

East Maine School District 63
Math Learner Benchmarks

East Maine School District 63 Math Benchmarks

The original District benchmarks for math were developed during the 2003-04 school year, and were approved by the Board of Education in June, 2004.

During the 2005-06 and 2006-07 school year two committees reviewed and revised the math benchmarks. In addition to utilizing the Illinois Learning Standards for Mathematics, the committees carefully reviewed the Illinois Mathematics Assessment Framework Grades 3-8, which reflected the new Illinois Student Achievement Tests, and the Illinois Early Learning Standards for Kindergarten.

These benchmarks reflect a balanced instructional program and document a progression of expected achievement in each of the Illinois Learning Standards for Mathematics. The standards are organized by grade levels and reflect the gradual progression in the development of skills and knowledge. They are meant to be viewed cumulatively. Some benchmarks are repeated in some grade levels to indicate expectations that students will reinforce these benchmarks on more difficult material over several grades and perform to a higher proficiency using higher level thinking skills. Teachers at each grade level delineate these skills and the level of proficiency within each grade level context.

Although the benchmarks are listed separately, they are integrated in the classroom, and where applicable, throughout all other curricular areas.

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6-8 Committee Members

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Goal 6: Demonstrate and apply a knowledge and sense of numbers, including numeration and operations (addition, subtraction, multiplication, division), patterns, ratios, and proportions.)

Grade K	Grade One	Grade Two	Grade Three	Grade Four	Grade Five	Grade Six	Grade Seven	Grade Eight
***Use concepts that include number recognition, counting, sequence, 1-to-1 correspondence, and ordinal numbers.	***Identify and count whole numbers to 100.	***Count with understanding, including skip counting from any number by 2s and 10s.	***Rename numbers using word form, standard and expanded notation to 1000.	***Rename numbers using word form, standard and expanded notation to 1000.	***Read, write, recognize, and model equivalent representations of whole number and their place values to 100,000,000 and to thousandths.	Read, write, recognize, and model equivalent representations of whole numbers and their place values.	Order and compare integers, terminating decimals, fractions, and mixed numbers.	Order and compare rational numbers.
***Count with understanding and recognize "how many" in sets of objects.	*** Skip count by 2s, 5s, and 10s from zero.	***Recognize and explain the concepts of even and odd.	***Read, write, order, and compare whole numbers and fraction using models.	***Read, write, and model whole numbers and their place value to 1,000,000.	***Read, write, recognize, model and interpret numerical expressions from a given situation or description.	Read, write, recognize, and model equivalent representations of fractions, including improper fractions and mixed numbers.	Identify and locate integers, decimals, and fractions/mixed numbers on a number line, and estimate the locations of square roots.	Identify and locate rational and irrational numbers on a number line.

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***Solve simple math problems mentally, or by using objects, drawing pictures, etc.	*** Recognize “how many” in sets of objects.	*** Identify and compare whole numbers using the symbols $<$, $>$, and $=$.	***Solve simple open numerical sentences.	***Locate whole numbers and their place value on a number line.	***Read, write, recognize, and model equivalent representations of fractions (mixed and improper).	Recognize, translate between, and apply multiple representations of decimals, fractions, percents, and mixed numbers.	Solve problems involving descriptions of number, including characteristics and relationships (square numbers, prime/composite, prime factorization, greatest common factor, least common multiple).	Solve problems involving descriptions of numbers, including characteristics and relationships (exponents, roots, prime/composite, prime factorization, greatest common factor, least common multiple).
***Represent mathematical ideas with symbols, pictures, or objects.	***Demonstrate odd and even using manipulatives.	*** Describe numeric relationships using comparison (word form, standard and expanded) notation.	***Understand and demonstrate the commutative properties of whole numbers.	***Identify prime and composite numbers through 100 using a hundreds chart.	***Represent multiplication as repeated addition.	Read, write, recognize, and model equivalent representations of decimals and their place values through thousandths.	Solve problems and number sentences involving addition, subtraction, multiplication, and division using integers, fractions, and decimals.	Solve problems and number sentences involving addition, subtraction, multiplication, and division using rational numbers, exponents, and roots.

