison

Wks 12	Operations and Algebraic Thinking	Number and Operations in Base 10	Numbers and Operations - Fractions	Measurement and Data	Geometry	Mathematical Practices
November 3 - 7 (17 days)	**OA.1[m] Interpret a multiplication as a comparison, e.g., interpret 35 = 5 x 7 as a statement that 35 is 5 times as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations.** **OA.2[m] Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison.** OA.3[m] Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding. OA.4 Find all factor pairs for a whole number in the range 1–100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1–100 is a multiple of a given one-digit number. Determine whether a given whole number in the range 1–100 is prime or composite.	NBT.1[m] Recognize that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right. *For example, recognize that 700 ÷ 70 = 10 by applying concepts of place value and division.* NBT.2[m] Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form. Compare two multi-digit numbers based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons. NBT.3[m] Use place value understanding to round multi-digit whole numbers to any place. NBT.4[m] ~~Fluently~~ add and subtract multi-digit whole numbers using the standard algorithm. NBT.5[m] Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.		MD.3 Apply the area and perimeter formulas for rectangles in real-world and mathematical problems. *For example, find the width of a rectangular room given the area of the flooring and the length, by viewing the area formula as a multiplication equation with an unknown factor.*		MP2 Reason abstractly and quantitatively. MP4 Model with mathematics. MP5 Use appropriate math tools strategically. MP7 Look for and make use of structure.

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	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.*	NBT.6[m] 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.				

In this unit, students will focus on multiplication as comparison and solve problems using their understanding.

NOTE: This will get students ready for Units 6, 8 and 10, where students will use their understanding of multiplicative comparison to compare fractions, multiply a fraction by a whole number, and convert measurements. Use visuals to show comparison.

Below are suggested Lesson Resources. Refer to the Survival Kit for additional ideas and resources. Lessons can be taught separately, combined, or out of sequence to meet the needs of your students.

Students will reason about what it means to be "times as many as" by using manipulatives or drawings (**MP2, MP5**). Students look for patterns when comparing, seeing connection between multiplication and division and commutative property (**MP7**). Students solve problems using multiplicative comparison (**MP4**).

Vocabulary	Lesson Resources		Manipulatives
equation times compare multiplicative comparison problems times more greater How many more times How many more How much less Additive comparison problems Variable or symbol	**Chapter 5: Multiplication and Division Facts** CCSS3 Multiplication as Comparison CCSS4 Compare to Solve Problems **http://www.k-5mathteachingresources.com/4th-grade-number-activities.html** OA.1 Multiplication Equations and Comparative Statements OA.2 Comparison Problems **Common Core Sheets** OA.1 http://commoncoresheets.com/SortedByGrade.php?Sorted=4oa1 OA.2 http://commoncoresheets.com/SortedByGrade.php?Sorted=4oa2	**BoardMath**: This is review from Grade 3, please pull problems from these sections to put on board to review with students before Unit 5. 13-1 Parts of a Whole 13-2 Parts of a Set (optional: teach these in Unit 5)	Base-ten blocks Two-color chips Linking chips "Groups" – post-its, index cards
Number Talks	Find My Rule (students can use multiplicative comparison to find the rule)		
Key Dates			

Unit 5 – Decomposing and composing fractions for addition and subtraction

Wks 13-14	Operations and Algebraic Thinking	Number and Operations in Base 10	Numbers and Operations - Fractions	Measurement and Data	Geometry	Mathematical Practices
November 10 - 21 (9 days)	OA.1[m] Interpret a multiplication as a comparison, e.g., interpret 35 = 5 x 7 as a statement that 35 is 5 times as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations. OA.2[m] Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison. OA.3[m] Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding. OA.4 Find all factor pairs for a whole number in the range 1–100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1–100 is a multiple of a given one-digit number. Determine whether a given whole number in the range 1–100 is prime or composite.	NBT.1[m] Recognize that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right. *For example, recognize that 700 ÷ 70 = 10 by applying concepts of place value and division.* NBT.2[m] Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form. Compare two multi-digit numbers based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons. NBT.3[m] Use place value understanding to round multi-digit whole numbers to any place. NBT.4[m] ~~Fluently~~ add and subtract multi-digit whole numbers using the standard algorithm. NBT.5[m] Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.	**NF.3[m] Understand a fraction a/b with a 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 = 2/8 + 1/8*** ***$2\frac{1}{8}$ =1 + 1 + 1/8 = 8/8 + 8/8 + 1/8***	MD.3 Apply the area and perimeter formulas for rectangles in real-world and mathematical problems. *For example, find the width of a rectangular room given the area of the flooring and the length, by viewing the area formula as a multiplication equation with an unknown factor.*		MP1 Make sense of problems and persevere in solving them. MP2 Reason abstractly and quantitatively. MP4 Model with mathematics. MP5 Use appropriate math tools strategically. MP6 Attend to precision. MP7 Look for and make use of structure. MP8 Look for and express regularity in repeated reasoning.

