Mathletics
Ohio Program of Studies
Skill Quests

Grades 3 – 6

July, 2022

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July 2022

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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.	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.	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 or a symbol, which stands for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding. This standard is limited to problems posed with whole numbers and having whole number answers. Students may use parentheses for clarification since algebraic order of operations is not expected.	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. A range of strategies and algorithms may be used.

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 1,000 to the nearest 100
		Rounding numbers up to 1,000 to the nearest 10
2. Fluently add and subtract within 1,000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.	Add & subtract within 1,000	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-digits: 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; 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 and that the endpoint of the part based at 0 locates the number 1/b on the number line.	Locate unit fractions on a number line	Locating unit fractions on a number line
2.b Represent a fraction a/b (which may be greater than 1) on a number line diagram by marking off a lengths 1/b from 0. Recognize that the resulting interval has size a/b and that its endpoint locates the number 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. 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 denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same	Compare fractions	Comparing fractions: same numerator or denominator

whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions.		

4 Measurement and Data

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

Outcome	Quests	Content
1.a Tell and write time to the nearest minute. Measure time intervals in minutes (within 90 minutes). Solve real-world problems involving addition and subtraction of time intervals (elapsed time) in minutes.	Tell & write time to the minute	Telling time to the minute, digital & analog
		Calculating elapsed time
		Using timetables
1.b Solve word problems by adding and subtracting within 1,000 dollars with dollars and cents with cents (not using dollars and cents simultaneously) using the $ and ¢ symbol appropriately (not including decimal notation).	Use money to make purchases	Using money to make purchases
2. Measure and estimate liquid volumes and masses of objects using standard units of grams, kilograms, and liters. Add, subtract, multiply, or divide whole numbers to solve one-step word problems involving masses or volumes that are given in the same units.	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. Create scaled picture graphs to represent a data set with several categories. Create scaled bar graphs to represent a data set with several categories. Solve two-step “how many more” and “how many less” problems using information presented in the scaled 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 creating a line plot, where the horizontal scale is marked off in appropriate	Represent & read line plots	Representing & reading line plots

units—whole numbers, halves, or quarters.		

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

Outcome	Quests	Content
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
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 (represent the distributive property with visual models including an area model).	Find the area using area models	Finding the area of rectangles, area models
7.d Recognize area as additive. Find the area of figures composed of rectangles by decomposing into non-overlapping rectangles and adding the areas of the non-overlapping parts, applying this technique to solve real-world problems.	Find the area of rectilinear figures	Finding the area of rectilinear figures

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

5 Geometry

5.1 Reason with shapes and their attributes

Outcome	Quests	Content
1. Draw and describe triangles, quadrilaterals, and polygons (up to 8 sides) based on the number of sides and the presence or absence of square corners.	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. Interpret a multiplication equation as a comparison.	Interpret multiplication as a comparison	Describe comparisons using multiplication language
2. Multiply or divide to solve word problems involving multiplicative comparison.	Comparison word problems	Solving comparison word problems
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.	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 multiple of a given one-digit number. Determine whether a given whole number in the range 1-100 is prime or composite.	Factors, multiples & prime numbers	Finding multiples: whole numbers up to 100
		Finding factors: whole numbers up to 100
		Prime & composite numbers
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.	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 less than or equal to 1,000,000

Outcome	Quests	Content
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 by applying concepts of place value, multiplication, or division.	Place value for multi-digit numbers	Generalizing place value understanding
2. Read and write multi-digit whole numbers using standard form, word form, 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 through 1,000,000.	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 with whole numbers less than or equal to 1,000,000

Outcome	Quests	Content
4. Fluently add and subtract multi-digit whole numbers using a 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	Multiplying multi-digit numbers, algorithm
		Multiplying multi-digit numbers using place value
		Multiplying multi-digit numbers, area model
6. Find whole number quotients and remainders with up to four digit	Divide multi-digit numbers	Dividing numbers, place value blocks

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 limited to fractions with denominators 2, 3, 4, 5, 6, 8, 10, 12, and 100

Outcome	Quests	Content
1. Explain why a fraction a/b is equivalent to a fraction (n × a) /(n × b) by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions.	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, e.g., by using a visual fraction model.	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 limited to fractions with denominators 2, 3, 4, 5, 6, 8, 10, 12, and 100 (fractions need not be simplified)

