

Cedar Grove School District

Cedar Grove, NJ

2016 | **Mathematics**
Grade 4

Approved by the Cedar Grove Board of Education
November 15, 2016

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Mathematics

Grade 4

In Grade 4, instructional time will focus on three critical areas: (1) developing understanding and fluency with multi-digit multiplication, and developing understanding of dividing to find quotients involving multi-digit dividends; (2) developing an understanding of fraction equivalence, addition and subtraction of fractions with like denominators, and multiplication of fractions by whole numbers; (3) understanding that geometric figures can be analyzed and classified based on their properties, such as having parallel sides, perpendicular sides, particular angle measures, and symmetry.

1. Students generalize their understanding of place value to 1,000,000, understanding the relative sizes of numbers in each place. They apply their understanding of models for multiplication (equal-sized groups, arrays, area models), place value, and properties of operations, in particular the distributive property, as they develop, discuss, and use efficient, accurate, and generalizable methods to compute products of multi-digit whole numbers. Depending on the numbers and the context, they select and accurately apply appropriate methods to estimate or mentally calculate products. They develop fluency with efficient procedures for multiplying whole numbers; understand and explain why the procedures work based on place value and properties of operations; and use them to solve problems. Students apply their understanding of models for division, place value, properties of operations, and the relationship of division to multiplication as they develop, discuss, and use efficient, accurate, and generalizable procedures to find quotients involving multi-digit dividends. They select and accurately apply appropriate methods to estimate and mentally calculate quotients, and interpret remainders based upon the context.
2. Students develop understanding of fraction equivalence and operations with fractions. They recognize that two different fractions can be equal (e.g., $15/9 = 5/3$), and they develop methods for generating and recognizing equivalent fractions. Students extend previous understandings about how fractions are built from unit fractions, composing fractions from unit fractions, decomposing fractions into unit fractions, and using the meaning of fractions and the meaning of multiplication to multiply a fraction by a whole number.
3. Students describe, analyze, compare, and classify two-dimensional shapes. Through building, drawing, and analyzing two-dimensional shapes, students deepen their understanding of properties of two-dimensional objects and the use of them to solve problems involving symmetry.

**This curriculum was written in accordance with the
NEW JERSEY STUDENT LEARNING STANDARDS
for Mathematics**

The standards can be viewed at

<http://www.state.nj.us/education/cccs/2016/math/standards.pdf>

Grade 4 Overview

Operations and Algebraic Thinking

- Use the four operations with whole numbers to solve problems.
- Gain familiarity with factors and multiples.
- Generate and analyze patterns.

Number and Operations in Base Ten

- Generalize place value understanding for multi-digit whole numbers.
- Use place value understanding and properties of operations to perform multi-digit arithmetic.

Number and Operations—Fractions

- Extend understanding of fraction equivalence and ordering.
- Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.
- Understand decimal notation for fractions, and compare decimal fractions.

Measurement and Data

- Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.
- Represent and interpret data.
- Geometric measurement: understand concepts of angle and measure angles.

Geometry

- Draw and identify lines and angles, and classify shapes by properties of their lines and angles.

Mathematical Practices

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

Grade 4 - Scope and Sequence	
Unit 1	September – October
Unit 2	November – January
Unit 3	January – February
Unit 4	March – April
Unit 5	April – June

Mathematics - Grade 4

Unit 1: Use the Four Operations with Whole Numbers to Solve Problems

21st Century Themes

E-Encouraged, T-Taught, or A-Assessed in this unit

X	Creativity and Innovation
X	Critical Thinking and Problem Solving
X	Communication
X	Collaboration

Unit 1 Learning Targets

Students will be able to...

- Identify place value through the millions
- Represent numbers with place-value blocks and number lines
- Identify the value of digits through the millions
- Use expanded notation to decompose numbers
- Write numbers in standard notation, written form, and expanded notation
- Compare and order numbers based on place value to the millions place
- Round numbers to the nearest ten, hundred, thousand, or millions using place value
- Write number sentences to match given problem situations
- Use opposite operations to solve algebraic expressions
- Recognize multiplication as repeated addition of equal groups used in arrays and comparisons.
 - Draw pictures to problem solve multiplication situations and use their pictures to write number sentences
 - Use compatible numbers and rounding to estimate solutions to multiplication problems
 - Multiply numbers up to 3 digit by 2 digit numbers
 - Use partial products multiplication to multiply 3 digit by 2 digit numbers
 - Write number sentences to accompany a division model.
 - Divide whole numbers by 1-digit divisors resulting in quotients with remainders
 - Divide numbers up to 3 digits by 1 digit numbers
 - Draw pictures of groups, arrays, and area models to solve multiplication problems with 4 digits by 1 digit and 2 digit by 2 digit numbers
 - Draw pictures, arrays, and area models to solve division problems with multi-digit dividends by one-digit divisors
 - Use partial quotients to divide numbers up to 3 digits by 1 digits
 - Systematically find and record all possible outcomes for a situation
 - Solve problems using the problem-solving strategy with real world problems
 - Draw a picture and write an equation

#	Student Learning Objectives	NJSLs	Learning Activity
1	Explain the quantitative relationship between places of a multi-digit whole number up to one million when moving from right to left.	4.NBT.1	<ul style="list-style-type: none"> • Model numbers using base ten blocks and “quick” pictures • Draw, label and explain how to describe the value of the digit
2	Compare numbers using $>$, $=$, and $<$ for two multi-digit whole numbers up	4.NBT.2	<ul style="list-style-type: none"> • Think, pair, share on how they can compare and order numbers

