Mathletics
Georgia Program of Studies
Skill Quests

Grades 3 – 6

July, 2022

Mathletics

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Grade 3

1 Operations and Algebraic Thinking

1.1 Represent and solve problems involving multiplication and division

Outcome	Quests	Content
1. Interpret products of whole numbers.	Introduction to multiplication	Multiplying using arrays & repeated addition
2. Interpret whole number quotients of whole numbers.	Introduction to division	Dividing by sharing (up to 50)
		Dividing by grouping (up to 50)
		Create & solve problems involving equal groups
		Using repeated subtraction to divide
3. Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities.	Multiplication & division problems	Multiplication problems: fair share/equal grouping
		Multiplication/division problems: arrays
4. Determine the unknown whole number in a multiplication or division equation relating three whole numbers using the inverse relationship of multiplication and division.	Multiply & divide: finding the unknown	Multiplying & dividing: finding the unknown

1.2 Understand properties of multiplication and the relationship between multiplication and division

Outcome	Quests	Content
5. Apply properties of operations as strategies to multiply and divide.	Multiplication properties	Multiplication properties
6. Understand division as an unknown-factor problem.	Division: unknown-factor problems	Understand division as an unknown-factor problem

1.3 Multiply and divide within 100

Outcome	Quests	Content
7. Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division or properties of operations. By the end of Grade 3, know from memory all products of two one-digit numbers.	Multiplication & division facts	Multiplication facts: 2, 4, 8
		Multiplication facts: 5, 10
		Multiplication facts: 3, 6, 9
		Multiplication facts: 7
		Recalling multiplication facts to 5 x 5
		Recalling multiplication facts to 10 x 10
		Division facts: 2, 4, 8
		Division facts: 5, 10
		Division facts: 3, 6, 9
		Division facts: 7

1.4 Solve problems involving the four operations, and identify and explain patterns in arithmetic

Outcome	Quests	Content
8. Solve two-step word problems using the four operations. 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.	Solve 2-step word problems: 4 operations	2-step word problems with addition & subtraction
		2-step word problems with the 4 operations
9. Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations.	Number patterns	Identifying & creating number patterns
		Identifying odd & even number patterns
		Exploring number patterns in tables & charts

2 Number and Operations in Base Ten

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

Outcome	Quests	Content
1. Use place value understanding to round whole numbers to the nearest 10 or 100.	Round to the nearest 10 or 100	Rounding numbers up to 1000 to the nearest 100
		Rounding numbers up to 1000 to the nearest 10
2. Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.	Add & subtract within 1000	Add & subtract up to 3-digits: number line
		Add & subtract up to 3-digits: jump strategy
		Add & subtract two 2-digits: place value blocks
		Add & subtract up to 3-digits: expanded form
		Add & subtract two 2-digit numbers: compensation
3. Multiply one-digit whole numbers by multiples of 10 in the range 10–90 using strategies based on place value and properties of operations.	Multiply by a multiple of 10	Multiplying by a multiple of 10

3 Number and Operations – Fractions

3.1 Develop understanding of fractions as numbers

Outcome	Quests	Content
1. Understand a fraction 1/*b* as the quantity formed by 1 part when a whole is partitioned into b equal parts (unit fraction); understand a fraction a/b as the quantity formed by a parts of size 1/*b*.	Introduction to fractions	Introducing the numerator & denominator
		Introducing eighths
		Halves, fourths & eighths of objects or shapes
		Halves, thirds or fourths of shapes: partitioning
		Introducing sixths
		Thirds & sixths of objects, shapes & sets
2.a Represent a fraction 1/*b* on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into b equal parts. Recognize that each part has size 1/*b* . Recognize that a unit fraction 1/*b* is located 1/*b* whole unit from 0 on the number line.	Locate unit fractions on a number line	Locating unit fractions on a number line
2.b Represent a non-unit fraction a/b on a number line diagram by marking off a lengths of 1/b (unit fractions) from 0. Recognize that the resulting interval has size a/b and that its endpoint locates the non-unit fraction a/b on the number line.	Locate fractions on a number line	Locating fractions on a number line
3.a Understand two fractions as equivalent (equal) if they are the same size, or the same point on a number line.	Investigate equivalent fractions	Investigating equivalent fractions
3.b Recognize and generate simple equivalent fractions with denominators of 2, 3, 4, 6, and 8. Explain why the fractions are equivalent.	Find simple equivalent fractions	Recognize & generate simple equivalent fractions
3.c Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers.	Whole numbers as fractions	Express & recognize whole numbers as fractions
3.d Compare two fractions with the same numerator or the same	Compare fractions	Comparing fractions: same numerator or denominator

denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions.		

4 Measurement and Data

4.1 Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects

Outcome	Quests	Content
1. Tell and write time to the nearest minute and measure elapsed time intervals in minutes. Solve word problems involving addition and subtraction of time intervals in minutes.	Tell & write time to the minute	Telling time to the minute, digital & analog
		Calculating elapsed time
		Using timetables
2. Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l). Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units to represent the problem.	Liquid volume	Estimating, comparing & measuring in liters
		Liquid volume: milliliters
		Solving word problems involving liquid volume

4.2 Represent and interpret data

Outcome	Quests	Content
3. Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step "how many more" and "how many less" problems using information presented in scaled bar graphs.	Scaled picture & bar graphs	Reading & representing data: scaled picture graph
		Reading & representing data: scaled bar graph
4. Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units— whole numbers, halves, or quarters.	Represent & read line plots	Representing & reading line plots
5.a A square with side length 1 unit, called "a unit square," is said to have "one square unit" of area, and can be used to measure area.	Estimate area with tiling	Estimating area with tiling

4.3 Geometric measurement: understand concepts of area and relate area to multiplication and to addition

Outcome	Quests	Content
5.b A plane figure which can be covered without gaps or overlaps by n unit squares is said to have an area of n square units.	Measure area with unit squares	Measuring area with unit squares
6. Measure areas by counting unit squares.	Measure area with formal units	Introducing formal units for area
		Measuring the area of rectangles
7.a Find the area of a rectangle with whole-number side lengths by tiling it, and show that the area is the same as would be found by multiplying the side lengths.	Find the area with repeated addition	Finding the area of rectangles, repeated addition
7.b Multiply side lengths to find areas of rectangles with whole number side lengths in the context of solving real world and mathematical problems, and represent whole-number products as rectangular areas in mathematical reasoning.	Area problems: multiplication	Solving area problems using multiplication
7.c Use tiling to show in a concrete case that the area of a rectangle with whole-number side lengths a and b + c is the sum of a × b and a × c. Use area models to represent the distributive property in mathematical reasoning.	Find the area using area models	Finding the area of rectangles, area models

4.4 Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures

Outcome	Quests	Content
8. Solve real world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, and exhibiting rectangles with the same perimeter and	Perimeter problems	Finding the perimeter & area of rectangles
		Relating perimeter & area
		Introducing perimeter
		Finding the perimeter of rectangles
		Finding a missing side length given the perimeter

different areas or with the same area and different perimeters.		Finding the perimeter of polygons

4.5 Reason with shapes and their attributes

Outcome	Quests	Content
1. Understand that shapes in different categories may share attributes, and that the shared attributes can define a larger category. Recognize rhombuses, rectangles, and squares as examples of quadrilaterals, and draw examples of quadrilaterals that do not belong to any of these subcategories.	Shapes & their attributes	Sorting & naming quadrilaterals
		Comparing & describing two-dimensional shapes
2. Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole.	Partition shapes	Partition shapes into parts with equal areas

