

# Mathematics Standards

## GRADE: K

### Big Idea 1: BIG IDEA 1

#### Represent, compare, and order whole numbers and join and separate sets.

BENCHMARK CODE	BENCHMARK
MA.K.A.1.1	Represent quantities with numbers up to 20, verbally, in writing, and with manipulatives. <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>
MA.K.A.1.2	Solve problems including those involving sets by counting, by using cardinal and ordinal numbers, by comparing, by ordering, and by creating sets up to 20. <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>
MA.K.A.1.3	Solve word problems involving simple joining and separating situations. <i>Cognitive Complexity/Depth of Knowledge Rating: High</i>

### Big Idea 2: BIG IDEA 2

#### Describe shapes and space.

BENCHMARK CODE	BENCHMARK
MA.K.G.2.1	Describe, sort and re-sort objects using a variety of attributes such as shape, size, and position. <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>
MA.K.G.2.2	Identify, name, describe and sort basic two-dimensional shapes such as squares, triangles, circles, rectangles, hexagons, and trapezoids. <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>
MA.K.G.2.3	Identify, name, describe, and sort three-dimensional shapes such as spheres, cubes and cylinders. <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>
MA.K.G.2.4	Interpret the physical world with geometric shapes, and describe it with corresponding vocabulary. <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>
MA.K.G.2.5	Use basic shapes, spatial reasoning, and manipulatives to model objects in the environment and to construct more complex shapes. <i>Cognitive Complexity/Depth of Knowledge Rating: High</i>

### Big Idea 3: BIG IDEA 3

#### Order objects by measurable attributes.

BENCHMARK CODE	BENCHMARK
MA.K.G.3.1	Compare and order objects indirectly or directly using measurable attributes such as length, height, and weight. <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>

### Supporting Idea 4: Algebra

#### Algebra

BENCHMARK CODE	BENCHMARK
MA.K.A.4.1	Identify and duplicate simple number and non-numeric repeating and growing patterns. <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>

### Supporting Idea 5: Geometry and Measurement

## Geometry and Measurement

BENCHMARK CODE	BENCHMARK
MA.K.G.5.1	Demonstrate an understanding of the concept of time using identifiers such as morning, afternoon, day, week, month, year, before/after, shorter/longer.  <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>

## GRADE: 1

### Big Idea 1: BIG IDEA 1

#### Develop understandings of addition and subtraction strategies for basic addition facts and related subtraction facts.

BENCHMARK CODE	BENCHMARK
MA.1.A.1.1	Model addition and subtraction situations using the concepts of "part-whole," "adding to," "taking away from," "comparing," and missing addend."  <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>
MA.1.A.1.2	Identify, describe, and apply addition and subtraction as inverse operations.  <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>
MA.1.A.1.3	Create and use increasingly sophisticated strategies, and use properties such as Commutative, Associative and Additive Identity, to add whole numbers.  <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>
MA.1.A.1.4	Use counting strategies, number patterns, and models as a means for solving basic addition and subtraction fact problems.  <i>Cognitive Complexity/Depth of Knowledge Rating: High</i>

### Big Idea 2: BIG IDEA 2

#### Develop an understanding of whole number relationships, including grouping by tens and ones.

BENCHMARK CODE	BENCHMARK
MA.1.A.2.1	Compare and order whole numbers at least to 100.  <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>
MA.1.A.2.2	Represent two digit numbers in terms of tens and ones.  <i>Cognitive Complexity/Depth of Knowledge Rating: Low</i>
MA.1.A.2.3	Order counting numbers, compare their relative magnitudes, and represent numbers on a number line.  <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>

### Big Idea 3: BIG IDEA 3

#### Compose and decompose two-dimensional and three-dimensional geometric shapes.

BENCHMARK CODE	BENCHMARK
MA.1.G.3.1	Use appropriate vocabulary to compare shapes according to attributes and properties such as number and lengths of sides and number of vertices.  <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>
MA.1.G.3.2	Compose and decompose plane and solid figures, including making predictions about them, to build an understanding of part-whole relationships and properties of shapes.  <i>Cognitive Complexity/Depth of Knowledge Rating: High</i>