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	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.*	NBT.6[m] 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.				

In this unit, students extend prior knowledge of unit fractions with denominators of 2, 3, 4, 6, and 8 from Grade 3 to include denominators 5, 10, 12, and 100. In Grade 4, they use their understanding of partitioning to find unit fractions to compose and decompose fractions in order to add fractions with like denominators. This is foundational for further work with fractions later in the year, such as comparing fractions and multiplying fractions by a whole number.

NOTE: Students do not need to simplify sums. Students will understand equivalence in Unit 6 and can apply understanding to simplify sums and products in Units 7-8. This unit focuses on understanding addition and subtraction of fractions only. Also, use decomposition when rewriting Mixed Numbers to Improper fractions and vice versa. DO NOT use division as shown in Chapter 13, Section 9, Example 3 (page 539). Instead, use decomposition and visuals in this unit for conceptual understanding, such as: $^4/_3 = {}^3/_3 + {}^1/_3 = 1 + {}^1/_3 = 1{}^1/_3$

Below are suggested Lesson Resources. Refer to the Survival Kit for additional ideas and resources. Lessons can be taught separately, combined, or out of sequence to meet the needs of your students.

Students will make sense of fractions by decomposing and composing using manipulatives and visuals (**MP2, MP5**). Students will tend to precision with academic vocabulary and looking at patterns to develop an understanding when you add or subtract fractions, the numerator changes, not the denominator (**MP6, MP7, MP8**). Students may solve basic word problems including fractions (**MP1, MP4**). [Word problems will appear again in Unit 7]

Vocabulary	Lesson Resources		Manipulatives
Fraction Numerator Denominator Unit fraction Whole Decompose Compose	**Chapter 13: Fractions** CCSS Foldable 11 (addition and subtraction part only) 13.1 Parts of a Whole (optional – review from Grade 3) 13.2 Parts of a Set (optional – review from Grade 3) 13-8 Add and Subtract Like Fractions 13-9 Mixed Numbers **Common Core Sheets** NF.3a http://commoncoresheets.com/SortedByGrade.php?Sorted=4nf3a NF.3b http://commoncoresheets.com/SortedByGrade.php?Sorted=4nf3b	**http://www.k-5mathteachingresources.com/4th-grade-number-activities.html** NF.3a Add/Subtract Fractions with Like Denominators NF.3a Adding Fractions Using Pattern Blocks NF.3a The Chocolate Bar Problem NF.3a Sense or Nonsense (1) NF.3a Sense or Nonsense (2) NF.3a Picture Pie NF.3b Decomposing Fractions NF.3a Pizza Share **MARS Task**: Matching (2000)	Fraction tiles Fraction circles Pattern Blocks Cuisenaire Rods Go to Teacher Share – Blackline Masters to get Fraction Bars, if needed
Number Talks	How can I write 4/5 in a different way? 1? $1{}^3/_8$?		
Key Dates	Holiday: Veteran's Day 11/11 Thanksgiving Break: 11/24 – 11/28		

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Unit 6 – Understand fraction equivalence and comparison