Grade 4

1 Operations and Algebraic Thinking

1.1 Use the four operations with whole numbers to solve problems

Outcome	Quests	Content
1.a Interpret a multiplication equation as a comparison.	Interpret multiplication as a comparison	Describe comparisons using multiplication language
1.b Represent verbal statements of multiplicative comparisons as multiplication equations.	Multiplication comparisons as equations	Writing & solving multiplication comparisons
2. Multiply or divide to solve word problems involving multiplicative comparison. Use drawings and equations with a symbol or letter for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison.	Comparison word problems	Solving comparison word problems
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 symbol or letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.	Word problems: 4 operations	Multi-step multiplication/division word problems
		Solving division word problems
		Solving multiplication word problems
		2-step addition & subtraction word problems

1.2 Gain familiarity with factors and multiples

Outcome	Quests	Content
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	Factors, multiples & prime numbers	Finding multiples: whole numbers up to 100
		Finding factors: whole numbers up to 100
		Prime & composite numbers

multiple of a given one-digit number. Determine whether a given whole number in the range 1–100 is prime or composite.		

1.3 Generate and analyze patterns

Outcome	Quests	Content
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. Explain informally why the pattern will continue to develop in this way.	Number & shape patterns	Generate shape patterns from a given rule
		Generate addition patterns from a given rule
		Generate subtraction patterns from a given rule
		Generate multiplication patterns from a given rule

2 Number and Operations in Base Ten

2.1 Generalize place value understanding for multi-digit whole numbers

Outcome	Quests	Content
1. Recognize that in a multi-digit whole number, a digit in any one place represents ten times what it represents in the place to its right.	Place value for multi-digit numbers	Generalizing place value understanding
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.	Read & write multi-digit numbers	Reading & writing multi-digit numbers
		Comparing two 6-digit numbers
3. Use place value understanding to round multi-digit whole numbers to any place.	Round 6-digit numbers	Rounding 6-digit numbers to any place value

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

Outcome	Quests	Content
4. Fluently add and subtract multi-digit whole numbers using the standard algorithm.	Add multi-digit numbers	Adding multi-digit numbers, no regrouping
		Adding multi-digit numbers, regrouping
	Subtract multi-digit numbers	Subtracting multi-digit numbers, no regrouping
		Subtracting multi-digit numbers, regrouping
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.	Multiply multi-digit numbers	Multiply multi-digit numbers, algorithm
		Multiply multi-digit numbers using place value
		Multiply multi-digit numbers, area model
6. Find whole-number quotients and remainders with up to four-	Divide multi-digit numbers	Dividing numbers, place value blocks

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.		Dividing numbers, area model
		Dividing numbers, place value strategy
		Introducing remainders in division

3 Number and Operations – Fractions

3.1 Extend understanding of fraction equivalence and ordering

Outcome	Quests	Content
1. Explain why two or more fractions are equivalent $a/b = n \times a/n \times b$ by using visual fraction models. Focus attention on how the number and size of the parts differ even though the fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions.	Fraction equivalence	Equivalent fractions with models
		Equivalent fractions with multiplication
2. Compare two fractions with different numerators and different denominators. 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.	Compare fractions	Compare fractions using models
		Compare fractions, different numerator/denominator
		Compare fractions using common denominators

3.2 Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers

Outcome	Quests	Content
3.a Understand addition and subtraction of fractions as joining and separating parts referring to the same whole.	Understand adding/subtracting fractions	Adding unit fractions, same denominators: models
		Adding fractions, same denominator
		Subtracting fractions, same denominator
		Adding & subtracting fractions, same denominator
3.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.	Decompose fractions	Decomposing fractions
3.c Add and subtract mixed numbers with like denominators.	Add & subtract mixed numbers	Adding mixed numbers, same denominator
		Subtracting mixed numbers, same denominator

Outcome	Quests	Content
3.d Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators.	Word problems: add & subtract fractions	Word problems: adding & subtracting fractions
4.a Understand a fraction a/b as a multiple of 1/b.	Fractions: multiples of unit fractions	Fractions: multiples of unit fractions
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.	Multiply fractions by whole numbers	Multiply fractions by whole numbers using models
4.c Solve word problems involving multiplication of a fraction by a whole number.	Word problems: multiply fractions	Word problems: multiply fractions by whole numbers

