Mathletics

New York Program of Studies

Skill Quests

Grades 3 – 6

July, 2022

Mathletics

Mathletics

New York Program of Studies

Skill Quests

July 2022

Grade 3

1 Operations and Algebraic Thinking

1.1 Represent and solve problems involving multiplication and division

Outcome	Quests	Content
NY-3.OA.1 Interpret products of whole numbers.	Introduction to multiplication	Multiplying using arrays & repeated addition
NY-3.OA.2 Interpret whole-number quotients of whole numbers.	Introduction to division	Dividing by sharing (up to 50)
		Dividing by grouping (up to 50)
		Creating & solving problems involving equal groups
		Using repeated subtraction to divide
NY-3.OA.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
NY-3.OA.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
NY-3.OA.5 Apply properties of operations as strategies to multiply and divide.	Multiplication properties	Multiplication properties
NY-3.OA.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
NY-3.OA.7a Fluently solve single-digit multiplication and related divisions, using strategies such as the relationship between multiplication and division or properties of operations.	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 extend patterns in arithmetic

Outcome	Quests	Content
NY-3.OA.8a Represent these problems using equations or expressions with a letter standing for the unknown quantity.	2-step word problems: 4 operations	2-step word problems with addition & subtraction
NY-3.OA.8b Assess the reasonableness of answers using mental computation and estimation strategies including rounding.	Reasonableness of answers	Finding the reasonableness of answers
NY-3.OA.9 Identify and extend arithmetic patterns (including	Number patterns	Identifying & creating number patterns

patterns in the addition table or multiplication table).		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
NY-3.NBT.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
NY-3.NBT.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 within 1000	Add 2-digit & 3-digit numbers: number line
		Add 2-digit & 3-digit numbers: jump strategy
		Add two 2-digit numbers: base ten blocks
		Add 2-digit & 3-digit numbers: expanded form
		Add two 2-digit numbers: compensation
	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
NY-3.NBT.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
NY-3.NBT.4a Understand that the digits of a four-digit number represent amounts of thousands, hundreds, tens, and ones.	Place value: four-digit numbers	Using place value to partition 4-digit numbers
NY-3.NBT.4b Read and write four-digit numbers using base-ten numerals, number names, and expanded form.	Read & write four-digit numbers	Reading & writing four-digit numbers

3 Number and Operations – Fractions

3.1 Develop understanding of fractions as numbers

Outcome	Quests	Content
NY-3.NF.1 Understand a unit fraction, $1/b$, is 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
NY-3.NF.2a Represent a fraction $1/b$ on a number line 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 starting 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
NY-3.NF.2b Represent a fraction a/b on a number line 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
NY-3.NF.3a 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
NY-3.NF.3b Recognize and generate equivalent fractions. Explain why the fractions are equivalent.	Find simple equivalent fractions	Recognize & generate simple equivalent fractions
NY-3.NF.3c Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers.	Whole numbers as fractions	Express & recognize whole numbers as fractions
NY-3.NF.3d Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons rely on the two fractions referring 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 measurement and estimation of intervals of time, liquid volumes, and masses of objects

Outcome	Quests	Content
NY-3.MD.1 Tell and write time to the nearest minute and measure time intervals in minutes. Solve one-step 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
NY-3.MD.2a Measure and estimate liquid volumes and masses of objects using grams (g), kilograms (kg), and liters (l).	Liquid volume	Estimating, comparing & measuring in liters
		Liquid volume: milliliters
NY-3.MD.2b Add, subtract, multiply, or divide to solve one-step word problems involving masses or liquid volumes that are given in the same units.	Solve word problems: liquid volume	Solving word problems involving liquid volume

4.2 Represent and interpret data

Outcome	Quests	Content
NY-3.MD.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 a scaled picture graph or a scaled bar graph.	Scaled picture & bar graphs	Reading & representing data: scaled picture graph
		Reading & representing data: scaled bar graph
NY-3.MD.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

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

Outcome	Quests	Content
NY-3.MD.5a Recognize 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

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

Outcome	Quests	Content
NY-3.MD.5b Recognize 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
NY-3.MD.6 Measure areas by counting unit squares.	Measure area with formal units	Introducing formal units for area
		Measuring the area of rectangles
NY-3.MD.7a 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
NY-3.MD.7b 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
NY-3.MD.7c Use tiling to show in a concrete case that the area of a rectangle with whole-number side length a and side length 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

NY-3.MD.7d Recognize area as additive. Find areas of figures composed of non-overlapping rectangles, and apply this technique to solve real world problems.	Find the area of rectilinear figures	Finding the area of rectilinear figures