### Supporting Idea 4: Algebra

## Algebra

BENCHMARK CODE	BENCHMARK
MA.1.A.4.1	Extend repeating and growing patterns, fill in missing terms, and justify reasoning. <i>Cognitive Complexity/Depth of Knowledge Rating: High</i>

## Supporting Idea 5: Geometry and Measurement

### Geometry and Measurement

BENCHMARK CODE	BENCHMARK
MA.1.G.5.1	Measure by using iterations of a unit, and count the unit measures by grouping units. <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>
MA.1.G.5.2	Compare and order objects according to descriptors of length, weight, and capacity. <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>

## Supporting Idea 6: Number and Operations

### Number and Operations

BENCHMARK CODE	BENCHMARK
MA.1.A.6.1	Use mathematical reasoning and beginning understanding of tens and ones, including the use of invented strategies, to solve two-digit addition and subtraction problems. <i>Cognitive Complexity/Depth of Knowledge Rating: High</i>
MA.1.A.6.2	Solve routine and <a href="#">non-routine problems</a> by acting them out, using manipulatives, and drawing diagrams. <i>Cognitive Complexity/Depth of Knowledge Rating: High</i>

## GRADE: 2

## Big Idea 1: BIG IDEA 1

### Develop an understanding of base-ten numerations system and place-value concepts.

BENCHMARK CODE	BENCHMARK
MA.2.A.1.1	Identify relationships between the digits and their place values through the thousands, including counting by tens and hundreds. <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>
MA.2.A.1.2	Identify and name numbers through thousands in terms of place value, and apply this knowledge to expanded notation. <i>Cognitive Complexity/Depth of Knowledge Rating: Low</i>
MA.2.A.1.3	Compare and order multi-digit numbers through the thousands. <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>

## Big Idea 2: BIG IDEA 2

### Develop quick recall of addition facts and related subtraction facts and fluency with multi-digit addition and subtraction.

BENCHMARK CODE	BENCHMARK
MA.2.A.2.1	Recall basic addition and related subtraction facts. <i>Cognitive Complexity/Depth of Knowledge Rating: Low</i>
MA.2.A.2.2	Add and subtract multi-digit whole numbers through three digits with fluency by using a variety of strategies, including invented and standard algorithms and explanations of those procedures. <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>

MA.2.A.2.3	Estimate solutions to multi-digit addition and subtraction problems through three digits. <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>
MA.2.A.2.4	Solve addition and subtraction problems that involve measurement and geometry. <i>Cognitive Complexity/Depth of Knowledge Rating: High</i>

### Big Idea 3: BIG IDEA 3

#### Develop an understanding of linear measurement and facility in measuring lengths.

BENCHMARK CODE	BENCHMARK
MA.2.G.3.1	Estimate and use standard units, including inches and centimeters, to partition and measure lengths of objects. <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>
MA.2.G.3.2	Describe the inverse relationship between the size of a unit and number of units needed to measure a given object. <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>
MA.2.G.3.3	Apply the Transitive Property when comparing lengths of objects. <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>
MA.2.G.3.4	Estimate, select an appropriate tool, measure, and/or compute lengths to solve problems. <i>Cognitive Complexity/Depth of Knowledge Rating: High</i>

### Supporting Idea 4: Algebra

#### Algebra

BENCHMARK CODE	BENCHMARK
MA.2.A.4.1	Extend number patterns to build a foundation for understanding multiples and factors – for example, skip counting by 2's, 5's, 10's. <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>
MA.2.A.4.2	Classify numbers as odd or even and explain why. <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>
MA.2.A.4.3	Generalize numeric and non-numeric patterns using words and tables. <i>Cognitive Complexity/Depth of Knowledge Rating: High</i>
MA.2.A.4.4	Describe and apply equality to solve problems, such as in balancing situations. <i>Cognitive Complexity/Depth of Knowledge Rating: High</i>
MA.2.A.4.5	Recognize and state rules for functions that use addition and subtraction. <i>Cognitive Complexity/Depth of Knowledge Rating: High</i>