Wks 15-17	Operations and Algebraic Thinking	Number and Operations in Base 10	Numbers and Operations - Fractions	Measurement and Data	Geometry	Mathematical Practices
December 1 - 19 (9 days)	OA.1[m] Interpret a multiplication as a comparison, e.g., interpret 35 = 5 x 7 as a statement that 35 is 5 times as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations. OA.2[m] Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison. OA.3[m] Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding. OA.4 Find all factor pairs for a whole number in the range 1–100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1–100 is a multiple of a given one-digit number. Determine whether a given whole number in the range 1–100 is prime or composite.	NBT.1[m] Recognize that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right. *For example, recognize that 700 ÷ 70 = 10 by applying concepts of place value and division.* NBT.2[m] Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form. Compare two multi-digit numbers based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons. NBT.3[m] Use place value understanding to round multi-digit whole numbers to any place. NBT.4[m] ~~Fluently~~ add and subtract multi-digit whole numbers using the standard algorithm. NBT.5[m] Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.	**NF.1[m] Explain why a fraction a/b is equivalent to a fraction (n x a)/(n x 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.** **NF.2[m] Compare two fractions with different numerators and different denominators, e.g., by creating common denominators and numerators, or by comparing to a benchmark fraction such as ½. 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.** NF.3[m] Understand a fraction a/b with a 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 = 2/8 + 1/8* *$2\ ^{1}/_{8}$ =1 + 1 + 1/8 = 8/8 + 8/8 + 1/8*	MD.3 Apply the area and perimeter formulas for rectangles in real-world and mathematical problems. *For example, find the width of a rectangular room given the area of the flooring and the length, by viewing the area formula as a multiplication equation with an unknown factor.*		MP2 Reason abstractly and quantitatively. MP5 Use appropriate math tools strategically. MP6 Attend to precision. MP7 Look for and make use of structure. MP8 Look for and express regularity in repeated reasoning.

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	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.*	NBT.6[m] 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.				

In this unit, students develop an understanding of fraction equivalence and various methods for comparing fractions. Students should understand that when comparing fractions, it is not always necessary to generate equivalent fractions. Other methods, such as comparing fractions to a benchmark, can be used to discuss relative sizes or compare visuals/concrete objects. The justification of comparing or generating equivalent fractions using visual models is an emphasis of this unit.

NOTE: Students will solve word problems using fractions and whole numbers in Unit 8, so focus on equivalence and comparing only. Since students can now write equivalent fractions, when students add or subtraction fractions begin asking if they can simplify their answer by writing an equivalent fraction. Do not use cross multiplication, the "butterfly method", or another trick to compare fractions, use visuals or concrete manipulatives. Using visuals can transition to finding common denominator to compare.

Below are suggested Lesson Resources. Refer to the Survival Kit for additional ideas and resources. Lessons can be taught separately, combined, or out of sequence to meet the needs of your students.

Students will make sense of equivalence and comparing using manipulatives and visuals (**MP2, MP5**). Students will tend to precision with academic vocabulary and look for patterns when finding equivalent fractions, such as multiplying a fraction by a different whole (1 = 2/2, 3/3, 4/4., etc) and knowing multiplying a number by 1 does not change the value, rather it creates smaller parts (**MP6, MP7, MP8**).

Vocabulary	Lesson Resources		Manipulatives
Fraction Numerator Denominator Unit fraction Whole Decompose Compose	**Chapter 13: Fractions** Explore 13-4 Equivalent Fractions 13-4 Equivalent Fractions 13-5 Simplest Form 13-7 Compare and Order Fractions CCSS14 Use Benchmark Fractions to Compare and Order (Pg. 79-84) **Common Core Sheets** NF.1 http://commoncoresheets.com/SortedByGrade.php?Sorted=4nf1 NF.2 http://commoncoresheets.com/SortedByGrade.php?Sorted=4nf2 http://illuminations.nctm.org/Activity.aspx?id=3510 - Equivalent Fractions	**http://www.k-5mathteachingresources.com/4th-grade-number-activities.html** NF.1 Creating Equivalent Fractions NF.1 Fraction Wall Game NF.2 Birthday Fractions NF.2 Who Ate More? NF.2 Fraction Compare NF.2 Fraction Cards NF.2 Which is Larger? NF.2 Snack Time **MARS Task**: Picking Fractions (2007)	Fraction tiles Fraction circles Pattern Blocks Cuisenaire Rods Go to Teacher Share – Blackline Masters to get Fraction Bars, if needed
Number Talks	How can I write 4/5 in a different way? 1? $1\frac{3}{8}$? (students can now decompose or provide equivalent fraction responses) Would you Rather…have 7/10 or 7/8 of a pie? 3/10 or 2/3?		
Key Dates	Winter Break: 12/22 – 1/2		