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Grade K	Grade One	Grade Two	Grade Three	Grade Four	Grade Five	Grade Six	Grade Seven	Grade Eight
***Explain to others the solution of a math problem.	*** Apply place value concepts to 100.	*** Apply place value concepts to 1000.	***Demonstrate how to select and use the appropriate operations to solve problems.	***Read, write, order, and compare decimals to demonstrate an understanding of place value through hundredths.	***Demonstrate fluency of basic multiplication/division through 12.	Represent repeated factors using exponents.	Identify and apply order of operations to simplify numeric expressions involving whole numbers (including exponents), fractions, and decimals.	Identify and apply order of operations to simplify numeric expressions involving whole numbers (including exponents and roots), fractions, and decimals.

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<p>***Connect numbers to quantities they represent using physical models and representations.</p>	<p>***Compare numbers using the symbols <, >, =.</p>	<p>*** Estimate to make real-world decisions (i.e. Do I have enough money to buy that toy?)</p>	<p>***Select appropriate methods/tools for computing with whole numbers from mental computation, estimation, calculators, and paper/pencil according to the context and nature of the computation and use the selected method/tool.</p>	<p>***Order and compare fractions having like denominators with like denominators.</p>	<p>***Order and compare whole numbers to one billion and decimals to hundredths.</p>	<p>Order and compare whole numbers, decimals, fractions, and mixed numbers.</p>	<p>Identify and apply the following properties of operations with rational numbers:</p> <ul style="list-style-type: none"> - commutative /associative properties for addition/multiplication -distributive property additive/multiplicative - identity properties additive/multiplicative - inverse properties - multiplicative property of zero 	<p>Identify and apply the following properties of operations with rational numbers:</p> <ul style="list-style-type: none"> - commutative /associative properties for addition/multiplication -distributive property - additive/multiplicative identity properties - additive/multiplicative inverse properties - multiplicative property of zero
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Goal 6: Demonstrate and apply a knowledge and sense of numbers, including numeration and operations (addition, subtraction, multiplication, division), patterns, ratios, and proportions.)

***Make comparisons of quantities.	***Describe numeric relationships using appropriate vocabulary.	*** Explain and use mental math strategies to solve simple addition and subtraction problems.	***Demonstrate and describe the effects of multiplying/dividing whole numbers using appropriate mathematical vocabulary.	***Model situations involving + and – of fractions with like denominators.	***Solve problems involving descriptions of numbers, odd/even, factors/multiples, greater than/less than, square numbers.	Identify and locate decimals, fractions, and mixed numbers on a number line.	Demonstrate and apply the relationships between addition/subtraction and multiplication/division with rational numbers.	Describe the effect of multiplying and dividing by numbers, including the effect of multiplying or dividing a rational number by: -a number less than zero -zero -a number between zero and one -a number greater than one
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Goal 6: Demonstrate and apply a knowledge and sense of numbers, including numeration and operations (addition, subtraction, multiplication, division), patterns, ratios, and proportions.)

Grade K	Grade One	Grade Two	Grade Three	Grade Four	Grade Five	Grade Six	Grade Seven	Grade Eight
***Make comparisons of quantities.	***Construct and solve one-step addition/subtraction and word problems using the symbols +, -, and =.	*** Estimate sums/differences of one and two-digit numbers.	***Demonstrate fluency with basic multiplication/division facts to 9.	***Identify and locate whole numbers, halves, and fourths on a number line.	***Estimate and solve problems and number sentences involving addition/subtraction, multiplication/division using whole numbers, decimals, and fractions.	Solve problems involving descriptions of numbers, including characteristics and relationships (odd/even, factors/multiples, greater/less than, square numbers, primes).	Make estimates appropriate to a given situation, and analyze what effect estimation has on the accuracy of results.	Select, use, and justify appropriate operations, methods, and tools to compute or estimate with rational numbers. Verify solutions and determine reasonableness of results.
Explain the thinking involved in solving mathematical problems.	* Solve basic addition and subtraction problems orally, in writing, and using concrete materials and drawings.	*** Compare numbers of objects in groups.	***Show and use the relationship between multiplication and division.	***Represent fractions through pictures (divide regions or sets to represent a fraction).	***Model situations involving addition/subtraction of fractions.	Solve problems and number sentences using addition, subtraction, multiplication, and division using whole numbers and decimals.		