	to one million (presented as base ten numerals, number names, or expanded form).		<ul style="list-style-type: none"> • Model numbers using place value charts
3	Round multi-digit whole numbers up to one million to any place.	4.NBT.3	<ul style="list-style-type: none"> • Plot numbers on a number line to visually represent the placement of numbers and their distance to benchmark numbers • Use greater than and less than symbols to write a comparative expression •
4	Write multiplication equations from multiplicative comparisons given in words (example, 35 is 5 times as many as 7 and 7 times as many as 5) and describe a multiplication equation in words.	4.OA.1	<ul style="list-style-type: none"> • Use bar models to represent quantities that are being compared • Solve multiplication comparison with a variable by writing an equation and solving the unknown variable • Use number lines to show repeated addition within multiplication
5	Use strategies to multiply multi-digit numbers and explain the answer using equations, rectangular arrays, and area models (up to 4-digits by 1-digit or 2-digits by 2-digits).	4.OA.1	<ul style="list-style-type: none"> • Use a variety of strategies to solve multi digit multiplication <ul style="list-style-type: none"> a. Distributive property – model using graph paper b. Expanded form c. Partial products d. Mental math e. Standard algorithm - regrouping f. Bow tie method
6	Use strategies to divide multi-digit dividends by one-digit divisors and explain the answer using equations, rectangular arrays, and area models.	4.NBT.6	<ul style="list-style-type: none"> • Use a variety of strategies to solve division problems <ul style="list-style-type: none"> a. Estimate quotients using compatible numbers b. Partial quotients c. Repeated subtraction d. Regrouping e. Standard algorithm
7	Multiply or divide to solve word problems involving multiplicative comparisons.	4.OA.2	<ul style="list-style-type: none"> • Estimate products by rounding the factors to find a reasonable

			<p>answer</p> <ul style="list-style-type: none"> • Use compatible numbers to solve division problems • Interpret the remainder <ul style="list-style-type: none"> a. Drop the remainder b. Add one to the quotient c. Use the remainder as the answer d. Write it as a fraction
8	Compose an equation to identify the arithmetic operation written in a word problem (with and without solving) using all operations.	4.OA.2	<ul style="list-style-type: none"> • Use strategies to solve problems <ul style="list-style-type: none"> a. bar models to represent and solve comparison problem with addition and subtraction b. graph paper to model word problems c. Find patterns
9	Fluently add and subtract multi-digit whole numbers using the standard algorithm.	4.NBT.4	<ul style="list-style-type: none"> • Use base ten blocks to rename numbers to different place values to introduce regrouping • Use graph paper to model the standard algorithm in addition and subtraction • Write a note or letter that explains how to add and subtract using regrouping
Selected Opportunities for Connection to Mathematical Practices			

- 1. Make sense of problems and persevere in solving them.**
 SLO #1 Explain correspondences among equations involving all four operations in word problems.
 SLO #5 Multiply or divide to solve word problem scenarios.
- 2. Reason abstractly and quantitatively.**
 SLO #2 Consider and use available tools, such as rectangular arrays and area models, when multiplying multi-digit numbers.
 SLO #3 Consider and use available tools, such as rectangular arrays and area models, when using equations in division.
 SLO #4 Rewrite verbal multiplicative statements as mathematical expressions.
 SLO #5 Use symbols for the unknown [e.g., n , $?$, x] to solve word problems.
- 3. Construct viable arguments and critique the reason of others.**
- 4. Model with mathematics.**
- 5. Use appropriate tools strategically.**
 SLO #6 Add and subtract multi-digit whole numbers using the standard algorithm.
- 6. Attend to precision.**
 SLO #2 Calculate multiplication of multi-digit numbers accurately and efficiently and be able to explain the solution.
 SLO #3 Calculate division of multi-digit dividends by one-digit divisors accurately and efficiently and be able to explain the solution.
 SLO #3 Understand the “cut-off” digit for rounding whole numbers.
- 7. Look for and make use of structure.**
 SLO #1 For multi-digit whole numbers, any place value is 10 times the value of the place to the right.
 SLO #2 Write the value of a whole number as the sum of the values that each digit represents.
 SLO #7 Look for and discern patterns when using the standard algorithm to add and subtract multi-digit whole numbers.
- 8. Look for and express regularity in repeated reasoning.**
 SLO #1 For multi-digit whole numbers, any place value is 100 times that of two places to the right.

Unit 1 Essential Questions	Unit 1 Enduring Understandings
<ol style="list-style-type: none"> a. <i>How can being fluent in addition and subtraction facts help me?</i> b. <i>How can I use arrays and area models to compute and explain multiplication and division?</i> c. <i>When would you want to compare numbers using $<$, $>$, and $=$?</i> d. <i>How can I represent an unknown number in a word problem and how do I solve for what the unknown number represents?</i> e. <i>How do you determine how to round multi-digit whole numbers to any place?</i> f. <i>How do I show the relationship between numbers and place value for whole numbers up to the</i> 	<ol style="list-style-type: none"> a. <i>There are many ways to represent a quantity and you would want to know when quantities are equal, less than, or greater than in making decisions.</i> b. <i>Rounding numbers help you to estimate and use mental math.</i> c. <i>Knowing many different strategies to solve word problems is helps students to successfully solve for the answer.</i> d. <i>Fluency in addition and subtraction facts help with proficiency</i> e. <i>Arrays and area models aid in concrete understanding</i> f. <i>Division is an important operation in real world problems with understanding the concept of parts to the whole.</i>

<p>millions?</p> <p>g. What strategies can be used to solve problems using all 4 operations?</p> <p>h. Why is it important to write and equation for a word problem?</p>	
Standard Code #	NJ Student Learning Standards
4.OA.1	Interpret a multiplication equation as a comparison, e.g., interpret $35 = 5 \times 7$ 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.
4.OA.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.NBT.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. <i>For example, recognize that $700 \div 70 = 10$ by applying concepts of place value and division.</i>
4.NBT.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.NBT.3	Use place value understanding to round multi-digit whole numbers to any place.
4.NBT.4	Fluently add and subtract multi-digit whole numbers using the standard algorithm.
4.NBT.6	Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.
Evidence of Learning	
Summative Assessment	
<ul style="list-style-type: none"> ● Model Curriculum Unit Assessment ● Go Math Unit Test ● Performance Matters ● NWEA MAP 	
Formative Assessment	
<ul style="list-style-type: none"> ● Go Math Mid-Chapter Check Quiz ● Personal Math Trainer ● iXL ● “Stuck with You” post its 	
Instructional Materials and Resources	

- Math On The Spot
- Moby Max
- Interactive Student Edition
- Dry-Erase Problem Solving Mat
- Base Ten Blocks
 - <http://nlvm.usu.edu/en/nav/vlibrary.html>

Integration of Technology

- Computers
- SMART Board
- Pear Deck

Curriculum Development Resources

- <http://www.state.nj.us/education/cccs/2016/math/standards.pdf>
- <http://www.state.nj.us/education/modelcurriculum/math/2.shtml>
- <http://www.state.nj.us/education/cccs/standards/9/9.pdf>

Mathematics - Grade 4

Unit 2: Identify and Find Equivalent Fractions

21st Century Themes

E-Encouraged, T-Taught, or A-Assessed in this unit

X	Creativity and Innovation
X	Critical Thinking and Problem Solving
X	Communication
X	Collaboration

Unit 2 Learning Targets

Students will be able to...