Unit 7 – Solving Addition and Subtraction Word Problems involving Fractions and Mixed Numbers

Wks 18-19	Operations and Algebraic Thinking	Number and Operations in Base 10	Numbers and Operations - Fractions	Measurement and Data	Geometry	Math Practices
January 5 - 16 (10 days)	OA.1[m] Interpret a multiplication as a comparison, e.g., interpret 35 = 5 x 7 as a statement that 35 is 5 times as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations. OA.2[m] Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison. OA.3[m] Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding. OA.4 Find all factor pairs for a whole number in the range 1–100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1–100 is a multiple of a given one-digit number. Determine whether a given whole number in the range 1–100 is prime or composite.	NBT.1[m] Recognize that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right. *For example, recognize that 700 ÷ 70 = 10 by applying concepts of place value and division.* NBT.2[m] Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form. Compare two multi-digit numbers based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons. NBT.3[m] Use place value understanding to round multi-digit whole numbers to any place. NBT.4[m] ~~Fluently~~ add and subtract multi-digit whole numbers using the standard algorithm. NBT.5[m] Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.	NF.1[m] Explain why a fraction a/b is equivalent to a fraction (n x a)/(n x 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. NF.2[m] Compare two fractions with different numerators and different denominators, e.g., by creating common denominators and numerators, or by comparing to a benchmark fraction such as ½. 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. NF.3[m] Understand a fraction a/b with a 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 = 2/8 + 1/8* *$2\ ^{1}/_{8}$ =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.**	MD.3 Apply the area and perimeter formulas for rectangles in real-world and mathematical problems. *For example, find the width of a rectangular room given the area of the flooring and the length, by viewing the area formula as a multiplication equation with an unknown factor.*		MP1 Make sense of problems and persevere in solving them. MP2 Reason abstractly and quantitatively. MP4 Model with mathematics. MP5 Use appropriate math tools strategically. MP6 Attend to precision. MP7 Look for and make use of structure. MP8 Look for and express regularity in repeated reasoning.

- Newly introduced standards are in **bold print**
- Standards with ~~strikethroughs~~ are not taught yet
- California Common Core Standards Booklet

	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.*	NBT.6[m] 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.	**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.**			

In this unit, students extend their understanding of addition and subtraction of whole numbers and fractions to mixed numbers. Additionally, students will solve word problems that include fractions and mixed numbers.

NOTE: Students can continue to use their understanding of decomposing and composing to add and subtract mixed numbers. Using manipulatives and visuals will assist with the understanding addition and subtraction as well. Students will extend "trading" when subtracting mixed numbers. For example: 3 ¼ - 2 ¾. Students can trade a whole ($^4/_4$) from 3 ¼ to the fraction, to become $2^5/_4$. Students can then subtract $2^5/_4 - 2^3/_4$ using place value (subtract wholes and subtract parts) to get $2^5/_4 - 2^3/_4 = {}^2/_4 = {}^1/_2$.

Below are suggested Lesson Resources. Refer to the Survival Kit for additional ideas and resources. Lessons can be taught separately, combined, or out of sequence to meet the needs of your students.

Students will make sense of adding mixed numbers by decomposing and composing using manipulatives and visuals (**MP2, MP5**). Students will tend to precision with academic vocabulary and looking at patterns from adding and subtracting whole numbers and fractions to develop an understanding of adding or subtracting mixed numbers (**MP6, MP7, MP8**). Students may solve word problems including fractions and mixed numbers (**MP1, MP4**).