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

Outcome	Quests	Content
NY-3.MD.8a Solve real world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths or finding one unknown side length given the perimeter and other side lengths.	Perimeter problems	Introducing perimeter
		Finding the perimeter of rectangles
		Finding a missing side length given the perimeter
		Finding the perimeter of polygons
NY-3.MD.8b Identify rectangles with the same perimeter and different areas or with the same area and different perimeters.	Relate & compare perimeter & area	Relating & comparing perimeter & area

5 Geometry

5.1 Reason with shapes and their attributes

Outcome	Quests	Content
NY-3.G.1 Recognize and classify polygons based on the number of sides and vertices. Identify shapes that do not belong to one of the given subcategories.	Shapes & their attributes	Sorting & naming quadrilaterals
		Comparing & describing two-dimensional shapes
NY-3.G.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
NY-4.OA.1 Interpret a multiplication equation as a comparison. Represent verbal statements of multiplicative comparisons as multiplication equations.	Interpret multiplication as a comparison	Describe comparisons using multiplication language
NY-4.OA.2 Multiply or divide to solve word problems involving multiplicative comparison, distinguishing multiplicative comparison from additive comparison. Use drawings and equations with a symbol for the unknown number to represent the problem.	Comparison word problems	Solving comparison word problems
NY-4.OA.3a Represent these problems using equations or expressions with a letter standing for the unknown quantity.	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
NY-4.OA.4 Find all factor pairs for a whole number in the range 1–100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1–100 is a multiple of a given one-digit number. Determine whether a given	Factors, multiples & prime numbers	Finding multiples: whole numbers up to 100
		Finding factors: whole numbers up to 100
		Prime & composite numbers

whole number in the range 1-100 is prime or composite.		

1.3 Generate and analyze patterns

Outcome	Quests	Content
NY-4.OA.5 Generate a number or shape pattern that follows a given rule. Identify and informally explain 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

Outcome	Quests	Content
NY-4.NBT.1 Recognize that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right.	Place value for multi-digit numbers	Generalizing place value understanding
NY-4.NBT.2a Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form.	Read & write multi-digit numbers	Reading & writing multi-digit numbers
NY-4.NBT.2b Compare two multi-digit numbers based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.	Compare multi-digit numbers	Comparing multi-digit numbers
NY-4.NBT.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
NY-4.NBT.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
NY-4.NBT.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

NY-4.NBT.6 Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.	Divide multi-digit numbers	Dividing numbers, place value blocks
		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
NY-4.NF.1 Explain why a fraction a/b is equivalent to a fraction $a \times n/b \times n$ 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
NY-4.NF.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
NY-4.NF.3a 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
NY-4.NF.3b 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
NY-4.NF.3c Add and subtract mixed numbers with like denominators.	Add & subtract mixed numbers	Adding mixed numbers, same denominator
		Subtracting mixed numbers, same denominator

NY-4.NF.3d 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
NY-4.NF.4a Understand a fraction a/b as a multiple of $1/b$.	Fractions: multiples of unit fractions	Fractions: multiples of unit fractions
NY-4.NF.4b Understand a multiple of a/b as a multiple of $1/b$, and use this understanding to multiply a whole number by a fraction.	Multiply fractions by whole numbers	Multiply fractions by whole numbers using models
NY-4.NF.4c Solve word problems involving multiplication of a whole number by a fraction.	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
NY-4.NF.5 Express a fraction with denominator 10 as an equivalent fraction with denominator 100, and use this technique to add two fractions with respective denominators 10 and 100.	Add fractions: denominator of 10 and 100	Adding fractions with denominators of 10 and 100
NY-4.NF.6 Use decimal notation for fractions with denominators 10 or 100.	Fractions as decimals	Introducing decimal notation
		Introducing tenths
		Introducing hundredths
NY-4.NF.7 Compare two decimals to hundredths by reasoning about their size. Recognize that comparisons are valid only when 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
NY-4.MD.1 Know relative sizes of measurement units: ft., in.; km, m, cm. Know the conversion factor and use it to convert measurements in a larger unit in terms of a smaller unit: ft., in.; km, m, cm; hr., min., sec. Given the conversion factor, convert all other measurements within a single system of measurement from a larger unit to a smaller unit.	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
NY-4.MD.2a Solve problems involving fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit.	Word problems: units of measure	Length word problems
		Mass word problems
		Elapsed time word problems
		Volume & capacity word problems
		Money word problems
NY-4.MD.2b Represent measurement quantities using diagrams that feature a measurement scale, such as number lines.	Represent length measurements	Representing length measurements on number lines
NY-4.MD.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

4.2 Represent and interpret data

Outcome	Quests	Content
NY-4.MD.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 by using information presented in line plots.	Fractions on a line plot	Fractions on a line plot

4.3 Geometric measurement: understand concepts of angle and measure angles

Outcome	Quests	Content
NY-4.MD.5a Recognize 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
NY-4.MD.6 Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure.	Measure & estimate angles	Measuring & estimating angles
NY-4.MD.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

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

Outcome	Quests	Content
NY-4.G.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
NY-4.G.2a Identify and name triangles based on angle size (right, obtuse, acute).	Classify triangles	Classifying triangles by their sides & angles
NY-4.G.3 Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded along the line into matching parts.	Lines of symmetry	Lines of symmetry

Identify line-symmetric figures and draw lines of symmetry.		