### Supporting Idea 5: Geometry and Measurement

#### Geometry and Measurement

BENCHMARK CODE	BENCHMARK
MA.2.G.5.1	Use geometric models to demonstrate the relationships between wholes and their parts as a foundation to fractions. <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>
MA.2.G.5.2	Identify time to the nearest hour and half hour. <i>Cognitive Complexity/Depth of Knowledge Rating: Low</i>
MA.2.G.5.3	Identify, combine, and compare values of money in cents up to \$1 and in dollars up to \$100, working with a single unit of currency. <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>
MA.2.G.5.4	Measure weight/mass and capacity/volume of objects. Include the use of the appropriate unit of

	measure and their abbreviations including cups, pints, quarts, gallons, ounces (oz), pounds (lbs), grams (g), kilograms (kg), milliliters (mL) and liters (L).  <i>Cognitive Complexity/Depth of Knowledge Rating: Low</i>
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**Supporting Idea 6: Number and Operations**

**Number and Operations**

BENCHMARK CODE	BENCHMARK
MA.2.A.6.1	Solve problems that involve repeated addition.  <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>

**GRADE: 3**

**Big Idea 1: BIG IDEA 1**

**Develop understandings of multiplication and division and strategies for basic multiplication facts and related division facts.**

BENCHMARK CODE	BENCHMARK
MA.3.A.1.1	Model multiplication and division including problems presented in context: repeated addition, multiplicative comparison, array, how many combinations, measurement, and partitioning.  <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>
MA.3.A.1.2	Solve multiplication and division fact problems by using strategies that result from applying number properties.  <i>Cognitive Complexity/Depth of Knowledge Rating: High</i>
MA.3.A.1.3	Identify, describe, and apply division and multiplication as inverse operations.  <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>

**Big Idea 2: BIG IDEA 2**

**Develop an understanding of fractions and fraction equivalence.**

BENCHMARK CODE	BENCHMARK
MA.3.A.2.1	Represent fractions, including fractions greater than one, using area, set, and linear models.  <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>
MA.3.A.2.2	Describe how the size of the fractional part is related to the number of equal sized pieces in the whole.  <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>
MA.3.A.2.3	Compare and order fractions, including fractions greater than one, using models and strategies.  <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>
MA.3.A.2.4	Use models to represent equivalent fractions, including fractions greater than 1, and identify representations of equivalence.  <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>

**Big Idea 3: BIG IDEA 3**

**Describe and analyze properties of two-dimensional shapes.**

BENCHMARK CODE	BENCHMARK
MA.3.G.3.1	Describe, analyze, compare, and classify two-dimensional shapes using sides and angles - including acute, obtuse, and right angles - and connect these ideas to the definition of shapes.  <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>
MA.3.G.3.2	Compose, decompose, and transform polygons to make other polygons, including concave and convex polygons with three, four, five, six, eight, or ten sides.

	<i>Cognitive Complexity/Depth of Knowledge Rating: High</i>
MA.3.G.3.3	Build, draw, and analyze two-dimensional shapes from several orientations in order to examine and apply congruence and symmetry.
	<i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>

### Supporting Idea 4: Algebra

#### Algebra

BENCHMARK CODE	BENCHMARK
MA.3.A.4.1	Create, analyze, and represent patterns and relationships using words, variables, tables, and graphs.
	<i>Cognitive Complexity/Depth of Knowledge Rating: High</i>

### Supporting Idea 5: Geometry and Measurement

#### Geometry and Measurement

BENCHMARK CODE	BENCHMARK
MA.3.G.5.1	Select appropriate units, strategies, and tools to solve problems involving perimeter.
	<i>Cognitive Complexity/Depth of Knowledge Rating: High</i>
MA.3.G.5.2	Measure objects using fractional parts of linear units such as $\frac{1}{2}$ , $\frac{1}{4}$ , and $\frac{1}{10}$ .
	<i>Cognitive Complexity/Depth of Knowledge Rating: Low</i>
MA.3.G.5.3	Tell time to the nearest minute and to the nearest quarter hour, and determine the amount of time elapsed.
	<i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>

### Supporting Idea 6: Number and Operations

#### Number and Operations

BENCHMARK CODE	BENCHMARK
MA.3.A.6.1	Represent, compute, estimate, and solve problems using numbers through hundred thousands.
	<i>Cognitive Complexity/Depth of Knowledge Rating: High</i>
MA.3.A.6.2	Solve non-routine problems by making a table, chart, or list and searching for patterns.
	<i>Cognitive Complexity/Depth of Knowledge Rating: High</i>