Goal 6: Demonstrate and apply a knowledge and sense of numbers, including numeration and operations (addition, subtraction, multiplication, division), patterns, ratios, and proportions.)								
Estimate number of objects in a set.	* Construct number sentences to match simple word problems.	*** Solve and justify one and two-step addition and subtraction sentences and word problems orally, in writing, and using manipulatives and drawings.	***Solve and justify addition/subtraction, and multiplication/division number sentence and word problem solutions.	***Model multiplication as repeated addition.	***Identify and locate whole numbers and fractions including halves, fourths and thirds on a number line.	Solve problems involving addition and subtraction of fractions and mixed numbers, and express answers in simplest form.	Create and explain ratios that represent a given situation.	Use ratios to describe problem situations.
	*** Compute using fact families.	*** Apply the relationships of addition/subtraction families to solve problems.	***Use strategies to estimate reasonable answers.	***Model and apply basic multiplication/division facts up to 12 and apply to related multiples of 10 ($3 \times 9 = 27$, $30 \times 9 = 270$).	***Determine whether a number is prime or composite.	Solve problems involving addition and subtraction of fractions and mixed numbers, and express answers in simplest form.	Estimate the square root of a number less than 1,000 between two whole numbers.	Estimate the square or cube root of a number less than 1,000 between two whole numbers.

Goal 6: Demonstrate and apply a knowledge and sense of numbers, including numeration and operations (addition, subtraction, multiplication, division), patterns, ratios, and proportions.)

	*** Know addition and subtraction facts to 12.	***Demonstrate fluency with basic addition and subtraction facts to 18.	***Determine when to use exact answers or estimates for solutions to problems.	***Solve problems involving + and – with regrouping and multiplication (3 digit by 1 digit).	***Select and use appropriate operation(s) and tool(s) to perform calculations on whole numbers, fractions, and decimals. (commutative, distributive, and identity properties).	Identify and apply order of operations to simplify numeric expressions involving whole numbers.	Use proportional reasoning to model and solve problems.	Use proportional reasoning to model and solve problems.
	*** Use mental math counting strategies.	***Represent, order, label, and compare fractions ($\frac{1}{3}$, $\frac{1}{4}$, $\frac{1}{2}$) using manipulatives and pictures.	** Develop and use strategies to estimate the results of whole number computations and to judge the reasonableness of such results.	***Solve multi-step number sentences and word problems using whole numbers and the four basic operations.	***Make estimates appropriate to a given situation with whole numbers, fractions, and decimals.	Solve problems involving the commutative, distributive, and associative properties of operations on whole numbers.	Read, write, recognize, model, and interpret percents from 0% to 100%.	Read, write, recognize, model, and interpret percents, including those less than 1% and greater than 100%.
	*** Justify that whole number computations are correct.	** Validate that whole number computational results are correct and/or that estimates are reasonable.	***Recognize and generate equivalent forms of familiar fractions.	***Select and use one of various algorithms to multiply and divide.	***Solve problems involving proportional relationships (i.e.: unit pricing).	Make estimates appropriate to a given situation and analyze what effect estimation has on the accuracy of results.	Solve number sentences and problems involving fractions, decimal, and percents.	Solve number sentences and problems involving fractions, decimal, and percents.

Goal 6: Demonstrate and apply a knowledge and sense of numbers, including numeration and operations (addition, subtraction, multiplication, division), patterns, ratios, and proportions.)