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
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 limited to fractions with denominators 2, 3, 4, 5, 6, 8, 10, 12, and 100

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 & 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

4 Measurement and Data

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

Outcome	Quests	Content
1. Know relative sizes of the metric measurement units within one system of units. Metric units include kilometer, meter, centimeter, and millimeter; kilogram and gram; and liter and milliliter. Express a larger measurement unit in terms of a smaller unit. Record measurement conversions in a two-column table.	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.a Using models, add and subtract money and express the answer in decimal notation.	Money word problems	Money word problems
2.b Using number line diagrams, clocks, or other models, add and subtract intervals of time in hours and minutes.	Tell & write time to the minute	Telling time to the minute, digital & analog
		Calculating elapsed time
		Using timetables
2.c Add, subtract, and multiply whole numbers to solve metric measurement problems involving distances, liquid volumes, and masses of objects.	Word problems: units of measure	Length word problems
		Mass word problems
		Volume & capacity word problems
3. Develop efficient strategies to determine the area and perimeter of rectangles in real-world situations and mathematical problems.	Area & perimeter	Finding the area of a rectangle, formula
		Finding the perimeter of a rectangle, formula

4.2 Represent and interpret data

Outcome	Quests	Content
4. Display and interpret data in graphs (picture graphs, bar graphs, and line plots) to solve problems using numbers and operations for this grade.	Fractions on a line plot	Fractions on a line plot
	Represent data in a picture graph	Representing data in a picture graph
	Represent data in a bar graph	Representing data in a bar graph

4.3 Geometric measurement: understand concepts of angle and measure angles

Outcome	Quests	Content
5.a Understand 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

5 Geometry

5.1 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, and 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.	Classify 2-D figures	Classifying plane shapes by their spatial features
		Classifying quadrilaterals
		Classifying triangles by their sides & angles

Grade 5

1 Operations and Algebraic Thinking

1.1 Write and interpret numerical expressions

Outcome	Quests	Content
1. Use parentheses in numerical expressions, and evaluate expressions with this symbol. Formal use of algebraic order of operations is not necessary.	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 two given rules. Identify apparent relationships between corresponding terms. Form ordered pairs consisting of corresponding terms from the two patterns, and graph the 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 to any place, millions through hundredths.	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 a standard algorithm.	Multiply multi-digit numbers, algorithm	Multiplying multi-digit numbers, algorithm
6. Find whole number quotients of whole numbers with up to four-digit dividends and two-digit divisors, using strategies based on place	Divide multi-digit numbers	Using facts to divide 2-digit multiples of 10
		Multiplying & dividing 2-digit multiples of 10

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.		Multiplication/division problems: multiples of 10
		Dividing by subtracting partial products
		Dividing multi-digit numbers, algorithm
		Divide multi-digit numbers, whole number remainder
7.a Add and subtract decimals, including decimals with whole numbers, (whole numbers through the hundreds place and decimals through the hundredths place).	Add & subtract with decimals	Adding decimals to hundredths, algorithm
		Subtracting decimals using mental strategies
7.b Multiply whole numbers by decimals (whole numbers through the hundreds place and decimals through the hundredths place).	Multiply whole numbers by decimals	Multiplying decimals & whole numbers
		Multiplicative relationships with decimals
7.c Divide whole numbers by decimals and decimals by whole numbers (whole numbers through the tens place and decimals less than one through the hundredths place using numbers whose division can be readily modeled).	Divide whole numbers & 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 (fractions need not be simplified)

Outcome	Quests	Content
1. Add and subtract fractions with unlike denominators (including mixed numbers and fractions greater than 1) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with 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 referring to the same whole, including cases of unlike denominators.	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 (fractions need not be simplified)