3.3 Understand decimal notation for fractions, and compare decimal fractions

Outcome	Quests	Content
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.	Add fractions: denominator of 10 & 100	Adding fractions with denominators of 10 and 100
6. Use decimal notation for fractions with denominators 10 or 100.	Fractions as decimals	Introducing decimal notation
		Introducing tenths
		Introducing hundredths
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.	Compare decimals to hundredths	Compare & order decimals to hundredths

3.4 Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit

Outcome	Quests	Content
1.a Understand the relationship between gallons, cups, quarts, and pints.	Convert: imperial units of capacity	Converting between gallons & pints

1.b Express larger units in terms of smaller units within the same measurement system.	Convert units of measure	Units of length: mm/cm/m/km
		Units of mass: g/kg & oz/lb
		Units of time: sec/min/hr & day/week/year
		Units of volume & capacity: mL/L
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.	Word problems: units of measure	Length word problems
		Mass word problems
		Elapsed time word problems
		Volume & capacity word problems
		Money word problems
3. Apply the area and perimeter formulas for rectangles in real world and mathematical problems.	Area & perimeter	Finding the area of a rectangle, formula
		Finding the perimeter of a rectangle, formula

4 Measurement and Data

4.1 Represent and interpret data

Outcome	Quests	Content
4. Make a line plot to display a data set of measurements in fractions of a unit. Solve problems involving addition and subtraction of fractions with common denominators by using information presented in line plots.	Fractions on a line plot	Fractions on a line plot

4.2 Geometric measurement: understand concepts of angle and measure angles

Outcome	Quests	Content
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 1/360 of a circle is called a "one-degree angle," and can be used to measure angles.	Angle measurements in a circle	Using a circular protractor to measure angles
6. Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure.	Measure & estimate angles	Measuring & estimating angles
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.	Problems with adjacent angles	Solving problems with adjacent angles

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

Outcome	Quests	Content
1. Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.	Spatial features in 2-D figures	Classifying angles
		Labeling points & lines
		Identifying spatial features in 2-D shapes
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.	Classify 2-D figures	Classifying plane shapes by their spatial features
		Classifying quadrilaterals
		Classifying triangles by their sides & angles
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.	Lines of symmetry	Lines of symmetry

Grade 5

1 Operations and Algebraic Thinking

1.1 Write and interpret numerical expressions

Outcome	Quests	Content
1. Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols.	Grouping symbols	Order of operations with grouping symbols
2. Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them.	Write & interpret expressions	Writing & interpreting expressions without solving

1.2 Analyze patterns and relationships

Outcome	Quests	Content
3. Generate two numerical patterns using a given rule. Identify apparent relationships between corresponding terms by completing a function table or input/output table. Using the terms created, form and graph ordered pairs on a coordinate plane.	Numerical patterns	Comparing numerical patterns
		Interpreting & creating a number pattern table
		Graphing ordered pairs from numerical patterns

2 Number and Operations in Base Ten

2.1 Understand the place value system

Outcome	Quests	Content
1. Recognize that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and 1/10 of what it represents in the place to its left.	The place value system	Identifying the place value of a digit in a number
		Understanding the place value system: powers of 10
2. Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10.	Multiply & divide by powers of 10	Multiplying decimals by powers of 10
		Dividing decimals by powers of 10
		Finding numbers before & after using powers of 10
		Writing numbers using powers of 10
3.a Read and write decimals to thousandths using base-ten numerals, number names, and expanded form.	Read & write decimals to thousandths	Reading & writing decimals to thousandths
3.b Compare two decimals to thousandths based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.	Compare decimals to thousandths	Comparing & ordering decimals to thousandths
4. Use place value understanding to round decimals up to the hundredths place.	Round decimals	Rounding decimals