- *Define and identify a multiple and factor of given numbers.*
- *Use models, benchmarks, and equivalent forms to judge the size of fractions*
- *Identify and convert improper fractions to mixed numbers and vice versa using various strategies*
 - *Identify equivalent fractions*
 - *Generate equivalent fractions using various strategies*
 - *Generate equivalent forms of commonly used fractions*
 - *Connect equivalent fractions by comparing models to symbols and locating equivalent symbols on a number line*
 - *Use patterns to find products with factors of 2, 5, and 9*
 - *Simplify fractions using various strategies*
 - *Compare and order fractions with different numerators and different denominators using various strategies*
 - *Use benchmark fractions to compare fractions with unlike denominators*
 - *Use problem solving strategies to solve real world problems*

#	Student Learning Objectives	NJSLS	Learning Activity
1	Recognize and generate equivalent fractions and explain why they are equivalent using visual fraction models.	4.NF.1	<ul style="list-style-type: none"> • Model fractions to determine equivalency using <ol style="list-style-type: none"> a. Grid paper b. Number lines c. Fraction tiles d. Multiplication e. Division
2	Compare two fractions with different numerators and different denominators using $>$, $<$, and $=$ and justify the comparison by using visual fraction models (recognizing the comparison is valid only when two fractions refer to the same whole).	4.NF.2	<ul style="list-style-type: none"> • Draw picture of fractions using different shapes that represent 1 whole • Use fraction tiles to represent fractions • Use benchmark fractions (0, $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$, 1) to compare the value of the fraction

			given
3	Determine if a number between 1 and 100 is a prime or composite number.	4.OA.4	<ul style="list-style-type: none"> • Draw arrays • Use divisibility rules • Identify all the prime numbers on a hundreds chart
4	Find all factor pairs for a whole number up to 100 and determine whether it is a multiple of a given 1-digit whole number.	4.OA.4	<ul style="list-style-type: none"> • Model using tiles and counters to find factors • Draw arrays to find factors • Use divisibility rules • Find common factors by: <ul style="list-style-type: none"> • Use skip counting, • Venn diagrams
5	Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations	4.OA.3	<ul style="list-style-type: none"> • Model using tiles and counters • Use arrays to model

Selected Opportunities for Connection to Mathematical Practices

Unit 2 Essential Questions		Unit 2 Enduring Understandings	
<p>a. <i>How many different ways can I use models to determine, explain and compare equivalent fractions?</i></p> <p>b. <i>Why is it important to recognize if a number is prime or composite?</i></p> <p>c. <i>Why and how do we break multiples down into factors?</i></p>		<p>a. <i>Manipulatives create concrete understanding of fractions</i></p> <p>b. <i>Understanding how to use variables as unknowns help to translate word problems into equations.</i></p> <p>c. <i>Knowing how to break down multiples into factors aids students in proficiency. There are patterns in the products for multiplication facts with factors of 2, 5, and 9.</i></p> <p>d. <i>If two fractions have the same denominator, the fraction with the greater numerator is the greater fraction. If two fractions have the same numerator, the fraction with the lesser denominator is the greater fraction.</i></p>	

Benchmark Standards

1. Make sense of problems and persevere in solving them.

2. Reason abstractly and quantitatively.

SLO #1 Understand and make sense of decomposed fraction quantities and understand the relationship to its parts.

SLO #1 Use quantitative reasoning that involves creating a coherent representation of equations from word problems.

SLO #4 Understand and make sense of equivalent fractions' quantities and their relationships.

SLO #5 Understand and make sense of fraction quantities with different numerators and denominators in order to compare them.

3. Construct viable arguments and critique the reason of others.

SLO #4 Understand and use stated assumptions and definitions about fractions in order to recognize and generate equivalent fractions.

SLO #4 Be able to communicate and justify conclusions made about equivalent fractions.

4. Model with mathematics.

SLO #1 Apply and use previously learned concepts about equations and word problems to compose an equation from a word problem.

SLO #1 Apply and use previously learned concepts about fractions in order to decompose fractions and record the decomposition in an equation.

SLO #5 Map the relationship between fractions with different numerators and denominators using tools.

5. Use appropriate tools strategically.

SLO #4 Consider and use available tools, such as visual fraction models, when working with equivalent fractions.

6. Attend to precision.

SLO #4 Be able to precisely communicate why fractions are equivalent.

SLO #5 State the meaning of the symbols $<$, $>$, or $=$ when comparing two fractions with different numerators and denominators.

7. Look for and make use of structure.

SLO #6 Look for and discern patterns to determine prime numbers between 1 and 100.

SLO #7 Look for and discern patterns to determine factor pairs and multiples of whole numbers up to 100.

8. Look for and express regularity in repeated reasoning.

SLO #6 Look for and express regularity in repeated reasoning when determining prime numbers between 1 and 100.

SLO #7 Look for and express regularity in repeated reasoning when determining factor pairs and multiples of whole numbers.