### Supporting Idea 7: Data Analysis

#### Data Analysis

BENCHMARK CODE	BENCHMARK
MA.3.S.7.1	Construct and analyze frequency tables, bar graphs, pictographs, and line plots from data, including data collected through observations, surveys, and experiments.
	<i>Cognitive Complexity/Depth of Knowledge Rating: High</i>

## GRADE: 4

### Big Idea 1: BIG IDEA 1

#### Develop quick recall of multiplication facts and related division facts and fluency with whole number multiplication.

BENCHMARK CODE	BENCHMARK
MA.4.A.1.1	Use and describe various models for multiplication in problem-solving situations, and demonstrate recall of basic multiplication and related division facts with ease.

	<i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>
MA.4.A.1.2	Multiply multi-digit whole numbers through four digits fluently, demonstrating understanding of the standard algorithm, and checking for reasonableness of results, including solving real-world problems.
	<i>Cognitive Complexity/Depth of Knowledge Rating: High</i>

## Big Idea 2: BIG IDEA 2

### Develop an understanding of decimals, including the connection between fractions and decimals.

BENCHMARK CODE	BENCHMARK
MA.4.A.2.1	Use decimals through the thousandths place to name numbers between whole numbers.  <i>Cognitive Complexity/Depth of Knowledge Rating: Low</i>
MA.4.A.2.2	Describe decimals as an extension of the base-ten number system.  <i>Cognitive Complexity/Depth of Knowledge Rating: High</i>
MA.4.A.2.3	Relate equivalent fractions and decimals with and without models, including locations on a number line.  <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>
MA.4.A.2.4	Compare and order decimals, and estimate fraction and decimal amounts in real-world problems.  <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>

## Big Idea 3: BIG IDEA 3

### Develop an understanding of area and determine the area of two-dimensional shapes.

BENCHMARK CODE	BENCHMARK
MA.4.G.3.1	Describe and determine area as the number of same-sized units that cover a region in the plane, recognizing that a unit square is the standard unit for measuring area.  <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>
MA.4.G.3.2	Justify the formula for the area of the rectangle "area = base x height".  <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>
MA.4.G.3.3	Select and use appropriate units, both customary and metric, strategies, and measuring tools to estimate and solve real-world area problems.  <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>

## Supporting Idea 4: Algebra

### Algebra

BENCHMARK CODE	BENCHMARK
MA.4.A.4.1	Generate algebraic rules and use all four operations to describe patterns, including nonnumeric growing or repeating patterns.  <i>Cognitive Complexity/Depth of Knowledge Rating: High</i>
MA.4.A.4.2	Describe mathematics relationships using expressions, equations, and visual representations.  <i>Cognitive Complexity/Depth of Knowledge Rating: High</i>
MA.4.A.4.3	Recognize and write algebraic expressions for functions with two operations.  <i>Cognitive Complexity/Depth of Knowledge Rating: High</i>

## Supporting Idea 5: Geometry and Measurement

### Geometry and Measurement

BENCHMARK CODE	BENCHMARK
MA.4.G.5.1	Classify angles of two-dimensional shapes using benchmark angles ( $45^\circ$ , $90^\circ$ , $180^\circ$ , and $360^\circ$ )  <i>Cognitive Complexity/Depth of Knowledge Rating: Low</i>

MA.4.G.5.2	Identify and describe the results of translations, reflections, and rotations of 45, 90, 180, 270, and 360 degrees, including figures with line and rotational symmetry.  <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>
MA.4.G.5.3	Identify and build a three-dimensional object from a two-dimensional representation of that object and vice versa.  <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>