2.2 Perform operations with multi-digit whole numbers and with decimals to hundredths

Outcome	Quests	Content
5. Fluently multiply multi-digit whole numbers using the standard algorithm (or other strategies demonstrating understanding of multiplication) up to a 3 digit by 2 digit factor.	Multiply multi-digit numbers, algorithm	Multiplying multi-digit numbers, algorithm
6. Fluently divide up to 4-digit dividends and 2-digit divisors by	Divide multi-digit numbers	Using facts to divide 2-digit multiples of 10

using at least one of the following methods: 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 or concrete models.		Multiplying & dividing 2-digit multiples of 10
		Multiplication/division problems: multiples of 10
		Dividing by subtracting partial products
		Dividing multi-digit numbers, algorithm
		Divide multi-digit numbers, whole number remainder
7. Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.	Operations with decimals	Adding decimals to hundredths, algorithm
		Subtracting decimals using mental strategies
		Subtracting decimals to hundredths, algorithm
		Multiplying decimals & whole numbers
		Multiplying decimals to hundredths, algorithm
		Multiplying decimals using mental strategies
		Multiplicative relationships with decimals
		Divide whole numbers & decimals, mental strategies
		Dividing whole numbers & decimals, algorithm

3 Number and Operations – Fractions

3.1 Use equivalent fractions as a strategy to add and subtract fractions

Outcome	Quests	Content
1. Add and subtract fractions and mixed numbers with unlike denominators by finding a common denominator and equivalent fractions to produce like denominators.	Add & subtract fractions	Adding fractions & mixed numbers
		Subtracting fractions & mixed numbers
		Adding & subtracting fractions & mixed numbers
		Adding fractions, proper & improper
		Adding mixed numbers
		Subtracting fractions, proper & improper
		Subtracting mixed numbers
2. Solve word problems involving addition and subtraction of fractions, including cases of unlike denominators. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers.	Add/subtract fraction word problems	Solving word problems: fractions & mixed numbers
		Solving fraction word problems

3.2 Apply and extend previous understandings of multiplication and division to multiply and divide fractions

Outcome	Quests	Content
3. Interpret a fraction as division of the numerator by the denominator ($a/b = a \div b$). Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers.	Fractions as division	Interpreting fractions as division
4.a Apply and use understanding of multiplication to multiply a fraction or whole number by a fraction.	Multiply fractions	Multiplying a fraction by a whole number
		Multiplying a fraction by a fraction
4.b Find the area of a rectangle with fractional side lengths by tiling it with unit squares of the appropriate unit fraction side	Area of a rectangle, fractional sides	Find the area of a rectangle with fractional sides

lengths, and show that the area is the same as would be found by multiplying the side lengths.		
5.a Comparing the size of a product to the size of one factor on the basis of the size of the other factor, without performing the indicated multiplication.	Compare products & factors	Comparing products & factors
5.b Explaining why multiplying a given number by a fraction greater than 1 results in a product greater than the given number (recognizing multiplication by whole numbers greater than 1 as a familiar case); explaining why multiplying a given number by a fraction less than 1 results in a product smaller than the given number; and relating the principle of fraction equivalence a/b = (n×a)/(n×b) to the effect of multiplying a/b by 1.	Effects of multiplying fractions	Interpreting multiplying fractions as scaling
6. Solve real world problems involving multiplication of fractions and mixed numbers.	Multiply fractions word problems	Word problems: multiply fractions & mixed numbers
7.a Interpret division of a unit fraction by a non-zero whole number, and compute such quotients.	Divide unit fractions by whole numbers	Dividing unit fractions by whole numbers, models
7.b Interpret division of a whole number by a unit fraction, and compute such quotients.	Divide whole numbers by unit fractions	Dividing whole numbers by unit fractions, models
7.c Solve real world problems involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions.	Divide unit fractions word problems	Word problems: divide unit fractions/whole numbers