Standard Code #	NJ Student Learning Standards
4.OA.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.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.
4.NF.1	Explain why a fraction a/b is equivalent to a fraction $(n \times a)/(n \times b)$ 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. (Grade 4 expectations in this domain are limited to fractions with denominators 2, 3, 4,

	5, 6, 8, 10, 12, and 100).
4.NF.2	Compare two fractions with different numerators and different denominators, e.g. , by creating common denominators or numerators, or by comparing to a benchmark fraction such as $\frac{1}{2}$. 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.
Evidence of Learning	
Summative Assessment	
<ul style="list-style-type: none"> ● Model Curriculum Unit Assessment ● Go Math Unit Test ● Performance Matters ● NWEA MAP ● 	
Formative Assessment	
<ul style="list-style-type: none"> ● Go Math Mid-Chapter Check Quiz ● Personal Math Trainer ● iXL ● “Stuck with You” post its 	
Instructional Materials and Resources	
<ul style="list-style-type: none"> ● Math On The Spot ● Moby Max ● Interactive Student Edition ● Dry-Erase Problem Solving Mat ● Base Ten Blocks ● http://nlvm.usu.edu/en/nav/vlibrary.html ● 	
Integration of Technology	
<ul style="list-style-type: none"> ● Computers ● SMART Board ● 	
Curriculum Development Resources	
<ul style="list-style-type: none"> ● http://www.state.nj.us/education/cccs/2016/math/standards.pdf ● http://www.state.nj.us/education/modelcurriculum/math/2.shtml ● http://www.state.nj.us/education/cccs/standards/9/9.pdf 	

Mathematics - Grade 4

Unit 3: Extend Understanding of Fractions

21st Century Themes

E-Encouraged, T-Taught, or A-Assessed in this unit

X	Creativity and Innovation
X	Critical Thinking and Problem Solving
X	Communication
X	Collaboration

Unit 3 Learning Targets

Students will be able to...

- *Generate and analyze patterns*
- *Extend understanding of fraction equivalence and ordering*
- *Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers*
 - *Decompose a fraction into a sum of fractions with the same denominators ($3/8 = 1/8 + 1/8 + 1/8$) Identify equivalent fractions using number patterns (least common multiple, greatest common factor), manipulatives, and models (e.g., number lines)*
 - *Add fractions with like denominators using models and paper and pencil*
 - *Understand how to subtract fractions with unlike denominators*
 - *Students will check for reasonableness by making sure their calculations answer the questions asked and by using estimation to make sure the calculation was performed correctly*
 - *Solve two-question problems*

#	Student Learning Objectives	NJSLS	Learning Activity
1	Decompose a fraction into a sum of fractions with the same denominator in more than one way; record the decomposition as an equation and justify with a visual fraction model.	4.NF.3a 4.NF.3b	<ul style="list-style-type: none"> • Use fraction tiles to decompose fractions • Decompose fractions in various ways
2	Add and subtract mixed numbers with like denominators by replacing each mixed number with an equivalent fraction.	4.NF.3c	<ul style="list-style-type: none"> • Replace the whole number with the equivalent fraction • Model improper fraction as an addition problem of all the unit fractions • Rename fractions that need to be regrouped
3	Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, e.g., by	4.NF.3d	<ul style="list-style-type: none"> • Use act it out strategy by creating models and diagrams

	using visual fraction models and equations to represent the problem.		
4	Multiply a fraction by a whole number using visual fraction models and equations, demonstrating a fraction $\frac{a}{b}$ as a multiple of $\frac{1}{b}$.	4.NF.4a 4.NF.4b	<ul style="list-style-type: none"> • Create unit fraction models that represent the equation • Use fraction number line to skip count by the fraction you are multiplying by
5	Solve 1-step word problems involving multiplication of a fraction by a whole number. <i>For example, if each person at a party will eat $\frac{3}{8}$ 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?</i>	4.NF.4c	<ul style="list-style-type: none"> • Create pictures and models to solve problems
6	Compose equations from information supplied in word problems using letters to represent unknowns and solve the word problems with addition and subtraction.	4.OA.3	<ul style="list-style-type: none"> • Utilize bar models to create a multiplication comparative model
7	Add and subtract fractions like denominators including denominators of 10 and 100.	4.NF.3d 4.NF.5	<ul style="list-style-type: none"> • Use number lines • Use fraction tiles to add fractions • Use different shapes to model addition and subtraction • Use commutative and associative property to add fractions • Simplify the answer

Selected Opportunities for Connection to Mathematical Practices

1. Make sense of problems and persevere in solving them.

SLO #5 Explain the meaning and the process of finding a solution to a word problem that involves multiplication of a fraction by a whole number.

SLO #7 Explain correspondences between composed equations and equations represented as word problems.

2. Reason abstractly and quantitatively.

SLO #2 Understand and make sense of addition and subtraction of mixed number quantities and their relationship to an equivalent fraction.

SLO #3 Understand and make sense of fraction quantities in the context of addition and subtraction word problems.

SLO #4 Understand and make sense of multiplied fraction quantities.

SLO #4 Use quantitative reasoning to create a coherent representation of fraction multiplication and understand the fraction quantities involved.

SLO #5 Understand and makes sense of whole number and fraction quantities in the context of multiplication.

SLO #3 Understand and make sense of fraction quantities with denominators of 10 or 100.

3. Construct viable arguments and critique the reasoning of others.

4. Model with mathematics.

SLO #3 Apply and use previously learned concepts about fractions in order to solve addition and subtraction word problems utilizing fractions.

SLO #3 Map the relationship between fractions sums and differences using tools.

5. Use appropriate tools strategically.

SLO #4 When multiplying fractions consider and use available tools that include equations and visual fraction models.

6. Attend to precision.

7. Look for and make use of structure.

SLO #3 Look for and discern patterns when adding and subtraction fractions with like denominators and are represented as word problems.

SLO #4 Look for and discern patterns in the multiplication of fraction by a whole number.

SLO #3 Look for and discern patterns when adding two fraction with denominators of 10 or 100.

8. Look for and express regularity in repeated reasoning.

Unit 3 Essential Questions	Unit 3 Enduring Understandings
<ul style="list-style-type: none"> a. <i>Are patterns important in our world and why? How can models help me to compare fractions with unlike and common denominators?</i> b. <i>How can I change mixed numbers into fractions? What strategies can I use?</i> c. <i>Why is it important to know how to solve addition and subtraction of fractions?</i> d. <i>Why do we use variables to represent the unknown in equations?</i> e. <i>How do we decompose and reconstruct numbers to find sums and differences when adding and subtracting?</i> f. <i>How can I use models to demonstrate multiplying fractions and whole numbers?</i> 	<ul style="list-style-type: none"> a. <i>To add or subtract fractions with like denominators, add or subtract the numerators and write the sum or difference over the common denominator.</i> b. <i>Using and writing variables is a skill used in the real world to understand relationships among numbers.</i> c. <i>Using variables develops the awareness of algebraic equations.</i> d. <i>The use of grid models aids in understanding how multiplying a fraction by a fraction produces a smaller fraction.</i> e. <i>Fractions are used in every day in the real world and must be an acquired skill to accurately represent measurements.</i>
Standard Code #	NJ Student Learning Standards