	** Compare and order the number of objects in groups.	** Connect repeated addition to multiplication.		***Display simple mathematical relationships with number sentences.	***Order and compare fractions with like and unlike denominators .	Identify and express ratios using appropriate notation (a/b, a to b), identify equivalent ratios, and explain ratios that represent a given situation.		
	** Describe parts of a set using $\frac{1}{2}$, $\frac{1}{3}$, and $\frac{1}{4}$.	* Explore multiplication and division through equal grouping and equal sharing of objects.		***Solve word problems involving unknown quantities.	***Develop and use strategies to solve addition/subtraction and multiplication/division problems using currency and decimals.	Solve problems involving proportional relationships, including unit pricing.		
				***Understand and demonstrate the commutative and distributive properties of whole numbers.	**Explore and identify properties of square numbers.	Read, write, recognize, and model percents from 0% to 100%.		

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				***Use the inverse relationship between all operations (x, ÷, -, +) to complete and solve basic fact sentences and problems.	*Compute with 10, 100, 1000, and other powers of 10.	Solve number sentences and problems using percents.		
					*Explore and use divisibility rules and formulas to solve problems.			
					*Recognize, translate between, and model multiple representations of decimals, fractions less than one, and percents.			

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Goal 7: Estimate, make and use measurement of objects, quantities, and relationships and determine acceptable levels of accuracy								
Grade K	Grade One	Grade Two	Grade Three	Grade Four	Grade Five	Grade Six	Grade Seven	Grade Eight
***Demonstrate ways to measure objects using non-standards units.	***Identify the value of coins (penny, nickel, dime, and quarter).	***Estimate standard measurements of length, weight, and capacity.	***Measure objects using standard units in the U.S. customary and metric systems.	***Solve word problems involving elapsed time.	***Compare and estimate length, area, volume, weight/mass, and angles using referents.	Select and use appropriate standard units and tools to measure length, mass/weight, capacity, and angles.	Select and use appropriate standard units and tools to measure length, mass/weight, capacity, and angles. Sketch with given specifications, line segments, angles, triangles, and quadrilaterals.	Select and use appropriate standard units and tools to solve measurement problems, including measurements of polygons and circles.
***Use common instruments for measuring during work or play.	*** Count like sets of coins.	***Measure length, volume, and weight/mass using rulers, scales, and other instruments in the customary and metric system.	***Select and apply appropriate standard units and tools to measure length, area, volume, weight, time, and temperature.	***Solve money problems, including the making of change, using the amount of \$100.00 or less.	***Solve problems using elapsed time.	Solve problems involving the perimeter and area of a triangle, parallelogram, or irregular shape diagrams, models, and grids or by measuring/using given formulas.	Solve problems involving the perimeter and area of polygons and composite figures using diagrams, models, and grids or by measuring/using given formulas.	Solve problems involving the perimeter/circumference and area of polygons, circles, and composite figures using diagrams, models, and grids or by measuring/using given formulas.

Goal 7: Estimate, make and use measurement of objects, quantities, and relationships and determine acceptable levels of accuracy								
Grade K	Grade One	Grade Two	Grade Three	Grade Four	Grade Five	Grade Six	Grade Seven	Grade Eight
** Make reasonable versus unreasonable estimates.	***Measure units of elapsed time using calendars.	***Estimate elapsed time for a given task.	***Solve problems involving elapsed time.	***Select and apply appropriate standard units and tools to measure length, area, volume, weight, time, and temperature.	***Draw an angle of any given measure using a protractor.	Compare and estimate length (including perimeter), area, volume, weight/mass, and angles (0° to 180°) using referents.	Compare and estimate length (including perimeter), area, volume, weight/mass, and angles (0° to 180°) using referents.	Compare and estimate length (including perimeter/circumference), area, volume, weight/mass, and angles (0° to 360°) using referents.
*Construct a sense of time through participation in daily activities.	**Measure length, volume, and weight using appropriate measuring instruments in the customary and metric systems.	***Deduce and record time to the quarter hour using analog and digital clocks.	***Perform simple unit conversions.	***Solve problems involving the area and perimeter of irregular and regular polygons.	***Estimate the perimeter, area, and/or volume of regular and irregular shapes and objects.	Determine volume of a right rectangular prism using an appropriate formula/strategy.	Determine volume and surface area of a right rectangular prism using an appropriate formula/strategy.	Solve problems involving the volume or surface area of a right rectangular prism, right circular cylinder, or composite shape using an appropriate formula/strategy.