4 Measurement and Data

4.1 Convert like measurement units within a given measurement system

Outcome	Quests	Content
1. Convert among different-sized standard measurement units (mass, weight, length, time, etc.) within a given measurement system (customary and metric), and use these conversions in solving multi-step, real world problems.	Convert measurement units	Converting between standard metric units of length
		Converting between standard metric units of mass
		Converting metric units of volume & capacity
		Converting between customary units of length
		Converting customary units of volume & capacity
		Converting between customary units of mass
		Word problems: measurement conversions

4.2 Represent and interpret data

Outcome	Quests	Content
2. Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Use operations on fractions for this grade to solve problems involving information presented in line plots.	Fraction problems: line plots	Represent & interpret measurements: line plots

4.3 Geometric measurement: understand concepts of volume and relate volume to multiplication and division

Outcome	Quests	Content
4. Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised units.	Measure volume with unit cubes	Measuring volume: unit cubes & cubic centimeters
5.a Find the volume of a right rectangular prism with whole-number side lengths by packing it with unit cubes, and show that the	Volume: rectangular prisms	Volume: additive & multiplicative strategies

volume is the same as would be found by multiplying the edge lengths, equivalently by multiplying the height by the area of the base. Represent threefold whole-number products as volumes.		
5.b Apply the formulas V = l × w × h and V = b × h for rectangular prisms to find volumes of right rectangular prisms with whole number edge lengths in the context of solving real world and mathematical problems.	Volume formulas: rectangular prism	Applying volume formulas for rectangular prisms
5.c Recognize volume as additive. Find volumes of solid figures composed of two non-overlapping right rectangular prisms by adding the volumes of the non-overlapping parts, applying this technique to solve real world problems.	Volume: composite rectangular prisms	Volume of composite rectangular prisms

5 Geometry

5.1 Graph points on the coordinate plane to solve real-world and mathematical problems

Outcome	Quests	Content
1. Use a pair of perpendicular number lines, called axes, to define a coordinate system, with the intersection of the lines (the origin) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers, called its coordinates. Understand that the first number indicates how far to travel from the origin in the direction of one axis, and the second number indicates how far to travel in the direction of the second axis, with the convention that the names of the two axes and the coordinates correspond.	The coordinate plane	Introducing the coordinate plane
2. Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation.	Graph in the first quadrant	Graphing in the first quadrant

5.2 Classify two-dimensional figures into categories based on their properties

Outcome	Quests	Content
3. Understand that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category.	Attributes of 2-D figures	Sorting plane shapes
4. Classify two-dimensional figures in a hierarchy based on properties.	Classify 2-D figures, properties	Classifying 2-D figures in a hierarchy
		Classifying quadrilaterals

Grade 6

1 Ratios and Proportional Relationships

1.1 Understand ratio concepts and use ratio reasoning to solve problems

Outcome	Quests	Content
1. Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities.	Introduction to ratios	Defining, understanding & writing ratios
2. Understand the concept of a unit rate a / b associated with a ratio a: b with b ≠ 0 (b not equal to zero), and use rate language in the context of a ratio relationship.	Introduction to unit rate	Understanding unit rates & making comparisons
3.a Make tables of equivalent ratios relating quantities with whole-number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios.	Ratio tables	Creating tables of equivalent ratios
		Plotting coordinates from ratio tables
3.b Solve unit rate problems including those involving unit pricing and constant speed.	Unit rate	Solving unit rate problems for given time periods
		Solving unit rate problems involving unit pricing
3.c Find a percent of a quantity as a rate per 100; given a percent, solve problems involving finding the whole given a part and the part given the whole.	Percent of a quantity	Expressing rates as a percent
		Solving percent problems: finding the whole
3.d Given a conversion factor, use ratio reasoning to convert measurement units within one system of measurement and between two systems of measurements (customary and metric); manipulate and transform units appropriately when multiplying or dividing quantities.	Convert measurements using ratios	Converting measurement units using ratios

2 The Number System

2.1 Apply and extend previous understandings of multiplication and division to divide fractions by fractions

Outcome	Quests	Content
1. Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, including reasoning strategies such as using visual fraction models and equations to represent the problem.	Divide fractions	Dividing a fraction by a positive integer
		Dividing a positive integer by a fraction
		Dividing a fraction by a fraction
		Dividing fractions & mixed numbers
		Solving word problems: division of fractions