4.OA.3	Solve multistep word problems 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 & estimation strategies including rounding.
4.NBT.4	Fluently add and subtract multi-digit whole numbers using the standard algorithm.
4.NF.3 4.NF.3a 4.NF.3b 4.NF.3c 4.NF.3d	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.
4.NF.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. <i>For example, express $3/10$ as $30/100$, and add $3/10 + 4/100 = 34/100$.</i>
4.NF.a 4.NF.b	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 $1/b$. <i>For example, use a visual fraction model to represent $5/4$ as the product $5 \times (1/4)$, recording the conclusion by the equation $5/4 = 5 \times (1/4)$.</i> 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. <i>For example, use a visual fraction model to express $3 \times (2/5)$ as $6 \times (1/5)$, recognizing this product as $6/5$. In general, $n \times (a/b) = (n \times a)/b$.</i>
4.NF.4c	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. <i>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?</i>
4.MD.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 measurement equivalents in a two-column table. <i>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).</i>

Summative Assessment	
<ul style="list-style-type: none"> ● Model Curriculum Unit Assessment ● Go Math Unit Test ● Performance Matters ● NWEA MAP ● 	
Formative Assessment	
<ul style="list-style-type: none"> ● Go Math Mid-Chapter Check Quiz ● Personal Math Trainer ● iXL ● “Stuck with You” post its ● ● 	
Instructional Materials and Resources	
<ul style="list-style-type: none"> ● Math On The Spot ● Moby Max ● Interactive Student Edition ● Dry-Erase Problem Solving Mat ● Base Ten Blocks ● http://nlvm.usu.edu/en/nav/vlibrary.html ● 	
Integration of Technology	
<ul style="list-style-type: none"> ● Computers ● SMART Board ● 	
Curriculum Development Resources	
<ul style="list-style-type: none"> ● http://www.state.nj.us/education/cccs/2016/math/standards.pdf ● http://www.state.nj.us/education/modelcurriculum/math/2.shtml ● http://www.state.nj.us/education/cccs/standards/9/9.pdf 	

Grade 4 Mathematics	
Unit 4: Introduce Decimals and Solve Word Problems	
21st Century Themes	
<i>E-Encouraged, T-Taught, or A-Assessed in this unit</i>	
	Creativity and Innovation
X	Critical Thinking and Problem Solving
X	Communication

X	Collaboration
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Unit 4 Learning Targets

Students will be able to...

- *Convert fraction with denominators of 10 and 100 to decimals*
- *Determine what picture matches a decimal picture/model*
- *Understand decimal notation for fractions, and compare decimal fractions*
- *Understand how to write fractions as decimals and decimals as fractions*
- *Estimate and compute the sum or difference of whole numbers and positive decimals to two places*
 - *Try a solution, check the solution, and if not correct, revise the solution following the same method until the correct solution is determined via checking*
 - *Use models and place-value charts to compare decimals to hundredths. They will use greater-than and less-than symbols to order decimals numbers*
 - *Write decimal representation for a model/picture through the hundredths place*
 - *Compare and order decimals to the hundredths place*

#	Student Learning Objectives	NJSLS	Learning Activity
1	Write decimal representation to model through the hundredths place	4.NF.6	<ul style="list-style-type: none"> ● Use base ten blocks and place value charts to represent decimals ● Use number lines to compare decimals through the hundredths ● Use hundreds grid to represent decimals in different orientations
2	Compose equations from information supplied in word problems, using letters to represent unknowns in formulas, and solve the word problems (with all four operations).	4.OA.3	<ul style="list-style-type: none"> ● Use the act it out strategy to relate decimals to real world situations
3	Use decimal notation to write fractions with denominators of 10 or 100 by writing each fraction as a fraction with denominator 100.	4.NF.6	<ul style="list-style-type: none"> ● Convert tenths to hundredths using tenths and hundredths charts
4	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	4.NF.7	<ul style="list-style-type: none"> ● Make connections that explain the relation between fractions, decimals and money

using a visual model.

Selected Opportunities for Connection to Mathematical Practices

1. Make sense of problems and persevere in solving them.

SLO #1 Use concrete models to help conceptualize, generate, and identify number and shape patterns using predetermined rules.

SLO #2 Be able to explain the meaning of equations derived from word problems, and know the process involved in composing equations.

SLO #2 Explain correspondences between composed equations and information supplied in a word problem.

2. Reason abstractly and quantitatively.

SLO #4 Understand and make sense of quantities expressed in decimal notation and as fractions.

SLO #7 Understand and make sense of decimal quantities in order to compare them.

SLO #7 Use quantitative reasoning to create a coherent representation of decimal numbers in order to compare their size.

SLO #8 Understand and make sense of both decimal and fraction quantities and understand their relationship to each other.

SLO #8 Use quantitative reasoning to create a coherent representation of word problems involving fractions and decimals.

3. Construct viable arguments and critique the reasoning of others.

SLO #1 Make conjectures and build a logical progression of statements in order to generate and identify number and shape patterns when using predetermined rules.

4. Model with mathematics.

SLO #1 Map the relationships of numbers and shapes using tools that include models, words, and graphs.

SLO #1 Analyze the relationships and patterns between numbers and shapes that have been generated using a similar rule.

SLO #2 Apply previously learned concepts regarding composing equations, and all four operations.

SLO #6 Draw diagrams and construct graphs of important features contained in a dataset.

SLO #7 Map the relationship of two decimal numbers using various tools.

5. Use appropriate tools strategically.

6. Attend to precision.

SLO #4 Use clear reasoning and definitions to describe writing fractions in decimal notation.

SLO #7 State the meaning of the $<$, $>$, or $=$ symbols when comparing two decimal numbers.

7. Look for and make use of structure.

SLO #4 Look for and discern a pattern when using decimal notation to express a fraction quantity.