Outcome	Quests	Content
3. Interpret a fraction as division of the numerator by the denominator (a/b = a ÷ 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 Interpret the product (a/b) × q as a parts of a partition of q into b equal parts, equivalently, as the result of a sequence of operations a × q ÷ b.	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 lengths, and show that the area is	Area of a rectangle, fractional sides	Find the area of a rectangle with fractional sides

the same as would be found by multiplying the side lengths. Multiply fractional side lengths to find areas of rectangles, and represent fraction products as rectangular areas.		
5.a Compare 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 Explain 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. Know relative sizes of these U.S. customary measurement units: pounds, ounces, miles, yards, feet, inches, gallons, quarts, pints, cups, fluid ounces, hours, minutes, and seconds. Convert between pounds and ounces; miles and feet; yards, feet, and inches; gallons, quarts, pints, cups, and fluid ounces; hours, minutes, and seconds 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. Display and interpret data in graphs (picture graphs, bar graphs, and line plots) to solve problems using numbers and operations for this grade.	Fraction problems: line plots	Represent & interpret measurements: line plots

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

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 is the same as would be	Volume: rectangular prisms	Volume: additive & multiplicative strategies

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 $V = \ell \times w \times h$ and $V = B \times h$ 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. Identify and describe commonalities and differences between types of triangles based on angle measures (equiangular, right, acute, and obtuse triangles) and side lengths (isosceles, equilateral, and scalene triangles).	Classify triangles	Classifying triangles by their sides & angles
4. Identify and describe commonalities and differences between types of quadrilaterals	Identify different quadrilaterals	Sorting & naming quadrilaterals

based on angle measures, side lengths, and the presence or absence of parallel and perpendicular lines.		

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, and use rate language in the context of a ratio relationship.	Introduction to unit rates	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.d Use ratio reasoning to convert measurement units; 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.	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 a 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 a 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
6.NS.4 Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole	GCF & LCM	Greatest common factor
		Least common multiple
		Solving word problems: factors & multiples

numbers less than or equal to 12. Use the distributive property to express a sum of two whole numbers 1-100 with a common factor as a multiple of a sum of two whole numbers with no common factor.		Factoring using the distributive property

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, e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge; 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	Compare rational numbers	Comparing integers
		Comparing rational numbers

relative position of two numbers on a number line diagram.		
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 of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole number exponents, using the algebraic order of operations when there are no parentheses to specify a particular order.	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.	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 substitution to determine whether a	Test solutions	Testing solutions: equations
		Testing solutions: inequalities

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; write an equation to express one quantity, thought of as the dependent variable, in terms of	Independent & dependent variables	Independent & dependent variables

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

4 Geometry

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

Outcome	Quests	Content
1. Through composition into rectangles or decomposition into triangles, find the area of right triangles, other triangles, special quadrilaterals, and polygons; apply these techniques in the context of solving real-world and mathematical problems.	Area: triangles & quadrilaterals	Finding the area of a 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, and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas $V = \ell \cdot w \cdot h$ and $V = B \cdot h$ 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 these figures. Apply these techniques in the context of solving real world and mathematical problems.	Surface area	Connecting 3-D objects with their nets
		Calculating the surface area of rectangular prisms

5 Statistics and Probability

5.1 Develop understanding of statistical problem solving

Outcome	Quests	Content
1.a Formulate questions: recognize and formulate a statistical question as one that anticipates variability and can be answered with quantitative data.	Statistical questions	Evaluating statistical questions
1.b Collect data: design and use a plan to collect appropriate data to answer a statistical question.	Conduct a statistical investigation	Conducting a statistical investigation
1.c Analyze data: select appropriate graphical methods and numerical measures to analyze data by displaying variability within a group, comparing individual to individual, and comparing individual to group.	Compare graphical data methods	Comparing graphical data methods
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
		Understanding the mean

5.2 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 Report the number of observations.	Report observations	Reporting observations in a data display
5.b Describe 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 Find the quantitative measures of center (median and/or mean) for a numerical data set and recognize that this value summarizes the data set with a single number. Interpret mean as an equal or fair share. Find measures of variability (range and interquartile range) as well as informally describe the shape and the presence of clusters, gaps, peaks, and outliers in a distribution.	Calculate measures of center & variation	Calculating the mean absolute deviation
		Calculating the median
		Calculating the mean
		Identifying clusters, gaps & outliers
		Identifying skewed & symmetrical sets of data
5.d Choose the measures of center and variability, based on the shape of the data distribution and the context in which the data were gathered.	Relate measures of center & variation	Choosing appropriate measures of center/variation
		Comparing measures of center & variation

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