Vocabulary	Lesson Resources		Manipulatives
Fraction Numerator Denominator Unit fraction Whole Decompose Compose	**Chapter 13: Fractions** CCSS15 Add Mixed Numbers – Pg 85-90 CCSS16 Subtract Mixed Numbers- Pg 91 - 96 13-8 Problem Solving Practice (see TE 534B) 13-9 Problem Solving Practice (see TE 538B) **Common Core Sheets** NF.3c http://www.commoncoresheets.com/SortedByGrade.php?Sorted=4nf3c NF.3d http://commoncoresheets.com/SortedByGrade.php?Sorted=4nf2	**http://www.k-5mathteachingresources.com/4th-grade-number-activities.html** NF.3c Mixed Number Word Problems (like denominators) NF.3c Adding Mixed Numbers NF.3c Subtracting Mixed Numbers NF.3d Fraction Word Problems (like denominator) NF.3d Addition Word Problems with Fractions NF.3d Subtraction Word Problems with Fractions **MARS Tasks:** Candy Bar (Practice); Leap Frog Fractions (2009); Brittany's Cat's Kittens (2011); Penguin Ice Cream (2012); Mariana's Fractions (2013); A Queen and Her Pears (2014)	Fraction tiles Fraction circles Pattern Blocks Cuisenaire Rods Go to Teacher Share – Blackline Masters to get Fraction Bars, if needed
Number Talks	What is the product of 3 x 6? How do you know? (change factors)		
Key Dates	Holiday: Martin Luther King, Jr. Birthday – 01/19		

Unit 8 – Multiplying Fractions by Whole Numbers

Wks 20-22	Operations and Algebraic Thinking	Number and Operations in Base 10	Numbers and Operations - Fractions	Measurement and Data	Geometry	Math Practices
January 22 – February 4 (11 days)	OA.1[m] Interpret a multiplication as a comparison, e.g., interpret 35 = 5 x 7 as a statement that 35 is 5 times as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations. OA.2[m] Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison. OA.3[m] Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding. OA.4 Find all factor pairs for a whole number in the range 1–100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1–100 is a multiple of a given one-digit number. Determine whether a given whole number in the range 1–100 is prime or composite.	NBT.1[m] Recognize that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right. *For example, recognize that 700 ÷ 70 = 10 by applying concepts of place value and division.* NBT.2[m] Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form. Compare two multi-digit numbers based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons. NBT.3[m] Use place value understanding to round multi-digit whole numbers to any place. NBT.4[m] ~~Fluently~~ add and subtract multi-digit whole numbers using the standard algorithm. NBT.5[m] Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.	NF.1[m] Explain why a fraction a/b is equivalent to a fraction (n x a)/(n x 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. NF.2[m] Compare two fractions with different numerators and different denominators, e.g., by creating common denominators and numerators, or by comparing to a benchmark fraction such as ½. 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. NF.3[m] Understand a fraction a/b with a 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 = 2/8 + 1/8* *$2\ ^{1}/_{8}$=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.	MD.3 Apply the area and perimeter formulas for rectangles in real-world and mathematical problems. *For example, find the width of a rectangular room given the area of the flooring and the length, by viewing the area formula as a multiplication equation with an unknown factor.*		MP1 Make sense of problems and persevere in solving them. MP2 Reason abstractly and quantitatively. MP4 Model with mathematics. MP5 Use appropriate math tools strategically. MP6 Attend to precision. MP7 Look for and make use of structure. MP8 Look for and express regularity in repeated reasoning.

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	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.*	NBT.6[m] 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.	**NF.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 of 5x(1/4), recording the conclusion by the equation 5/4 =5x(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 3x(2/5) as 6x(1/5), recognizing this product as 6/5. (In general, n x (a/b) = (nxa)/b.)*** **c. Solve word problems involving multiplication of a fraction by a whole number, e.g., by using a 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?***			

In this unit, students apply their understanding of composing and decomposing fractions to develop a conceptual understanding of multiplication of a fraction by a whole number. Students also use and extend their previous understandings of operations with whole numbers and relate that understanding to fractions. In this unit, multiplicative comparison (OA.1) is addressed to include multiplication of fractions and apply the understanding of "times as much" to multiply a fraction by a whole number. Students also see multiplication as or "groups of".

NOTE: Extend students' knowledge of "groups of" with multiplication of a fraction with a whole number. 3 x ½ is 3 "groups of" ½ , which is ½ + ½ + ½ . Using their knowledge of composition, ½ + ½ + ½ = $^{2}/_{2}$ + ½ = $^{3}/_{2}$ or 1½ .

