

Use Math to Solve Problems and Communicate

Level 1	Level 2	Level 3
Number Sense		
<p>M.1.1 Connect and count number words and numerals from 0-999 to the quantities they represent.</p>	<p>M.2.1 Connect and count number words and numerals from 0-1,000,000 to the quantities they represent.</p>	<p>M.3.1 Connect and count number words and numerals from 0-1,000,000, including common fractions ($\frac{1}{4}$, $\frac{1}{3}$, $\frac{1}{2}$) and decimals (.25, .33, .50), to the quantities they represent.</p>
<p>M.1.2 Solve one-, two- and three-digit addition and subtraction problems in horizontal (for example, $6 + 3 + 9 = 18$) and vertical* notation without regrouping.</p> $\begin{array}{r} *6 \\ 3 \\ +9 \\ \hline 18 \end{array}$	<p>M.2.2 Solve, with high degree of accuracy, multi-digit addition and subtraction problems in horizontal and vertical notation with regrouping; perform multiplication (through 12).</p>	<p>M.3.2 Solve, with a high degree of accuracy, problems using four basic math operations (addition, subtraction, multiplication, division) using</p> <ul style="list-style-type: none"> • whole numbers, • fractions and • decimals.
<p>M.1.3 Compare and order sets of whole numbers from 0-999</p>	<p>M.2.3 Compare and order sets of whole numbers from 0-1,000,000.</p>	<p>M.3.3 Compare and order sets of whole numbers, fractions and decimals.</p>
<p>M.1.4 Estimate (when appropriate) and compute solutions to problems involving whole numbers from 0-999.</p>	<p>M.2.4 Estimate (when appropriate) and compute solutions to problems involving whole numbers from 0-1,000,000.</p>	<p>M.3.4 Estimate (when appropriate) and compute solutions to problems involving whole numbers, fractions and decimals.</p>
		<p>M.3.5 Evaluate simple expressions using whole numbers, squares and cubes.</p>

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Level 4	Level 5	Level 6
Number Sense		
M.4.1 Connect a wide range of number words and numerals, including fractions, decimals and whole numbers, to the quantities they represent.		
M.4.2 Solve, with a high degree of accuracy, multi-digit addition, subtraction, multiplication and division problems in horizontal and vertical notation with regrouping, using <ul style="list-style-type: none"> • whole numbers, • fractions, • decimals and • positive/negative integers. 	M.5.1 Solve, with a high degree of accuracy, problems using four basic math operations (addition, subtraction, multiplication, division) using <ul style="list-style-type: none"> • whole numbers, • fractions, • decimals and • positive/negative integers. 	M.6.1 Solve, with a high degree of accuracy, problems using four basic math operations (addition, subtraction, multiplication, division) using <ul style="list-style-type: none"> • whole numbers, • fractions, • decimals, • positive/negative integers and • absolute values.
M.4.3 Apply order of operations to simplify expressions and perform computations.	M.5.2 Apply order of operations, including parentheses and exponents, to simplify expressions and perform computations with positive and negative integers.	M.6.2 Explain the effects of numerical operations on integers, whole numbers and fractions.
M.4.4 Compare and order equivalent forms of commonly used fractions, decimals and percents.	M.5.3 Compare and order equivalent forms of commonly used fractions, decimals and percents, including scientific notation and positive/negative integers.	M.6.3 Compare and order equivalent forms of commonly used fractions, decimals, percents, radicals and scientific notation.
M.4.5 Estimate (when appropriate) and compute solutions to problems involving fractions, decimals, ratios, proportions and percents.	M.5.4 Estimate (when appropriate) and compute solutions to problems involving ratios, percents and proportions, scientific notation and square roots.	M.6.4 Estimate (when appropriate) and compute solutions to problems involving ratios, percents and proportions, scientific notation, roots and numbers with integer exponents.
M.4.6 Evaluate simple exponent and radical expressions.	M.5.5 Evaluate simple radical expressions with negative exponents.	M.6.5 Evaluate a variety of exponent and radical expressions, applying laws of exponents.