2.2 Compute fluently with multi-digit numbers and find common factors and multiples

Outcome	Quests	Content
2. Fluently divide multi-digit numbers using the standard algorithm.	Divide multi-digit numbers, algorithm	Divide 4-digit by 2-digit numbers, no remainder
		Divide 4-digit by 2-digit numbers, with remainders
		Divide 4-digit by 2-digit numbers
3. Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.	Operations with multi-digit decimals	Adding decimals using the standard algorithm
		Subtracting decimals using the standard algorithm
		Multiplying decimals using the standard algorithm
		Dividing decimals using the standard algorithm
		Word problems: adding & subtracting decimals
		Word problems: multiplying & dividing decimals
4.a Find the greatest common factor of 2 whole numbers and use the distributive property to express a sum of two whole numbers 1-100 with a common factor as a multiple	Find the greatest common factor	Finding the greatest common factor

of a sum of two whole numbers with no common factors.		
4.b Apply the least common multiple of two whole numbers less than or equal to 12 to solve real-world problems.	Find the least common multiple	Finding the least common multiple
	Solve word problems: factors & multiples	Solving word problems: factors & multiples

2.3 Apply and extend previous understandings of numbers to the system of rational numbers

Outcome	Quests	Content
5. Understand that positive and negative numbers are used together to describe quantities having opposite directions or values; use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation.	Positive & negative numbers	Investigating & interpreting integers
6.a Recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line; recognize that the opposite of the opposite of a number is the number itself, and that 0 is its own opposite.	Opposites on the number line	Opposites on the number line
6.b Understand signs of numbers in ordered pairs as indicating locations in quadrants of the coordinate plane; recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes.	Graph in the 4 quadrants	Graphing coordinates in the 4 quadrants
		Graphing coordinates across the x-axis & y-axis
6.c Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane.	Graph rational numbers	Placing rational numbers on the number line
		Graphing rational numbers on the coordinate plane
7.a Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram.	Compare rational numbers	Comparing integers
		Comparing rational numbers
7.b Write, interpret, and explain statements of order for rational numbers in real-world contexts.	Order rational numbers	Exploring the everyday language of integers
		Statements of order: rational numbers

7.c Understand the absolute value of a rational number as its distance from 0 on the number line; interpret absolute value as magnitude for a positive or negative quantity in a real-world situation.	Introduction to absolute value	Introducing absolute value
7.d Distinguish comparisons of absolute value from statements about order.	Absolute value vs order	Interpreting meanings of integers in context
8. Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.	Solve problems by graphing: 4 quadrants	Solving problems by graphing in the 4 quadrants
		Find the distance between 2 points, absolute value

3 Expressions and Equations

3.1 Apply and extend previous understandings of arithmetic to algebraic expressions

Outcome	Quests	Content
1. Write and evaluate numerical expressions involving whole-number exponents.	Numerical expressions with exponents	Writing numerical expressions with exponents
		Evaluating numerical expressions with exponents
2.a Write expressions that record operations with numbers and with letters standing for numbers.	Write expressions: numbers & variables	Writing expressions with numbers & variables
2.b Identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient); view one or more parts of an expression as a single entity.	Parts of an expression	Identifying parts of an expression
2.c Evaluate expressions at specific values for their variables. Include expressions that arise from formulas in real-world problems. Perform arithmetic operations, including those involving whole-number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations).	Evaluate algebraic expressions	Evaluating algebraic expressions
		Evaluating expressions using order of operations
3. Apply the properties of operations to generate equivalent expressions.	Properties of operations: expressions	Properties of operations: equivalent expressions
4. Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them).	Equivalent expressions	Identifying equivalent expressions

3.2 Reason about and solve one-variable equations and inequalities

Outcome	Quests	Content
5. Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true? Use	Test solutions	Testing solutions: equations
		Testing solutions: inequalities