Below are suggested Lesson Resources. Refer to the Survival Kit for additional ideas and resources. Lessons can be taught separately, combined, or out of sequence to meet the needs of your students.

Students will make sense of multiplying a fraction by a whole number by using manipulatives and visuals (**MP2, MP5**). Students will tend to precision with academic vocabulary and looking at patterns from their understanding of multiplying whole numbers to develop an understanding of multiplying a fraction by a whole number (**MP6, MP7, MP8**). Students will apply their understanding to solve word problems (**MP1, MP4**).

Vocabulary	Lesson Resources		Manipulatives
Repeated addition ___groups of ___objects Multiples Improper fraction between	**Chapter 13: Fractions** CCSS Foldable 11 (complete multiplication part) CCSS17 Hands on: Model Fractions and Multiplication - Pg 97-102 CCSS18 Multiply Fractions by Whole Numbers – Pg 103 - 108 **Common Core Sheets** NF.4a http://www.commoncoresheets.com/SortedByGrade.php?Sorted=4nf4a NF.4b http://www.commoncoresheets.com/SortedByGrade.php?Sorted=4nf4b NF.4c http://www.commoncoresheets.com/SortedByGrade.php?Sorted=4nf4c	**http://www.k-5mathteachingresources.com/4th-grade-number-activities.html** NF.4a Models for Fraction Multiplication NF.4b Multiplying a Number by a Fraction NF.4c Whole Number x Fraction Word Problems NF.4c Full House: An Invitation to Fractions (Math Read Activity)	Fraction tiles Fraction circles Pattern Blocks Cuisenaire Rods (Go to Teacher Share – Blackline Masters to get Fraction Bars, if needed)
Number Talks	What is the product of 3 x 6? What is the product of 3 x $^{1}/_{6}$? How do you know? (change factors, fraction)		
Key Dates	1/30: Staff Development Day		

Unit 9 – Comparing Decimal Fractions and Understanding Notation

Wks 23-25	Operations and Algebraic Thinking	Number and Operations in Base 10	Numbers and Operations - Fractions	Measurement and Data	Geometry	Math Practices
February 5 – 24 (12 days)	OA.1[m] Interpret a multiplication as a comparison, e.g., interpret 35 = 5 x 7 as a statement that 35 is 5 times as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations. OA.2[m] Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison. OA.3[m] Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding. OA.4 Find all factor pairs for a whole number in the range 1–100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1–100 is a multiple of a given one-digit number. Determine whether a given whole number in the range 1–100 is prime or composite.	NBT.1[m] Recognize that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right. *For example, recognize that 700 ÷ 70 = 10 by applying concepts of place value and division.* NBT.2[m] Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form. Compare two multi-digit numbers based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons. NBT.3[m] Use place value understanding to round multi-digit whole numbers to any place. NBT.4[m] ~~Fluently~~ add and subtract multi-digit whole numbers using the standard algorithm. NBT.5[m] Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.	NF.1[m] Explain why a fraction a/b is equivalent to a fraction (n x a)/(n x 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. NF.2[m] Compare two fractions with different numerators and different denominators, e.g., by creating common denominators and numerators, or by comparing to a benchmark fraction such as ½. 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. NF.3[m] Understand a fraction a/b with a 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 = 2/8 + 1/8; and* $2\,^{1}/_{8} = 1 + 1 + 1/8 = 8/8 + 8/8 + 1/8$ *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. NF.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 of 5x(1/4), recording the conclusion by the equation 5/4 =5x(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 3x(2/5) as 6x(1/5), recognizing this product as 6/5. (In general, n x (a/b) = (nxa)/b.)*	MD.3 Apply the area and perimeter formulas for rectangles in real-world and mathematical problems. *For example, find the width of a rectangular room given the area of the flooring and the length, by viewing the area formula as a multiplication equation with an unknown factor.*		MP2 Reason abstractly and quantitatively. MP5 Use appropriate math tools strategically. MP6 Attend to precision. MP7 Look for and make use of structure.