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Geometry and Measurement		
M.1.5 Identify and compare simple two-dimensional figures (square, circle, diamond, rectangle, triangle) and three-dimensional figures (rectangular solid, cube, cylinder, sphere, cone).	M.2.5 Identify and classify features (length, width, height, diameter, radius) of two- and three-dimensional figures and angles by degrees.	M.3.6 Identify figures (tables, clocks, walls, floors) as simple, complex or irregular; two-dimensional or three-dimensional; and symmetrical, congruent or similar.
M.1.6 Identify and define spatial relationships (vertical, horizontal, adjacent).	M.2.6 Identify and define points, rays, line segments, lines and planes in mathematical and everyday settings.	M.3.7 Identify coordinate systems and plot pairs of points (x, y).
	M.2.7 Use established formulas to calculate perimeter of a polygon.	M.3.8 Use established formulas to calculate perimeter and area of polygons.
	M.2.8 Draw two-dimensional figures.	M.3.9 Complete partial two-dimensional figures on a coordinate grid system.
M.1.7 Identify basic units of measurement (for example, inches, pounds, temperature, hours/time) and their purpose.	M.2.9 Choose appropriate units (cup or quart or gallon, foot or mile) to measure an object's properties.	M.3.10 Choose and apply appropriate units, including fractional values, and instruments to measure length (inch, foot or mile), weight (ounce, pound or ton), capacity (cup or gallon), time (second, minute, day or week) and temperature (degrees).
M.1.8 Select the appropriate tool (for example, ruler, scale, thermometer, clock, calendar) and unit to measure a given property.	M.2.10 Use appropriate tools (for example, yardstick, measuring tape, meter stick) and units to measure given properties of figures.	M.3.11 Make, record and interpret measurements of everyday figures.
M.1.9 Match equivalent units of measurement, including length, weight, time, temperature and U.S. currency.	M.2.11 Convert and compute measurements, without regrouping.	M.3.12 Convert and compute measurements, with regrouping.
M.1.10 Round to the nearest 100.	M.2.12 Round to the nearest 1,000.	M.3.13 Round to the nearest 1,000,000, to hundredths and to the nearest whole number.

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Level 4	Level 5	Level 6
Geometry and Measurement		
M.4.7 Identify/apply basic formulas about parallel and perpendicular lines, pairs of angles, congruent figures, similar figures, polygons, spheres, cylinders and cones.	M.5.6 Identify/apply basic theorems about parallel and perpendicular lines, pairs of angles, congruent and similar figures, triangles (including right triangles and the Pythagorean theorem), polygons, circles, spheres, cylinders and cones.	M.6.6 Identify/apply basic theorems about parallel and perpendicular lines, pairs of angles, congruent and similar figures, triangles (including right triangles and the Pythagorean theorem), polygons, circles, spheres, cylinders, cones and polyhedrons.
M.4.8 Connect graphical and algebraic representations of lines.	M.5.7 Connect graphical and algebraic representations of lines and simple curves.	M.6.7 Connect graphical and algebraic representations of lines, simple curves and conic sections.
M.4.9 Use established formulas to calculate perimeter, circumference, area and volume for basic figures.	M.5.8 Use established formulas to calculate perimeter, circumference, area and volume for basic figures.	M.6.8 Analyze irregular geometric figures to calculate perimeter, area and volume.
M.4.10 Represent and analyze figures using coordinate geometry.	M.5.9 Graph and analyze two-dimensional figures in a variety of orientations using coordinate geometry.	M.6.9 Graph the results of translations, reflections and rotations in the coordinate plane and determine properties that remain fixed.
M.4.11 Show that geometric measures such as length, perimeter, area and volume depend on the choice of unit and that measurements are only as precise as the units used.	M.5.10 Predict the impact of changes in linear dimensions on length, perimeter, area and volume.	M.6.10 Predict the impact of changes in linear dimensions on length, perimeter, area and volume.
	M.5.11 Use the Pythagorean theorem ($a^2 + b^2 = c^2$) and its equivalent forms.	M.6.11 Use right triangle trigonometry to solve contextual problems.
M.4.12 Apply measurement scales and units to describe geometric figures to solve one-step and two-step problems.	M.5.12 Apply measurement scales and units to describe geometric figures in order to solve two-step problems with embedded and irrelevant information.	M.6.12 Apply measurement scales and units to describe geometric figures in order to solve multi-step contextual problems with embedded and irrelevant information.
M.4.13 Convert fluently, within measurement systems (metric, customary, time), from one unit to another in order to solve contextual problems and express the conversions using appropriate unit labels.	M.5.13 Convert fluently, between measurement systems (metric, customary, time), from one unit to another in order to solve contextual problems and express the conversions using appropriate unit labels.	M.6.13 Convert fluently, within and between measurement systems (metric, customary, time), from one unit to another in order to solve contextual problems and express the conversions using appropriate unit labels.
M.4.14 Apply the concept of rounding to specified place value; distinguish between exact and approximate values.	M.5.14 Begin to apply the concept of rounding to appropriate place value in two-step problems; distinguish between exact and approximate values.	M.6.14 Apply the concept of rounding to appropriate place value in contextual situations; distinguish between exact and approximate values and justify their uses.