Grade 5

1 Operations and Algebraic Thinking

1.1 Write and interpret numerical expressions

Outcome	Quests	Content
NY-5.OA.1 Apply the order of operations to evaluate numerical expressions.	Grouping symbols	Order of operations with grouping symbols
NY-5.OA.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
NY-5.OA.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
NY-5.NBT.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
NY-5.NBT.2 Use whole-number exponents to denote powers of 10. 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.	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
NY-5.NBT.3a 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
NY-5.NBT.3b 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
NY-5.NBT.4 Use place value understanding to round decimals to any place.	Round decimals	Rounding decimals

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

Outcome	Quests	Content
NY-5.NBT.5 Fluently multiply multi-digit whole numbers using a standard algorithm.	Multiply multi-digit numbers, algorithm	Multiplying multi-digit numbers, algorithm
NY-5.NBT.6 Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors, using strategies	Divide multi-digit numbers	Using facts to divide 2-digit multiples of 10
		Multiplying & dividing 2-digit multiples of 10

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.		Multiplication/division problems: multiples of 10
		Dividing by subtracting partial products
		Dividing multi-digit numbers, algorithm
		Divide multi-digit numbers, whole number remainder
NY-5.NBT.7 Using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between operations: add and subtract decimals to hundredths; multiply and divide decimals to hundredths. 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
NY-5.NF.1 Add and subtract fractions with unlike denominators (including mixed numbers) by repacing 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
NY-5.NF.2 Solve word problems involving addition and subtraction of fractions referring to the same whole, 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
NY-5.NF.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
NY-5.NF.4a 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
NY-5.NF.4b Find the area of a rectangle with fractional side	Area of a rectangle, fractional sides	Find the area of a rectangle with fractional sides

lengths by tiling it with rectangles of the appropriate unit fraction side lengths, and show that the area is 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.		
NY-5.NF.5b 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). Explain why multiplying a given number by a fraction less than 1 results in a product smaller than the given number. Relate the principle of fraction equivalence a/b = a/b x n/n to the effect of multiplying a/b by 1.	Effects of multiplying fractions	Interpreting multiplying fractions as scaling
NY-5.NF.6 Solve real world problems involving multiplication of fractions and mixed numbers.	Multiply fractions word problems	Word problems: multiply fractions & mixed numbers
NY-5.NF.7a 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
NY-5.NF.7b 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
NY-5.NF.7c 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
NY-5.MD.1 Convert among different-sized standard measurement units within a given measurement system when the conversion factor is given. 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
NY-5.MD.2 Make a line plot to display a data set of measurements in fractions of a unit. 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 to addition

Outcome	Quests	Content
NY-5.MD.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
NY-5.MD.5a 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.		
NY-5.MD.5b 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
NY-5.MD.5c Recognize volume as additive. Find volumes of solid figures composed of two nonoverlapping 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
NY-5.G.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
NY-5.G.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
NY-5.G.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
NY-5.G.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
NY-6.RP.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
NY-6.RP.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
NY-6.RP.3a 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
NY-6.RP.3b Solve unit rate problems.	Unit rate	Solving unit rate problems for given time periods
		Solving unit rate problems involving unit pricing
NY-6.RP.3c Find a percent of a quantity as a rate per 100. Solve problems that involve finding the whole given a part and the percent, and finding a part of a whole given the percent.	Percent of a quantity	Expressing rates as a percent
		Solving percent problems: finding the whole
NY-6.RP.3d 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
NY-6.NS.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
NY-6.NS.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
NY-6.NS.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
NY-6.NS.4 Find the greatest common factor of two whole numbers less than or equal to 100. Use the distributive property to	GCF & LCM	Greatest common factor
		Least common multiple
		Solving word problems: factors & multiples

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 other than 1. Find the least common multiple of two whole numbers less than or equal to 12.		Factoring using the distributive property

