

Mathematics Scope and Sequence Chart
 Arranged by Strand and Grade Level
 Based Upon Massachusetts Curriculum Framework

Strand	Grade PreK to K	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
Number & Operations	<ul style="list-style-type: none"> ☆ Count by ones to at least 20. ☆ Match quantities up to at least 10 with numerals and words. ☆ Identify positions of objects in sequences (e.g., first, second) up to fifth. ☆ Use objects and drawings to model and solve related addition and subtraction problems to ten. 	<ul style="list-style-type: none"> ☆ Demonstrate an understanding of various meanings of addition and subtraction. Know addition facts (addends to ten) and related subtraction facts, and use them to solve problems. ☆ Estimate, calculate, and solve problems involving addition and subtraction. ☆ Identify different patterns on the hundreds chart. ☆ Write number sentences using +, -, = to represent mathematical relationships in everyday situations. ☆ Name, write, and order whole numbers to 100. 	<ul style="list-style-type: none"> ☆ Know addition and subtraction facts to 10. ☆ Identify the value of all U.S. coins, and \$1, \$5, \$10, and \$20 bills. ☆ Demonstrate an understanding of various meanings of addition and subtraction. Know addition facts (addends to ten) and related subtraction facts, and use them to solve problems. ☆ Estimate, calculate, and solve problems involving addition and subtraction of two-digit numbers. ☆ Demonstrate in the classroom an understanding of and the ability to use the conventional algorithms for addition and subtraction. ☆ Identify and represent common fractions ($\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$). ☆ Name, write, and order whole numbers to 1000. ☆ 	<ul style="list-style-type: none"> ☆ Know multiplication facts through 10×10 and related division facts. ☆ Select, use, and explain various meanings and models of multiplication (through 10×10). ☆ Relate multiplication problems to corresponding division problems. ☆ Add and subtract (up to four-digit numbers) and multiply two digits by a one-digit number and by multiples of ten accurately and efficiently. ☆ Divide a two-digit number by a one-digit divisor with and without remainders. ☆ Identify and represent fractions between zero and one, through tenths, as parts of unit wholes, as parts of a collection, and as locations on the 	<ul style="list-style-type: none"> ☆ Know multiplication facts through 12×12 and related division facts. Use these facts to solve related multiplication problems and compute related problems, e.g. 3×5 is related to 30×50, 300×5, and 30×500. ☆ Select and use a variety of strategies to estimate quantities, measures, and the results of whole-number computations up to three-digit whole numbers and amounts of money to \$1000, and to judge the reasonableness of the answer. ☆ Add and subtract (up to five-digit numbers) and multiply three digits by two digits accurately and efficiently. ☆ Divide up to a three-digit number with a single-digit divisor accurately and efficiently. Interpret any remainders. ☆ Demonstrate an understanding of 	<ul style="list-style-type: none"> ☆ Know multiplication and division facts to 12. ☆ Apply number theory concepts to the solution of problems. ☆ Accurately and efficiently add, subtract, multiply, and divide whole numbers. ☆ Accurately and efficiently add, subtract, multiply, and divide positive decimals. ☆ Demonstrate an understanding of fractions. ☆ Accurately and efficiently add, subtract, multiply, and divide positive fractions and mixed numbers.