Use Math to Solve Problems and Communicate

Level 1	Level 2	Level 3
Algebra and Patterns		
M.1.11 Continue simple patterns and sequences of numbers, colors and figures.	M.2.13 Identify, extend and construct numerical patterns and sequences.	M.3.14 Identify, extend and construct numerical and geometric patterns and sequences.
M.1.12 Complete simple number sentences (for example, $5 + \underline{\quad} = 12$).	M.2.14 Read and solve simple equations (for example, $a + 5 = 12$) with addition and subtraction operations.	M.3.15 Solve simple equations (for example, $18 - 3 \times 15 = n$) using order of operations (multiplication, division, addition, subtraction), excluding parentheses and exponents.

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Level 4	Level 5	Level 6
Algebra and Patterns		
M.4.15 Identify, extend and construct arithmetic/ geometric patterns and sequences that are one-step and linear or exponential.	M.5.15 Identify, extend and construct arithmetic/geometric patterns and sequences that are multi-step, linear and exponential.	M.6.15 Identify, extend and construct arithmetic/ geometric patterns and sequences that are multi-step and linear, nonlinear or exponential.
M.4.16 Evaluate and simplify algebraic expressions and solve equations.	M.5.16 Evaluate expressions and solve equations with multiple variables using order of operations (parentheses, exponents, multiplication, division, addition, subtraction).	M.6.16 Evaluate and simplify algebraic expressions and solve equations and inequalities.
M.4.17 Connect the various representations of a single linear relationship to <ul style="list-style-type: none"> • a table, • a verbal description, • a graph and • an equation. 	M.5.17 Connect a variety of linear relationships to <ul style="list-style-type: none"> • a table, • a verbal description, • a graph and • an equation. 	M.6.17 Connect the various representations of linear and nonlinear relationships to <ul style="list-style-type: none"> • a table, • a verbal description, • a graph and • an equation.
M.4.18 Graph linear equations.	M.5.18 Graph linear and nonlinear functions.	M.6.18 Graph linear and nonlinear functions and analyze their characteristics.
M.4.19 Solve linear equations with one unknown graphically and algebraically.	M.5.19 Solve linear equations with two unknowns algebraically and graphically.	M.6.19 Solve systems of linear equations with two unknowns by graphing, substitution or addition/elimination.
		M.6.20 Solve quadratic equations for real roots by graphing, factoring, completing the square or applying the quadratic formula.

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Level 1	Level 2	Level 3
Data Analysis and Probability		
M.1.13 Identify key features of simple charts, pictographs or bar graphs (for example, title, column, row, axis, key, legend).	M.2.15 Read and interpret pictographs and bar graphs.	M.3.16 Read and interpret pictographs, bar graphs and line graphs as well as schedules, diagrams and tables.
M.1.14 Display data using concrete objects, pictographs or charts.	M.2.16 Create and interpret pictographs and bar graphs.	M.3.17 Create and interpret pictographs, bar graphs and line graphs as well as schedules, diagrams and tables.
		M.3.18 Calculate mean, median, mode and range for simple data sets.
	M.2.17 Classify events as likely or unlikely.	M.3.19 Determine simple probabilities.
		M.3.20 Represent likely and unlikely events as fractions and decimals.