8. Look for and express regularity in repeated reasoning.

Unit 4 Essential Questions

a. How does converting fractions to like denominators of 100 help me with understanding decimals?

a. How can I use place value of

Unit 4 Enduring Understandings

a. Decimals with a denominator of 100 can easily be compared to one another as well as fractions with denominators of 100 can easily be compared to one another as well as

<p><i>tenths and hundredths to compare fractions and decimals?</i></p> <p><i>b. How do I change a decimal from tenths to hundredths and explain how this does not affect its' value?</i></p>	<p><i>fractions to decimals since the decimal system is a base 10 system.</i></p> <p><i>b. There are many ways to represent quantities and changing a fraction with a denominator of hundredths helps to prepare students for percentages.</i></p> <p><i>c. Some problems can be solved by making a reasoned first try for what the answer might be, and then by using additional reasoning to arrive at the correct answer.</i></p>
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Standard Code #	NJ Student Learning Standards
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4.OA.3	Solve multistep word problems 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 & estimation strategies including rounding.
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4.NF.6	Use decimal notation for fractions with denominators 10 or 100. <i>For example, rewrite 0.62 as 62/100; describe a length as 0.62 meters; locate 0.62 on a number line diagram.</i>
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4.NF.7	Compare two decimals to hundredths by reasoning about their size. Recognize that comparisons are valid only when the two decimals refer to the same whole. Record the results of comparisons with the symbols $>$, $=$, or $<$, and justify the conclusions, e.g. , by using a visual model.
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Evidence of Learning

Summative Assessment

- Model Curriculum Unit Assessment
- Go Math Unit Test
- Performance Matters
- NWEA MAP
-

Formative Assessment

- Go Math Mid-Chapter Check Quiz
- Personal Math Trainer
- iXL
- “Stuck with You” post its
-
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Instructional Materials and Resources

- Math On The Spot
- Moby Max
- Interactive Student Edition

- Dry-Erase Problem Solving Mat
- Base Ten Blocks
- <http://nlvm.usu.edu/en/nav/vlibrary.html>
-

Integration of Technology

- Computers
- SMART Board
-

Curriculum Development Resources

- <http://www.state.nj.us/education/cccs/2016/math/standards.pdf>
- <http://www.state.nj.us/education/modelcurriculum/math/2.shtml>
- <http://www.state.nj.us/education/cccs/standards/9/9.pdf>

Grade 4 Mathematics

Unit 5: Measure and Classify Geometric Figures and Angles

21st Century Themes

E-Encouraged, T-Taught, or A-Assessed in this unit

X	Creativity and Innovation
X	Critical Thinking and Problem Solving
X	Communication
X	Collaboration

Unit 5 Learning Targets

Students will be able to...

Perimeter

- *Count squares or use formulas to solve for perimeter and area (rectangles, irregular shapes, polygons)*
- *Decide if a word problem is asking about perimeter or area*
- *Compare several different units of time and freely convert from one unit of time to another*

Data

- *Understand how to draw line plots, interpret points, and recognize outliers*
- *Represent and interpret data. Use the four operations with whole numbers to solve problems*

Measurement

- *Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit*
- *Estimate and measure length by choosing the most appropriate unit of length*
- *Estimate fluently and measure with units of weight, volume and mass*
- *Convert between customary units and metric units*
- *Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit*
- *Estimate and measure length to the nearest centimeter, and choose the most appropriate metric unit for measuring length*
- *Compare several different units of time and freely convert from one unit of time to another*

Angles

- *Understand concepts of angle and measure angles*
- *Draw and identify lines and angles, classify shapes by properties of their lines and angles*
- *Draw and Measure angles with protractors*
- *Recognize right, acute, obtuse angles*
- *Solve addition and subtraction problems for unknown angles in word problems and use symbols for the unknown measures*
- *Find the missing angle measurement in polygons*
- *Students will learn to identify and classify triangles as right, obtuse, isosceles and scalene*
- *Learn to identify quadrilaterals*
- *Define and identify point, line, line segment, ray, and plane*

- Identify a line of symmetry

Problem Solving

- Solve problems that require finding the original times, measurements, or quantities that led to a result that is given

#	Student Learning Objectives	NJSLS	Learning Activity
1	Determine the measure of an angle in degrees. The two rays of an angle share a common endpoint. If that endpoint is located at the center of a circle, the fraction of the circular arc (between the points where the rays intersect the circle) measures the angle in degrees. A “degree” is defined as 1/360 (one degree angle) of the entire circle; and an angle that turns n one degree angles is said to measure n degrees.	4.MD.5a ,b	<ul style="list-style-type: none"> • Use a circle model to demonstrate the opening of two rays to create an angle (e.g. clock)
2	Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines and identify these in two-dimensional figures.	4.G.1	<ul style="list-style-type: none"> • Find examples of lines and rays in the real world • Draw and describe facts and characteristics on parallel/ perpendicular lines • Analyze maps with streets and roads to identify types of lines
3	Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of a specific size. Recognize right angles as a category, and identify right triangles.	4.G.2	<ul style="list-style-type: none"> • Students will label shapes and find similarities and differences between them. • Find examples of the shapes in the real world • Draw and explain to a partner how to classify triangles by size and angle • Create a Venn Diagram that compares and contrasts attributes of shapes
4	Use a protractor to measure angles in whole number degrees and sketch	4.MD.6	<ul style="list-style-type: none"> • Use a protractor to measure and to draw

	angles of specific measures.		angles with given measurements
5	Solve addition and subtraction problems to find unknown angles on a diagram in real world and mathematical problems using a symbol for an unknown angle measure.	4.MD.7	<ul style="list-style-type: none"> • Use polygons as diagrams to find the missing angle
6	Draw lines of symmetry and identify line-symmetric figures.	4.G.3	<ul style="list-style-type: none"> • Create shapes on tracing paper and fold to find lines of symmetry • Use grid paper to complete the shape using symmetry properties • Use dot paper and geo boards to find how many lines of symmetry a shape has
7	Solve word problems involving simple fractions or decimals that incorporate measurement comparisons of like units (including problems that require measurements given in a larger unit in terms of a smaller unit).	4.MD.2 4.NF.4	<ul style="list-style-type: none"> • Use number lines to solve word problems of elapsed time • Write guidelines on how to solve problems using mixed measures • Create tables and charts to show relationship between number pairs
8	Apply area and perimeter formulas for rectangles in real world math problems (whole numbers).	4.MD.3	<ul style="list-style-type: none"> • Share with a partner how to find the formula to find the perimeter of a rectangle • Use figures to model the formula • Use polygons to build shapes to identify area and perimeter • To find irregular shapes area and perimeter break apart the shape into regular polygons • Use simpler problems to solve for the area