## Supporting Idea 6: Number and Operations

### Number and Operations

BENCHMARK CODE	BENCHMARK
MA.4.A.6.1	Use and represent numbers through millions in various contexts, including estimation of relative sizes of amounts or distances.  <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>
MA.4.A.6.2	Use models to represent division as: <ul style="list-style-type: none"> <li>• the inverse of multiplication</li> <li>• as partitioning</li> <li>• as successive subtraction</li> </ul> <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>
MA.4.A.6.3	Generate equivalent fractions and simplify fractions.  <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>
MA.4.A.6.4	Determine factors and multiples for specified whole numbers.  <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>
MA.4.A.6.5	Relate halves, fourths, tenths, and hundredths to decimals and percents.  <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>
MA.4.A.6.6	Estimate and describe reasonableness of estimates; determine the appropriateness of an estimate versus an exact answer.  <i>Cognitive Complexity/Depth of Knowledge Rating: High</i>

## GRADE: 5

### Big Idea 1: BIG IDEA 1

#### Develop an understanding of and fluency with division of whole numbers.

BENCHMARK CODE	BENCHMARK
MA.5.A.1.1	Describe the process of finding quotients involving multi-digit dividends using models, place value, properties, and the relationship of division to multiplication.  <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>
MA.5.A.1.2	Estimate quotients or calculate them mentally depending on the context and numbers involved.  <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>
MA.5.A.1.3	Interpret solutions to division situations including those with remainders depending on the context of the problem.  <i>Cognitive Complexity/Depth of Knowledge Rating: High</i>
MA.5.A.1.4	Divide multi-digit whole numbers fluently, including solving real-world problems, demonstrating understanding of the standard algorithm and checking the reasonableness of results.  <i>Cognitive Complexity/Depth of Knowledge Rating: High</i>

## Big Idea 2: BIG IDEA 2

### Develop an understanding of and fluency with addition and subtraction of fractions and decimals.

BENCHMARK CODE	BENCHMARK
MA.5.A.2.1	Represent addition and subtraction of decimals and fractions with like and unlike denominators using models, place value, or properties. <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>
MA.5.A.2.2	Add and subtract fractions and decimals fluently, and verify the reasonableness of results, including in problem situations. <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>
MA.5.A.2.3	Make reasonable estimates of fraction and decimal sums and differences, and use techniques for rounding. <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>
MA.5.A.2.4	Determine the prime factorization of numbers. <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>

## Big Idea 3: BIG IDEA 3

### Describe three-dimensional shapes and analyze their properties, including volume and surface area.

BENCHMARK CODE	BENCHMARK
MA.5.G.3.1	Analyze and compare the properties of two-dimensional figures and three-dimensional solids (polyhedra), including the number of edges, faces, vertices, and types of faces. <i>Cognitive Complexity/Depth of Knowledge Rating: High</i>
MA.5.G.3.2	Describe, define, and determine surface area and volume of prisms by using appropriate units and selecting strategies and tools. <i>Cognitive Complexity/Depth of Knowledge Rating: High</i>

## Supporting Idea 4: Algebra

### Algebra

BENCHMARK CODE	BENCHMARK
MA.5.A.4.1	Use the properties of equality to solve numerical and real world situations. <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>
MA.5.A.4.2	Construct and describe a graph showing continuous data, such as a graph of a quantity that changes over time. <i>Cognitive Complexity/Depth of Knowledge Rating: High</i>

## Supporting Idea 5: Geometry and Measurement

### Geometry and Measurement

BENCHMARK CODE	BENCHMARK
MA.5.G.5.1	Identify and plot ordered pairs on the first quadrant of the coordinate plane. <i>Cognitive Complexity/Depth of Knowledge Rating: Low</i>
MA.5.G.5.2	Compare, contrast, and convert units of measure within the same dimension (length, mass, or time) to solve problems. <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>
MA.5.G.5.3	Solve problems requiring attention to approximation, selection of appropriate measuring tools, and precision of measurement. <i>Cognitive Complexity/Depth of Knowledge Rating: High</i>
MA.5.G.5.4	Derive and apply formulas for areas of parallelograms, triangles, and trapezoids from the area of a rectangle.