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Level 4	Level 5	Level 6
Data Analysis and Probability		
M.4.20 Collect, organize and interpret data sets involving a single variable.	M.5.20 Collect, organize and interpret data sets involving a single variable.	M.6.21 Collect, organize and interpret data sets with two variables using frequency distributions for simple counts (one-way tables) and cross-tabulations (two-way tables).
M.4.21 Create and interpret data sets using simple frequency distributions and appropriate graphs.	M.5.21 Create and interpret appropriate graphical displays given frequency distributions for two variables.	M.6.22 Create and interpret appropriate graphical displays given frequency distributions for two variables and various distribution shapes.
M.4.22 Calculate basic measures of central tendency (mean, median, mode) and variability (range).	M.5.22 Calculate measures of central tendency (mean, median, mode) and variability (range, interquartile range).	M.6.23 Calculate measures of central tendency (mean, median, mode) and variability (range, interquartile range, standard deviation, variance).
M.4.23 Determine, using the fundamental counting principle (multiplication rule), the number of possible outcomes for a situation.	M.5.23 Use simple probabilities to predict outcomes.	M.6.24 Determine, using the fundamental counting principle (multiplication rule), the number of possible outcomes for a situation, including permutations and combinations.
M.4.24 Determine probabilities in real-world problem situations, recognizing and accounting for events that may occur more than once or when order is important.	M.5.24 Calculate probability of events that are independent (not related) and dependent (related).	M.6.25 Use theoretical or experimental probability, including simulations, to determine probabilities in real-world problem situations involving uncertainty, such as mutually exclusive events, complementary events and conditional probability.

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PROCESS: Solve Problems		
M.1.15 Solve word problems at the appropriate reading level using addition and subtraction.	M.2.18 Solve word problems at the appropriate reading level using addition, subtraction and simple multiplication facts.	M.3.21 Solve a variety of problems using addition and subtraction, multiplication and division and fractions and decimals.
M.1.16 Confirm results with a calculator.	M.2.19 Confirm results with a calculator.	M.3.22 Confirm results with a calculator.

PROCESS: Communicate Mathematical Ideas		
M.1.17 Define simple mathematical terms (for example, addend, sum, difference, operation, borrowing, carrying, rounding) and symbols (for example, \$, ¢ , + , - , = , < , >).	M.2.20 Use simple mathematical terms (for example, product, approximate, factor, remainders) and symbols (for example, × , ≈) in solving simple word problems.	M.3.23 Use correct mathematical terminology (for example, quotient, numerator, denominator, dividend, decimal, divisor) and symbols (for example, ÷ , ≤ , ≥ , / , ± , ≠ , %).
		M.3.24 Show a logical progression of thought, orally and in writing.

PROCESS: Reason Mathematically		
M.1.18 Identify true or false statements and verify with examples.	M.2.21 Determine if a mathematical result is a reasonable response to the problem.	M.3.25 Begin to use logical terms appropriately (and, or, but, if ... then).
		M.3.26 Explain the differences between accuracy and precision.

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Level 4	Level 5	Level 6
PROCESS: Solve Problems		
M.4.25 Solve multi-step problems.	M.5.25 Solve difficult problems that require sustained thought or effort.	M.6.26 Solve difficult and lengthy problems that may require sustained thought or effort.
M.4.26 Specify and use various problem-solving strategies (picture/graph, table, organized list and working backwards).	M.5.26 Specify and use various problem-solving strategies.	M.6.27 Specify and use various problem-solving strategies.
M.4.27 Reflect on and analyze problem solutions (both own and others').	M.5.27 Reflect on and analyze problem solutions (both own and others').	M.6.28 Reflect on and analyze problem solutions (both own and others').
M.4.28 Confirm results with a calculator.	M.5.28 Confirm results with a calculator.	M.6.29 Confirm results with a calculator.

PROCESS: Communicate Mathematical Ideas		
M.4.29 Use correct mathematical terminology (for example, exponent) and symbols (for example, $()$, \cdot , n , $\sqrt{\quad}$).	M.5.29 Use correct mathematical terminology and symbols ($[]$ or $\{ \}$).	M.6.30 Use correct mathematical terminology and symbols.
M.4.30 Show a logical progression of thought, orally and in writing.	M.5.30 Show a logical progression of thought, orally and in writing.	M.6.31 Show a logical progression of thought, orally and in writing.
M.4.31 Represent contextual situations using mathematics.	M.5.31 Model and represent contextual situations using mathematics.	M.6.32 Model and represent contextual situations using mathematics.
	M.5.32 Read mathematical material independently with understanding.	M.6.33 Read mathematical material independently with understanding.