9	Make a line plot to display a data set in measurements in fractions of a unit ($\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$) and use it to solve problems involving addition and subtraction of fractions with like denominators.	4.MD.4	<ul style="list-style-type: none"> • Use a tally chart to collect and organize data
10	Generate number or shape patterns by using rules including words, models, or graphs, and identify apparent features of the pattern that were not explicit in the rule of the original pattern. 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.	4.OA.5	<ul style="list-style-type: none"> • Use pattern blocks, counters, and math board to create shape patterns • Have students find patterns using specific directions (e.g. use 1 rectangle, 2 rectangles, 3 rectangles)
11	Express measurement comparisons within a single system of measurement and record in a two-column chart within a single system of measurement; e.g., <i>know that 1 ft. is 12 times as long as 1 in.</i>	4.MD.1	<ul style="list-style-type: none"> • Use benchmarks to understand relative sizes of measurement • Create a T chart to convert measurements • Use models to compare metric units • Students can use models to compare units of time • Use timelines to solve elapsed time

Selected Opportunities for Connection to Mathematical Practices

1. Make sense of problems and persevere in solving them.

SLO #1 Consider and use available tools when determining the measure of angles in degrees.

SLO #3 Analyze the relationship and constraints of various geometric objects.

SLO #4 Analyze the relationship between two-dimensional figures based on the presence or absence of parallel lines, perpendicular lines, or angles.

SLO #5 Analyze the givens and constraints when measuring angles.

SLO #7 Analyze the constraints and relationships between lines of symmetry and line-symmetric figures.

SLO #5 Analyze the relationship between area and perimeter in order to solve real world problems involving rectangles.

SLO #6 Draw diagrams and construct graphs of important features contained in a dataset.

SLO #8 Be able to explain the meaning of fractions or decimals that incorporate measurement, and know the process to solve word problems that incorporate both.

2. Reason abstractly and quantitatively.

SLO #6 Use and apply two abilities (making a line plot, solving addition and subtraction problems with fractions) to solve problems.

3. Construct viable arguments and critique the reasoning of others.

SLO #6 Understand and use the stated assumptions and definitions of angles to solve addition and subtraction problems utilizing angles.

4. Model with mathematics.

SLO #5 Apply previously learned concepts regarding rectangles to solve area and perimeter problems involving rectangles.

SLO #6 Use specific and appropriate units of measurement when comparing two objects within a single system.

5. Use appropriate tools strategically.

SLO #3 Consider and use available tools, such as graphing paper, a ruler, and concrete models, when drawing points, lines, line segments, rays, angles, perpendicular, and parallel lines.

SLO #5 Consider and use available and appropriate tools, such as a protractor, a ruler, and graphing paper, to measure angles.

6. Attend to precision.

SLO #1 Consider and use available tools, such as models and graphs, when solving problems that relate to number and shape patterns.

SLO #6 Specify units of measure when making a line plot from a dataset.

SLO #6 Specify units of measure in order to clarify the correspondence with the given quantities.

7. Look for and make use of structure.

SLO #1 Look for and discern patterns in the measurement of angles.

SLO #4 Look for and discern patterns in two dimensional figures based on the presence or absence of lines or angles.

SLO #7 Look for and discern patterns in lines of symmetry and line-symmetric figures.

8. Look for and express regularity in repeated reasoning.

Unit 5 Essential Questions	Unit 5 Enduring Understandings
<ul style="list-style-type: none"> a. <i>How do I measure angles in a two dimensional shape?</i> b. <i>How many different types of angles are there and what are their attributes?</i> c. <i>What is the difference between a line segment, line, ray, and point?</i> d. <i>Where do we find angles in our real world?</i> e. <i>What two dimensional shapes are found in our real world?</i> f. <i>How can I find a shape's line of symmetry and what shapes have lines of symmetry?</i> g. <i>Which unit of measure do I use to measure weight, length, volume, and capacity? Is there are universal measuring system?</i> 	<ul style="list-style-type: none"> a. <i>Constructions are based on the properties of geometric figures especially in area and perimeter. Graphs provide a visual organization of data making data interpretation quicker and easier.</i> b. <i>Relationships between customary measurement units can be expressed as a ratio (e.g., 12 inches to 1 ft. or 12 in. = 1 ft.). Relationships exist that enable you to convert between customary units of the same attribute by multiplying or dividing.</i> c. <i>Relationships between metric units can be expressed as a ratio (e.g., 10 mm to 1 cm or 10 mm = 1 cm). Relationships exist that enable you to convert between metric units of the same attribute</i>

<p><i>h. When would I need to use perimeter or area in the real life situations?</i></p> <p><i>i. How does placing data on a graph help me to organize data, display data and solve?</i></p>	<p><i>by multiplying or dividing.</i></p> <p><i>d. Time can be expressed using different units that are related to each other.</i></p> <p><i>e. Knowing the value is essential for life long money management/finances.</i></p> <p><i>f. Angles are everywhere in the real world and all constructions are based upon geometric figures. Understand that angles can be found in drawings, architecture, artwork, clothing construction and computer generated graphics.</i></p> <p><i>g. Understand that symmetry can be found in the real world in humans, nature, images, and objects.</i></p> <p><i>h. Point, line, and plane are the core attributes of space objects, and real-world situations can be used to think about these attributes.</i></p> <p><i>i. Two-dimensional or plane shapes have many properties that make them different from one another. Polygons can be described and classified by their sides and angles.</i></p> <p><i>j. Two-dimensional or plane shapes have many properties that make them different form one another. Polygons can be described and classified by their sides and angles.</i></p>
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Standard Code #	NJ Student Learning Standards
4.OA.5	Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself. <i>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.</i>
4.MD.2	Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.

4.MD.3	Apply the area and perimeter formulas for rectangles in real world and mathematical problems. <i>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.</i>
4.MD.4	Make a line plot to display a data set of measurements in fractions of a unit ($\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$). Solve problems involving addition and subtraction of fractions by using information presented in line plots. <i>For example, from a line plot find and interpret the difference in length between the longest and shortest specimens in an insect collection.</i>
4.MD.5 4.MD.5a 4.MD.5b	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 $\frac{1}{360}$ 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.MD.6	Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure.
4.MD.7	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.G.1	Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.
4.G.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.
4.G.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.