Outcome	Quests	Content
substitution to determine whether a given number in a specified set makes an equation or inequality true.		
6. Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.	Write algebraic expressions	Writing algebraic expressions
7. Solve real-world and mathematical problems by writing and solving equations of the form $x + p = q$ and $px = q$ for cases in which p, q and x are all nonnegative rational numbers.	Solve 1-step equations	Preserving equality in equations
		Solving simple linear equations using models
		1-step equations: add/subtract, positive integers
		1-step equations: add/subtract, rational numbers
		1-step equations: multiply, positive integers
		1-step equations: multiply, rational numbers
		1-step equations: division, rational numbers
		Writing & solving 1-step equations
8. Write an inequality of the form $x > c$ or $x < c$ to represent a constraint or condition in a real-world or mathematical problem. Recognize that inequalities of the form $x > c$ or $x < c$ have infinitely many solutions; represent solutions of such inequalities on number line diagrams.	Write & represent inequalities	Writing inequalities
		Represent algebraic inequalities on a number line

3.3 Represent and analyze quantitative relationships between dependent and independent variables

Outcome	Quests	Content
9. Use variables to represent two quantities in a real-world problem that change in relationship to one another. a. Write an equation to express one quantity, the	Independent & dependent variables	Independent & dependent variables

dependent variable, in terms of the other quantity, the independent variable. b. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation.		

3.4 Solve real-world and mathematical problems involving area, surface area, and volume

Outcome	Quests	Content
1. Find area of right triangles, other triangles, quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems.	Area: triangles & quadrilaterals	Finding the area of a right triangle
		Investigating the area of special quadrilaterals
		Real-world area problems: special quadrilaterals
2. Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths (1/2 u), and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas V = (length) x (width) x (height) and V= (area of base) x (height) to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems.	Volume: rectangular prisms, formula	Volume: rectangular prisms, fraction edge lengths
3. Draw polygons in the coordinate plane given coordinates for the vertices; use coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate. Apply these techniques in the context of solving real-world and mathematical problems.	Polygons in the coordinate plane	Drawing polygons in the coordinate plane
4. Represent three-dimensional figures using nets made up of rectangles and triangles, and use the nets to find the surface area of	Surface area	Connecting 3-D objects with their nets
		Calculating the surface area of rectangular prisms

these figures. Apply these techniques in the context of solving real world and mathematical problems.		

4 Statistics and Probability

4.1 Develop understanding of statistical variability

Outcome	Quests	Content
1. Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers.	Statistical questions	Evaluating statistical questions
2. Understand that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread, and overall shape.	Shape of data distribution	Introducing the shape of data distribution
3. Recognize that a measure of center for a numerical data set summarizes all of its values with a single number, while a measure of variation describes how its values vary with a single number.	Measures of center & variation	Measures of center & variation
		Introducing the upper & lower quartiles
		Introducing interquartile range
		Understanding the median

4.2 Summarize and describe distributions

Outcome	Quests	Content
4. Display numerical data in plots on a number line, including dot plots (line plots), histograms, and box plots.	Data displays	Constructing data displays
		Reading & interpreting data in a dot plot
		Reading & interpreting data in a histogram
		Reading & interpreting box plots
5. Summarize numerical data sets in relation to their context.	Summarize numerical data	Summarizing numerical data
5.a Reporting the number of observations.	Report observations	Reporting observations in a data display
5.b Describing the nature of the attribute under investigation, including how it was measured and its units of measurement.	Attributes of data	Describing attributes of data in data displays
5.c Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations	Calculate measures of center & variation	Calculating the mean absolute deviation
		Calculating the median
		Calculating the mean
		Identifying clusters, gaps & outliers

from the overall pattern with reference to the context in which the data were gathered.		Identifying skewed & symmetrical sets of data
5.d Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered.	Relating measures of center & variation	Choosing appropriate measures of center/variation
		Comparing measures of center & variation

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