				<p>number line.</p> <ul style="list-style-type: none"> ☆ Model and represent a mixed number (with denominator 2, 3, or 4) as a whole number and a fraction. 	<p>fractions as parts of unit wholes, as parts of a collection, and as locations on the number line.</p> <ul style="list-style-type: none"> ☆ Use concrete objects and visual models to add and subtract common fractions. 	
Patterns and Relationships	<ul style="list-style-type: none"> ☆ Identify the attributes of objects. Sort and classify objects. ☆ Recognize and compare objects of different sizes. ☆ Identify, reproduce, describe, extend, and create color, rhythmic, shape, number, and letter repeating patterns with simple attributes. 	<ul style="list-style-type: none"> ☆ Describe and create number and shape patterns. 	<ul style="list-style-type: none"> ☆ Skip count by twos, fives, and tens up to at least 50, starting at any number. ☆ Describe and create addition and subtraction number patterns, e.g. 1, 4, 7, 10...; or 25, 23, 21... ☆ Write number sentences using +, -, <, =, and/or > to represent mathematical relationships in everyday situations. 	<ul style="list-style-type: none"> ☆ Create, describe, extend, and explain patterns, including multiplication patterns up to 100. ☆ Use pictures, models, tables, charts, graphs, words, number sentences, and mathematical notations to represent and interpret mathematical relationships. 	<ul style="list-style-type: none"> ☆ Create, describe, extend, and explain symbolic (geometric) and numeric patterns. ☆ Use pictures, models, tables, charts, graphs, words, number sentences, and mathematical notations to represent and interpret mathematical relationships. 	<ul style="list-style-type: none"> ☆ Represent real situations and mathematical relationships with concrete models, tables, graphs, and rules in words and with symbols, e.g., input-output tables.
Geometry	<ul style="list-style-type: none"> ☆ Name, describe, sort, and draw simple two-dimensional shapes ☆ Name, describe, sort, and draw simple two-dimensional shapes. ☆ Name three-dimensional shapes. 	<ul style="list-style-type: none"> ☆ Identify symmetry in two-dimensional shapes. ☆ Describe attributes and parts of two- and three-dimensional shapes and identify, describe, draw, and compare two-dimensional shapes. ☆ Predict the results of putting shapes together and taking them apart. 	<ul style="list-style-type: none"> ☆ Identify symmetry in two-dimensional shapes. 	<ul style="list-style-type: none"> ☆ Describe and apply techniques for determining if two shapes are congruent. ☆ Identify, describe, and analyze shapes, lines, and angles. ☆ Locate and identify points using ordered pairs of positive whole numbers. 	<ul style="list-style-type: none"> ☆ Identify, describe, and analyze shapes, lines, and angles. ☆ Locate and identify points using ordered pairs of positive whole numbers. 	<ul style="list-style-type: none"> ☆ Identify two and three dimensional geometric shapes. ☆ Graph points and identify coordinates of points on the Cartesian coordinate plane.
Measurement	<ul style="list-style-type: none"> ☆ Describe attributes of two-dimensional shapes. ☆ Compare three- 	<ul style="list-style-type: none"> ☆ Measure and compare common objects. ☆ Identify parts of the day, days of the 	<ul style="list-style-type: none"> ☆ Identify parts of the day, days of the week, and months of the year. Identify dates using a 	<ul style="list-style-type: none"> ☆ Estimate and find area and perimeter of a rectangle. ☆ Understand and use appropriate 	<ul style="list-style-type: none"> ☆ Understand and use appropriate linear units (inches, feet, yards, centimeters, meters) and tools to 	<ul style="list-style-type: none"> ☆ Apply the concepts of geometry, measurement, perimeter, area, and volume.

	dimensional shapes.	week, and months of the year. ☆	calendar. ☆ Tell time at quarter-hour intervals. ☆ Measure and compare common objects.	units and tools to measure.	measure. ☆ Estimate and find area and perimeter of a rectangle.	☆
Statistics	Collect, sort, organize, and draw conclusions about data.	☆ Gather, organize, classify, represent, and interpret data using tallies, charts, tables, bar graphs, and pictographs; interpret the representations.	☆ Gather, organize, classify, represent, and interpret data using tallies, charts, tables, bar graphs, pictographs, and Venn diagrams; interpret the representations. ☆ Describe attributes and parts of two- and three-dimensional shapes and identify, describe, draw, and compare two-dimensional shapes. Predict the results of putting shapes together and taking them apart.	☆ Collect, organize, and represent data to construct, draw conclusions.	☆ Collect, organize, and represent data to construct, draw conclusions.	☆ Describe and compare data sets. ☆ Construct and interpret stem-and-leaf plots, line plots, and circle graphs. ☆ Produce and interpret graphs.
Probability				☆ Classify outcomes as certain, likely, unlikely, or impossible by conducting experiments.	☆ Classify outcome as certain, likely, unlikely, or impossible.	☆ Predict the probability of outcomes of simple experiments and test the predictions.