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	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.*	NBT.6[m] 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.	**c.** Solve word problems involving multiplication of a fraction by a whole number, e.g., by using a 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?* **NF.5[m] Express a fraction with denominator 10 as an equivalent fraction with denominator 100, and use this technique to add two fractions with respective denominators 10 and 100.** **NF.6[m] Use decimal notation for fractions with denominators 10 or 100.** **NF.7[m] 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 *the number line or another* visual model. *CA***			

In this unit, students use their understanding of fractions to represent special fractions (tenths and hundredths) in a new way. Students use their understanding of equivalent fractions to begin to use decimal notation – however, it is not the intent at this grade level to connect this notation to the base-ten system. The focus is on solving word problems involving simple fractions and decimals. Work with money and base 10 blocks can support student understanding.

NOTE: Precision with academic language for decimals is important. It is common for people to read .25 as "point two five", but should be "twenty-five hundredths". This will assist students in understanding .25 = $^{25}/_{100}$.

Below are suggested Lesson Resources. Refer to the Survival Kit for additional ideas and resources. Lessons can be taught separately, combined, or out of sequence to meet the needs of your students.

Students will make sense of adding tenths and hundredths by using manipulatives and visuals (**MP2, MP5**). Students will tend to precision with academic vocabulary and extending their understanding of equivalent fractions to develop an understanding of adding tenths and hundredths (**MP6, MP7, MP8**).

Vocabulary	Lesson Resources		Manipulatives
Whole Tenths Hundredths Decimal fractions Decimal, decimal point Convert	**Chapter 14: Decimals** CCSS Foldable 12 Explore 14-1 Fractions and Decimals 14-1 Tenths and Hundredths CCSS19 Use Place Value and Models to Add – Pg 109 – 114 14-4 Compare and Order Decimals (only tenths and hundredths) **Common Core Sheets** NF.5 http://www.commoncoresheets.com/SortedByGrade.php?Sorted=4nf5 NF.6 http://www.commoncoresheets.com/SortedByGrade.php?Sorted=4nf6 NF.7 http://www.commoncoresheets.com/SortedByGrade.php?Sorted=4nf7	**http://www.k-5mathteachingresources.com/4th-grade-number-activities.html** NF.5 Sums of 1 NF.5 Equivalent Fractions with a Denominator of 100 Problems NF.6 Decimals in Money NF.6 Representing Decimals with Base 10 Blocks NF.6 Decimal Riddles NF.7 Comparing Decimals NF.7 Decimal Sort	Base 10 Blocks - Hundred Flat = 1 whole - Ten Rod = tenth of whole - One Cube = hundredth of whole Coins - Dollar = 1 whole - Dime = tenth of whole - Penny = hundredth of whole Go to Teacher Share – Blackline Masters to get "Tens Hundreds Chart – 20 small" to use for visuals to compare, order, and add
Number Talks	Decimal Riddles: http://www.k-5mathteachingresources.com/support-files/decimalriddles.pdf; Compare/order decimals or fractions		
Key Dates	10/13: Staff Development Day	**END OF TRIMESTER INSTRUCTION** Benchmark 2: Units 1-9 Assessment window 2/17 – 2/27	

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CCSS BOARDMATH: Grade 4

Operations and Algebraic Thinking

Operations with Whole Numbers (1 problem)

OA.1
OA.2
OA.3

Factors, Multiples and Patterns (1 problem)

OA.4
OA.5

Numbers in Base 10

Place Value (1 problem)

NBT.1
NBT.2
NBT.3

Operations (2 problems)

NBT.4
NBT.5
NBT.6

Numbers and Operations-Fractions

Equivalent Fractions (2 problems)

NF.1
NF.2

Building Fractions (2 problems)

NF.3a
NF.3b
NF.3c
NF.3d
NF.4a
NF.4b
NF.4c

Decimals and Fractions (1 problem)

NF.5
NF.6
NF.7

Measurement and Data

Measurements (1 problem)

MD.1
MD.2
MD.3

Geometric Measurement/Interpret Data (1 problem)

MD.5
MD.6

Geometry

Lines, Angles and Shapes (2 problems)

G.1
G.2
G.3

Mathematical Reasoning

Word Problems (1 Problem)

Some Examples:

- Problem of the Day
- Partial MARS Task
- Patterns
- Word Problems with no question: With the given information, what questions can be asked?
- Draw it out
- Act it out
- Explain your reasoning
- Critique the reasoning of others

(15 problems)

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