Cognitive Complexity/Depth of Knowledge Rating: High

## Supporting Idea 6: Number and Operations

### Number and Operations

BENCHMARK CODE	BENCHMARK
MA.5.A.6.1	Identify and relate prime and composite numbers, factors, and multiples within the context of fractions. <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>
MA.5.A.6.2	Use the order of operations to simplify expressions which include exponents and parentheses. <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>
MA.5.A.6.3	Describe real-world situations using positive and negative numbers. <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>
MA.5.A.6.4	Compare, order, and graph integers, including integers shown on a number line. <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>
MA.5.A.6.5	Solve non-routine problems using various strategies including “solving a simpler problem” and “guess, check, and revise”. <i>Cognitive Complexity/Depth of Knowledge Rating: High</i>

## Supporting Idea 7: Data Analysis

### Data Analysis

BENCHMARK CODE	BENCHMARK
MA.5.S.7.1	Construct and analyze line graphs and double bar graphs. <i>Cognitive Complexity/Depth of Knowledge Rating: High</i>
MA.5.S.7.2	Differentiate between continuous and discrete data, and determine ways to represent those using graphs and diagrams. <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>

## GRADE: 6

## Big Idea 1: BIG IDEA 1

### Develop an understanding of and fluency with multiplication and division of fractions and decimals.

BENCHMARK CODE	BENCHMARK
MA.6.A.1.1	Explain and justify procedures for multiplying and dividing fractions and decimals. <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>
MA.6.A.1.2	Multiply and divide fractions and decimals efficiently. <i>Cognitive Complexity/Depth of Knowledge Rating: Low</i>
MA.6.A.1.3	Solve real-world problems involving multiplication and division of fractions and decimals. <i>Cognitive Complexity/Depth of Knowledge Rating: High</i>

## Big Idea 2: BIG IDEA 2

### Connect ratio and rates to multiplication and division.

BENCHMARK CODE	BENCHMARK
MA.6.A.2.1	Use reasoning about multiplication and division to solve ratio and rate problems. <i>Cognitive Complexity/Depth of Knowledge Rating: High</i>
MA.6.A.2.2	Interpret and compare ratios and rates.

*Cognitive Complexity/Depth of Knowledge Rating: Moderate*

### Big Idea 3: BIG IDEA 3

#### Write, interpret, and use mathematical expressions and equations.

BENCHMARK CODE	BENCHMARK
MA.6.A.3.1	Write and evaluate mathematical expressions that correspond to given situations. <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>
MA.6.A.3.2	Write, solve, and graph one- and two- step linear equations and inequalities. <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>
MA.6.A.3.3	Work backward with two-step function rules to undo expressions. <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>
MA.6.A.3.4	Solve problems given a formula. <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>
MA.6.A.3.5	Apply the Commutative, Associative, and Distributive Properties to show that two expressions are equivalent. <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>
MA.6.A.3.6	Construct and analyze tables, graphs, and equations to describe linear functions and other simple relations using both common language and algebraic notation. <i>Cognitive Complexity/Depth of Knowledge Rating: High</i>

### Supporting Idea 4: Geometry and Measurement

#### Geometry and Measurement

BENCHMARK CODE	BENCHMARK
MA.6.G.4.1	Understand the concept of Pi, know common estimates of Pi (3.14; 22/7) and use these values to estimate and calculate the circumference and the area of circles. <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>
MA.6.G.4.2	Find the perimeters and areas of composite two-dimensional figures, including non-rectangular figures (such as semicircles) using various strategies. <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>
MA.6.G.4.3	Determine a missing dimension of a plane figure or prism given its area or volume and some of the dimensions, or determine the area or volume given the dimensions. <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>

### Supporting Idea 5: Number and Operations

#### Number and Operations

BENCHMARK CODE	BENCHMARK
MA.6.A.5.1	Use equivalent forms of fractions, decimals, and percents to solve problems. <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>
MA.6.A.5.2	Compare and order fractions, decimals, and percents, including finding their approximate location on a number line. <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>
MA.6.A.5.3	Estimate the results of computations with fractions, decimals, and percents, and judge the reasonableness of the results. <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>

### Supporting Idea 6: Data Analysis

#### Data Analysis

BENCHMARK CODE	BENCHMARK
MA.6.S.6.1	Determine the measures of central tendency (mean, median, mode) and variability (range) for a given set of data. <i>Cognitive Complexity/Depth of Knowledge Rating: Low</i>
MA.6.S.6.2	Select and analyze the measures of central tendency or variability to represent, describe, analyze, and/or summarize a data set for the purposes of answering questions appropriately. <i>Cognitive Complexity/Depth of Knowledge Rating: High</i>