Strand	Grade 6	Grade 7	Grade 8
Number & Operations	<ul style="list-style-type: none"> ☆ Apply number theory concepts to the solution of problems. ☆ Accurately and efficiently add, subtract, multiply, and divide whole numbers, positive decimals, fractions, and mixed numbers. ☆ Select and use appropriate operations to solve problems. ☆ Add and subtract integers, with the exception of subtracting negative integers. ☆ Apply the Order of Operations. 	<ul style="list-style-type: none"> ☆ Use ratios and proportions in the solution of problems. ☆ Estimate and compute with fractions, integers, decimals, and percents. ☆ Select and use appropriate operations to solve problems with rational numbers (including negatives). ☆ Demonstrate an understanding of the identity and inverse relationships. 	<ul style="list-style-type: none"> ☆ Estimate and compute with fractions, integers, decimals, and percents. ☆ Include arithmetic and geometric progressions. ☆ Define, compare, order, and apply frequently used irrational numbers, such as $\sqrt{2}$ and π. ☆ Apply the rules of powers and roots to the solution of problems. ☆ Extend the Order of Operations to include positive integer exponents and square roots. ☆ Use ratio and proportion (including scale factors) in the solution of problems.
Patterns and Relationships	<ul style="list-style-type: none"> ☆ Represent real situations and mathematical relationships with concrete models, tables, graphs, and rules in words and with symbols, e.g., input-output tables. ☆ Produce and interpret graphs. 	<ul style="list-style-type: none"> ☆ Evaluate simple algebraic expressions for given variable values. ☆ Extend, represent, analyze, and generalize a variety of patterns. ☆ Create and use symbolic expressions and relate them to verbal, tabular, and graphical representations. ☆ Solve linear equations. ☆ Explain and analyze how a change in one variable results in a change in another variable in functional relationships. ☆ Use linear equations to model and analyze problems involving proportional relationships. 	<ul style="list-style-type: none"> ☆ Extend, represent, analyze, and generalize a variety of patterns with tables, graphs, words, and, when possible, symbolic expressions. ☆ Create, use, and evaluate symbolic expressions and relate them to verbal, tabular, and graphical representations. ☆ Use linear equations to model and analyze problems involving proportional relationships. Use technology as appropriate. ☆ Use models, graphs, and formulas to solve simple problems involving rates, e.g., velocity and density. ☆ Explain and analyze how a change in one variable results in a change in another variable in functional relationships. ☆ Use tables and graphs to represent and compare linear growth patterns. In particular, compare rates of change and x- and y-intercepts of different linear patterns. ☆ Identify the slope of a line as a measure of its steepness and as a constant rate of change from its table of values, equation, or graph. ☆ Apply the concept of slope to the solution of problems. ☆ Demonstrate an understanding of the Pythagorean Theorem and apply it to solve problems. ☆ Set up and solve linear equations and inequalities with one or two variables, using algebraic methods, models, and/or graphs.
Geometry	<ul style="list-style-type: none"> ☆ Predict, describe, and perform 	<ul style="list-style-type: none"> ☆ Demonstrate an understanding of geometric 	<ul style="list-style-type: none"> ☆ Recognize and draw two-dimensional

	<p>transformations on two-dimensional shapes.</p> <ul style="list-style-type: none"> ☆ Determine if two shapes are congruent. ☆ Identify, measure, describe, classify, and construct various angles, triangles and quadrilaterals. 	<p>concepts such as congruence, similarity, angle-side relationships.</p>	<p>representations of three-dimensional objects, e.g., nets, projections, and perspective drawings.</p>
Measurement	<ul style="list-style-type: none"> ☆ Solve problems involving proportional relationships and units of measurements. ☆ Find areas of triangles, parallelograms, and circles. ☆ Apply the concepts of perimeter and area to the solution of problems. ☆ Find volumes and surface areas of rectangular prisms. 	<ul style="list-style-type: none"> ☆ Apply formulas and procedures for determining measures of two and three dimensional geometric shapes and solids. 	<ul style="list-style-type: none"> ☆ Demonstrate an understanding of the concepts and apply formulas and procedures for determining measures, including those of area and perimeter/ circumference of parallelograms, trapezoids, and circles. Given the formulas, determine the surface area and volume of rectangular prisms, cylinders, and spheres. Use technology as appropriate.
Statistics	<ul style="list-style-type: none"> ☆ Describe and compare data sets. ☆ Construct and interpret stem-and-leaf plots, line plots and circle graphs. 	<ul style="list-style-type: none"> ☆ Select, create, interpret, and utilize data. 	
Probability	<ul style="list-style-type: none"> ☆ Predict the probability of outcomes of simple experiments and test the predictions. 	<ul style="list-style-type: none"> ☆ Compute probabilities for simple and compound events. 	