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

Outcome	Quests	Content
NY-6.NS.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
NY-6.NS.6a 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
NY-6.NS.6b 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
NY-6.NS.6c Find and position integers and other rational numbers on a horizontal or vertical number line. 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
NY-6.NS.7a Interpret statements of inequality as statements about the relative position of two numbers on a number line.	Compare rational numbers	Comparing integers
		Comparing rational numbers
NY-6.NS.7b Write, interpret, and explain statements of order for	Order rational numbers	Exploring the everyday language of integers

rational numbers in real-world contexts.		Statements of order: rational numbers
NY-6.NS.7c 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
NY-6.NS.7d Distinguish comparisons of absolute value from statements about order.	Absolute value vs order	Interpreting meanings of integers in context
NY-6.NS.8 Solve real-world and mathematical problems by graphing points on a 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, Equations, and Inequalities

3.1 Apply and extend previous understandings of arithmetic to algebraic expressions

Outcome	Quests	Content
NY-6.EE.1 Write and evaluate numerical expressions involving whole-number exponents.	Numerical expressions with exponents	Writing numerical expressions with exponents
		Evaluating numerical expressions with exponents
NY-6.EE.2a Write expressions that record operations with numbers and with letters standing for numbers.	Write expressions: numbers & variables	Writing expressions with numbers & variables
NY-6.EE.2b Identify parts of an expression using mathematical terms (term, coefficient, sum, difference, product, factor, and quotient); view one or more parts of an expression as a single entity.	Parts of an expression	Identifying parts of an expression
NY-6.EE.2c Evaluate expressions given 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 (Order of Operations).	Evaluate algebraic expressions	Evaluating algebraic expressions
		Evaluating expressions using order of operations
NY-6.EE.3 Apply the properties of operations to generate equivalent expressions.	Properties of operations: expressions	Properties of operations: equivalent expressions
NY-6.EE.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
NY-6.EE.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	Test solutions	Testing solutions: equations
		Testing solutions: inequalities

whether a given number in a specified set makes an equation or inequality true.		
NY-6.EE.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
NY-6.EE.7 Solve real-world and mathematical problems by writing and solving equations of the form x + p = q; x – p = q; px = q; and x/p = 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
NY-6.EE.8 Write an inequality of the form x > c, x ≥ c, x ≤ c, or x < c to represent a constraint or condition in a real-world or mathematical problem. Recognize that inequalities of these forms have infinitely many solutions; represent solutions of such inequalities on a number line.	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
NY-6.EE.9 Use variables to represent two quantities in a real-world problem that change in relationship to one another. Given a verbal context and an equation,	Independent & dependent variables	Independent & dependent variables

identify the dependent variable, in terms of 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
NY-6.G.1 Find area of triangles, trapezoids, and other polygons by composing into rectangles or decomposing into triangles and quadrilaterals. 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
NY-6.G.2 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
NY-6.G.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
NY-6.G.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
NY-6.G.5 Use area and volume models to explain perfect squares and perfect cubes.	Perfect squares & cubes	Modeling perfect squares & cubes

5 Statistics and Probability

5.1 Develop understanding of statistical variability

Outcome	Quests	Content
NY-6.SP.1a Recognize that a statistical question is one that anticipates variability in the data related to the question and accounts for it in the answers.	Statistical questions	Evaluating statistical questions
NY-6.SP.1b Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population.	Population & sample size	Understanding population & sample size
NY-6.SP.2 Understand that a set of quantitative 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
NY-6.SP.3 Recognize that a measure of center for a quantitative 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
NY-6.SP.4 Display quantitative data in plots on a number line, including dot plots, and histograms.	Data displays	Constructing data displays
		Reading & interpreting data in a dot plot
		Reading & interpreting data in a histogram
		Reading & interpreting box plots
NY-6.SP.5 Summarize quantitative data sets in relation to their context.	Summarize numerical data	Summarizing numerical data

NY-6.SP.5a Report the number of observations.	Report observations	Reporting observations in a data display
NY-6.SP.5b 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
NY-6.SP.5c Calculate range and measures of center, as well as describe any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered.	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

5.3 Investigate chance processes and develop, use, and evaluate probability models

Outcome	Quests	Content
NY-6.SP.6 Understand that the probability of a chance event is a number between 0 and 1 inclusive, that expresses the likelihood of the event occurring. Larger numbers indicate greater likelihood. A probability near 0 indicates an unlikely event, a probability around ½ indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event.	Investigate equally likely outcomes	Investigating equally likely outcomes
NY-6.SP.7 Approximate the probability of a simple event by collecting data on the chance process that produces it and observing its long-run relative frequency, and predict the approximate relative frequency given the probability.	Probability of simple events	Finding probability of simple events

Mathletics

For more information about Mathletics,
contact our friendly team.

www.mathletics.com/contact

A 3P Learning Product