## GRADE: 7

### Big Idea 1: BIG IDEA 1

#### Develop an understanding of and apply proportionality, including similarity.

BENCHMARK CODE	BENCHMARK
MA.7.A.1.1	Distinguish between situations that are proportional or not proportional, and use proportions to solve problems. <i>Cognitive Complexity/Depth of Knowledge Rating: High</i>
MA.7.A.1.2	Solve percent problems, including problems involving discounts, simple interest, taxes, tips, and percents of increase or decrease. <i>Cognitive Complexity/Depth of Knowledge Rating: High</i>
MA.7.A.1.3	Solve problems involving similar figures. <i>Cognitive Complexity/Depth of Knowledge Rating: High</i>
MA.7.A.1.4	Graph proportional relationships and identify the unit rate as the slope of the related linear function. <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>
MA.7.A.1.5	Distinguish direct variation from other relationships, including inverse variation. <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>
MA.7.A.1.6	Apply proportionality to measurement in multiple contexts, including scale drawings and constant speed. <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>

### Big Idea 2: BIG IDEA 2

#### Develop an understanding of and use formulas to determine surface areas and volumes of three-dimensional shapes.

BENCHMARK CODE	BENCHMARK
MA.7.G.2.1	Justify and apply formulas for surface area and volume of pyramids, prisms, cylinders, and cones. <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>
MA.7.G.2.2	Use formulas to find surface areas and volume of three-dimensional composite shapes. <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>

### Big Idea 3: BIG IDEA 3

#### Develop an understanding of operations on all rational numbers and solving linear equations.

BENCHMARK CODE	BENCHMARK
MA.7.A.3.1	Use and justify the rules for adding, subtracting, multiplying, dividing, and finding the absolute value of integers. <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>
MA.7.A.3.2	Add, subtract, multiply, and divide integers, fractions, and terminating decimals, and perform exponential operations with rational bases and whole number exponents including solving problems in everyday contexts.

	<i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>
MA.7.A.3.3	Formulate and use different strategies to solve one-step and two-step linear equations, including equations with rational coefficients.  <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>
MA.7.A.3.4	Use the properties of equality to represent an equation in a different way and to show that two equations are equivalent in a given context.  <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>

## Supporting Idea 4: Geometry and Measurement

### Geometry and Measurement

BENCHMARK CODE	BENCHMARK
MA.7.G.4.1	Determine how changes in dimensions affect the perimeter, area, and volume of common geometric figures, and apply these relationships to solve problems.  <i>Cognitive Complexity/Depth of Knowledge Rating: High</i>
MA.7.G.4.2	Predict the results of transformations, and draw transformed figures with and without the coordinate plane.  <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>
MA.7.G.4.3	Identify and plot ordered pairs in all four quadrants of the coordinate plane.  <i>Cognitive Complexity/Depth of Knowledge Rating: Low</i>
MA.7.G.4.4	Compare, contrast, and convert units of measure between different measurement systems (US customary or metric (SI)), dimensions, and derived units to solve problems.  <i>Cognitive Complexity/Depth of Knowledge Rating: High</i>

## Supporting Idea 5: Number and Operations

### Number and Operations

BENCHMARK CODE	BENCHMARK
MA.7.A.5.1	Express rational numbers as terminating or repeating decimals.  <i>Cognitive Complexity/Depth of Knowledge Rating: Low</i>
MA.7.A.5.2	Solve non-routine problems by working backwards.  <i>Cognitive Complexity/Depth of Knowledge Rating: High</i>

## Supporting Idea 6: Data Analysis

### Data Analysis

BENCHMARK CODE	BENCHMARK
MA.7.S.6.1	Evaluate the reasonableness of a sample to determine the appropriateness of generalizations made about the population.  <i>Cognitive Complexity/Depth of Knowledge Rating: High</i>
MA.7.S.6.2	Construct and analyze histograms, stem-and-leaf plots, and circle graphs.  <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>

## Supporting Idea 7: Probability

### Probability

BENCHMARK CODE	BENCHMARK
MA.7.P.7.1	Determine the outcome of an experiment and predict which events are likely or unlikely, and if the experiment is fair or unfair.  <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>
MA.7.P.7.2	Determine, compare, and make predictions based on experimental or theoretical probability of independent or dependent events,