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- Go Math Unit Test
- Performance Matters
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Integration of Technology

- Computers
- SMART Board
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Curriculum Development Resources

- <http://www.state.nj.us/education/cccs/2016/math/standards.pdf>
- <http://www.state.nj.us/education/modelcurriculum/math/2.shtml>
- <http://www.state.nj.us/education/cccs/standards/9/9.pdf>

NJ Student Learning Standards for Mathematics

Grade 4

Operations & Algebraic Thinking

Standards in this domain:

NJSLS.MATH.CONTENT.4.OA.A.1

NJSLS.MATH.CONTENT.4.OA.A.2

NJSLS.MATH.CONTENT.4.OA.A.3

NJSLS.MATH.CONTENT.4.OA.B.4

NJSLS.MATH.CONTENT.4.OA.C.5

Use the four operation with whole numbers to solve problems.

4.OA.A.1

Interpret a multiplication equation as a comparison, e.g., interpret $35 = 5 \times 7$ 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.

4.OA.A.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.¹

4.OA.A.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.

Gain familiarity with factors and multiples.

4.OA.B.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.

Generate and analyze patterns.

4.OA.C.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.*

Number & Operations in Base Ten

Standards in this domain:

NJSLS.MATH.CONTENT.4.NBT.A.1

NJSLS.MATH.CONTENT.4.NBT.A.2

NJSLS.MATH.CONTENT.4.NBT.A.3

NJSLS.MATH.CONTENT.4.NBT.B.4

NJSLS.MATH.CONTENT.4.NBT.B.5

NJSLS.MATH.CONTENT.4.NBT.B.6

Generalize place value understanding for multi-digit whole numbers.

4.NBT.A.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 $700 \div 70 = 10$ by applying concepts of place value and division.*

4.NBT.A.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.NBT.A.3

Use place value understanding to round multi-digit whole numbers to any place.

Use place value understanding and properties of operations to perform multi-digit arithmetic.

4.NBT.B.4

Fluently add and subtract multi-digit whole numbers using the standard algorithm.

4.NBT.B.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.NBT.B.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.

Number & Operations—Fractions

Standards in this domain:

NJSLS.MATH.CONTENT.4.NF.A.1

NJSLS.MATH.CONTENT.4.NF.A.2

NJSLS.MATH.CONTENT.4.NF.B.3

NJSLS.MATH.CONTENT.4.NF.B.4

NJSLS.MATH.CONTENT.4.NF.C.5

NJSLS.MATH.CONTENT.4.NF.C.6

NJSLS.MATH.CONTENT.4.NF.C.7

Extend understanding of fraction equivalence and ordering.

4.NF.A.1

Explain why a fraction a/b is equivalent to a fraction $(n \times a)/(n \times b)$ 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.

4.NF.A.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.

Build fractions from unit fractions.

4.NF.B.3

Understand a fraction a/b with $a > 1$ as a sum of fractions $1/b$.

- Understand addition and subtraction of fractions as joining and separating parts referring to the same whole.
- 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:* $3/8 = 1/8 + 1/8 + 1/8$; $3/8 = 1/8 + 2/8$; $2\ 1/8 = 1 + 1 + 1/8 = 8/8 + 8/8 + 1/8$.
- 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.
- Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, e.g., by using visual fraction models and equations to represent the problem.

4.NF.B.4

Apply and extend previous understandings of multiplication to multiply a fraction by a whole number.

- 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 $5 \times (1/4)$, recording the conclusion by the equation $5/4 = 5 \times (1/4)$.*

- 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 $3 \times (2/5)$ as $6 \times (1/5)$, recognizing this product as $6/5$. (In general, $n \times (a/b) = (n \times a)/b$.)*
- 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?*

Understand decimal notation for fractions, and compare decimal fractions.

4.NF.C.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 100.²*For example, express $3/10$ as $30/100$, and add $3/10 + 4/100 = 34/100$.*

4.NF.C.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.NF.C.7

Compare two decimals to hundredths by reasoning about their size. Recognize that comparisons are valid only when the two decimals refer to the same whole. Record the results of comparisons with the symbols $>$, $=$, or $<$, and justify the conclusions, e.g., by using a visual model.

¹ Grade 4 expectations in this domain are limited to fractions with denominators 2, 3, 4, 5, 6, 8, 10, 12, and 100.

² Students who can generate equivalent fractions can develop strategies for adding fractions with unlike denominators in general. But addition and subtraction with unlike denominators in general is not a requirement at this grade.

Measurement & Data

Standards in this domain:

NJSLS.MATH.CONTENT.4.MD.A.1
NJSLS.MATH.CONTENT.4.MD.A.2
NJSLS.MATH.CONTENT.4.MD.A.3
NJSLS.MATH.CONTENT.4.MD.B.4
NJSLS.MATH.CONTENT.4.MD.C.5
NJSLS.MATH.CONTENT.4.MD.C.6
NJSLS.MATH.CONTENT.4.MD.C.7

Solve problems involving measurement and conversion of measurements.

4.MD.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 measurement 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),
...

4.MD.A.2

Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.

4.MD.A.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.*

Represent and interpret data.

4.MD.B.4

Make a line plot to display a data set of measurements in fractions of a unit ($\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$). 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.*

Geometric measurement: understand concepts of angle and measure angles.

4.MD.C.5

Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement:

4.MD.C.5.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 $\frac{1}{360}$ of a circle is called a "one-degree angle," and can be used to measure angles.

4.MD.C.5.B

An angle that turns through n one-degree angles is said to have an angle measure of n degrees.

4.MD.C.6

Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure.

4.MD.C.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.

² Excludes multiplicative comparison problems (problems involving notions of “times as much”; see Glossary, Table 2).

Geometry

Standards in this domain:

NJSLS.MATH.CONTENT.4.G.A.1

NJSLS.MATH.CONTENT.4.G.A.2

NJSLS.MATH.CONTENT.4.G.A.3

Draw and identify lines and angles, and classify shapes by properties of their lines and angles.

4.G.A.1

Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.

4.G.A.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.

4.G.A.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.