PROCESS: Reason Mathematically		
M.4.32 Use logical terms appropriately (and, or, but, if ... then).	M.5.33 Use logical terms appropriately (and, or, but, if ... then).	M.6.34 Use logical terms appropriately (and, or, but, if ... then).
M.4.33 Explain the differences among accuracy, precision and error.	M.5.34 Explain the differences among accuracy, precision and error; describe how earlier errors affect later calculations.	M.6.35 Explain the differences among accuracy, precision and error; describe how earlier errors affect later calculations.

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PROCESS: Connect Mathematical Concepts		
M.1.19 List real-life settings in which mathematics is used.	M.2.22 Identify basic mathematical concepts used in real-life settings.	M.3.27 Apply mathematical concepts in real-life settings.

PROCESS: Mathematical Performance		
M.1.20 Perform very basic mathematical operations with directed instruction and few errors.	M.2.23 Perform basic mathematical operations, excluding division, with directed instruction and few errors.	M.3.28 Perform mathematical operations with increasing independence, using decimals and fractions, with few errors.

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Level 4	Level 5	Level 6
PROCESS: Connect Mathematical Concepts		
M.4.34 Apply mathematical ideas across a variety of settings (community, family, work).	M.5.35 Analyze problems using mathematical ideas across a variety of settings (community, work, family).	M.6.36 Synthesize and evaluate situations in order to solve problems across a variety of settings (community, work, family), using connections among broad domains of mathematics (algebra and geometry, number sense and data analysis).

PROCESS: Mathematical Performance		
M.4.35 Perform with increasing independence, range and fluency in demonstrating level-appropriate mathematical skills in contextual situations (community, family, work).	M.5.36 Perform with increasing independence, range and fluency in demonstrating level-appropriate mathematical skills in contextual situations (community, family, work).	M.6.37 Perform with increasing independence, range and fluency in demonstrating level-appropriate mathematical skills in contextual situations (community, family, work).

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Math Terms and Symbols Guide

	Level 1	Level 2	Level 3
Number Sense (Symbols)	\$, ¢, +, -, =, <, >	×, ≈	÷, ≤, ≥, /, ±, ≠, %
Geometry	<p>Two-dimensional shapes Square, circle, diamond, rectangle, triangle</p> <p>Three-dimensional shapes Rectangular solid, cube, cylinder, sphere, cone, pyramid</p>	<p>Given properties/features Length, width, height, diameter, radius</p>	<p>Everyday figures Tables, clocks, walls, floors, fields</p>
Measurement	<p>Units Inches, pounds, temperature, time</p> <p>Tools Ruler, scale, thermometer, clock, calendar</p>	<p>Units Cup, pint, quart, gallon, ounce</p> <p>Tools Yardstick, measuring tape, meter stick, protractor, compass</p>	<p>Units Half hour, quarter hour, half cup, quarter cup, feet</p>
Algebra	<p>Number sentences $5 + \underline{\quad} = 12$ $\underline{\quad} - 5 = 12$</p> <p>Horizontal notation $6 + 3 + 9 = 18$</p> <p>Vertical notation</p> $\begin{array}{r} 6 \\ 3 \\ + 9 \\ \hline 18 \end{array}$	<p>Equations $a + 5 = 12$ $b - 5 = 12$</p>	<p>Equation $18 - 3 \times 15 = n$</p>
Data Analysis and Probability	<p>Features Title, column, row, axis, key, legend</p>		<p>Descriptive Statistics Mean (M), median (Md), mode (Mo), range</p>
Process Terms	<p>Addend Borrowing Carrying Difference Rounding Operation Sum</p>	<p>Product Approximate Factor Remainders</p>	<p>Quotient Decimal Numerator Divisor Denominator Dividend</p>

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Math Terms and Symbols Guide

	Level 4	Level 5	Level 6
Number Sense (Symbols)	$() , \sqrt{\quad} , ^n , \cdot$	$[\quad] , \{\quad\}$	
Geometry		Pythagorean theorem $a^2 + b^2 = c^2$	
Measurement			
Algebra			Quadratic equation, function
Data Analysis and Probability	Probability Fundamental counting principle		Combinations $C(n, r)$
Process Terms	Exponents		