*Cognitive Complexity/Depth of Knowledge Rating: High*

## GRADE: 8

### Big Idea 1: BIG IDEA 1

#### Analyze and represent linear functions, and solve linear equations and systems of linear equations.

BENCHMARK CODE	BENCHMARK
MA.8.A.1.1	Create and interpret tables, graphs, and models to represent, analyze, and solve problems related to linear equations, including analysis of domain, range, and the difference between discrete and continuous data. <i>Cognitive Complexity/Depth of Knowledge Rating: High</i>
MA.8.A.1.2	Interpret the slope and the x- and y-intercepts when graphing a linear equation for a real-world problem. <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>
MA.8.A.1.3	Use tables, graphs, and models to represent, analyze, and solve real-world problems related to systems of linear equations. <i>Cognitive Complexity/Depth of Knowledge Rating: High</i>
MA.8.A.1.4	Identify the solution to a system of linear equations using graphs. <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>
MA.8.A.1.5	Translate among verbal, tabular, graphical, and algebraic representations of linear functions. <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>
MA.8.A.1.6	Compare the graphs of linear and non-linear functions for real-world situations. <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>

### Big Idea 2: BIG IDEA 2

#### Analyze two- and three-dimensional figures by using distance and angle.

BENCHMARK CODE	BENCHMARK
MA.8.G.2.1	Use similar triangles to solve problems that include height and distances. <i>Cognitive Complexity/Depth of Knowledge Rating: High</i>
MA.8.G.2.2	Classify and determine the measure of angles, including angles created when parallel lines are cut by transversals. <i>Cognitive Complexity/Depth of Knowledge Rating: Low</i>
MA.8.G.2.3	Demonstrate that the sum of the angles in a triangle is 180-degrees and apply this fact to find unknown measure of angles and the sum of angles in polygons. <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>
MA.8.G.2.4	Validate and apply Pythagorean Theorem to find distances in real world situations or between points in the coordinate plane. <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>

### Big Idea 3: BIG IDEA 3

#### Analyze and summarize data sets.

BENCHMARK CODE	BENCHMARK
MA.8.S.3.1	Select, organize and construct appropriate data displays, including box and whisker plots, scatter plots, and lines of best fit to convey information and make conjectures about possible relationships. <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>
MA.8.S.3.2	Determine and describe how changes in data values impact measures of central tendency.

*Cognitive Complexity/Depth of Knowledge Rating: Moderate*

## Supporting Idea 4: Algebra

### Algebra

BENCHMARK CODE	BENCHMARK
MA.8.A.4.1	Solve literal equations for a specified variable. <i>Cognitive Complexity/Depth of Knowledge Rating: Low</i>
MA.8.A.4.2	Solve and graph one- and two-step inequalities in one variable. <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>

## Supporting Idea 5: Geometry and Measurement

### Geometry and Measurement

BENCHMARK CODE	BENCHMARK
MA.8.G.5.1	Compare, contrast, and convert units of measure between different measurement systems (US customary or metric (SI)) and dimensions including temperature, area, volume, and derived units to solve problems. <i>Cognitive Complexity/Depth of Knowledge Rating: High</i>

## Supporting Idea 6: Number and Operations

### Number and Operations

BENCHMARK CODE	BENCHMARK
MA.8.A.6.1	Use exponents and scientific notation to write large and small numbers and vice versa and to solve problems. <i>Cognitive Complexity/Depth of Knowledge Rating: Low</i>
MA.8.A.6.2	Make reasonable approximations of square roots and mathematical expressions that include square roots, and use them to estimate solutions to problems and to compare mathematical expressions involving real numbers and radical expressions. <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>
MA.8.A.6.3	Simplify real number expressions using the laws of exponents. <i>Cognitive Complexity/Depth of Knowledge Rating: Moderate</i>
MA.8.A.6.4	Perform operations on real numbers (including integer exponents, radicals, percents, scientific notation, absolute value, rational numbers, and irrational numbers) using multi-step and real world problems. <i>Cognitive Complexity/Depth of Knowledge Rating: High</i>