Goal 7: Estimate, make and use measurement of objects, quantities, and relationships and determine acceptable levels of accuracy

Grade K	Grade One	Grade Two	Grade Three	Grade Four	Grade Five	Grade Six	Grade Seven	Grade Eight
	** Identify and record time to the hour using analog and digital clocks.	***Identify, describe, and determine the relative values among coins (pennies, nickels, dimes, quarters, and half dollars).	***Make change from a given amount using bills and coins.	***Compare and estimate length, area, volume, and weight/mass using measuring tools.	***Select appropriate tools to measure rectangles, triangles, and circles.	Solve problems involving unit conversions <u>within the same measurement system</u> for time, length, and weight/mass, including compound units.	Solve problems involving unit conversions <u>within the same measurement system</u> for length, weight/mass, capacity, and square units.	Solve problems involving unit conversions <u>within the same measurement system</u> for length, weight/mass, capacity, square units and measures expressed as rates (converting feet/second to yards/minute).
	** Read temperatures using Fahrenheit thermometers.	***Solve addition and subtraction problems using coins.		***Determine the volume of a solid figure.		Solve problems involving scale drawings and maps.	Solve problems involving scale drawings and maps.	Solve problems involving scale drawings and maps, and indirect measurement (determine the height of a building by comparing shadow length to height and shadow length of another object).

Goal 7: Estimate, make and use measurement of objects, quantities, and relationships and determine acceptable levels of accuracy								
Grade K	Grade One	Grade Two	Grade Three	Grade Four	Grade Five	Grade Six	Grade Seven	Grade Eight
	** Estimate measurements and justify levels of accuracy.	***Explore and explain “making change” using manipulatives.			***Select appropriate tools to measure, draw, and construct figures.			
	* Explore perimeter and area using concrete materials (geoboards , grids, other measurement materials).	**Identify Fahrenheit and Celsius temperatures using a thermometer.			***Estimate, find, and draw perimeter and area using customary formulas and metric systems.			
		Describe possible methods for estimating a given measure and compare estimates to actual measures.			*Represent and analyze patterns and functions using words, tables, and graphs.			

Goal 7: Estimate, make and use measurement of objects, quantities, and relationships and determine acceptable levels of accuracy								
Grade K	Grade One	Grade Two	Grade Three	Grade Four	Grade Five	Grade Six	Grade Seven	Grade Eight
					**Convert U.S. customary and metric measurements into larger/smaller units.			
					***Estimate, find, and draw volume, weight/mass including compound units.			

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State Goal 8: Use algebraic and analytical methods to identify and describe patterns and relationships in data, solve problems and predict results

Grade K	Grade One	Grade Two	Grade Three	Grade Four	Grade Five	Grade Six	Grade Seven	Grade Eight
***Sort objects into groups and tell the rule or rationale for the groups.	*** Solve simple number sentences with variables ($2 + _ = 5$).	***Identify, describe, solve, and extend simple geometric and numeric patterns.	***Represent simple mathematical relationships with number sentences (equalities and inequalities).	***Demonstrate understanding of number patterns (odd, even, factors, multiples, greater than, less than).	***Solve word problems involving unknown quantities.	Determine a missing term in a sequence, extend a sequence, and construct and identify a rule that can generate the terms of a given sequence.	Determine a missing term in a sequence, extend a sequence, and construct and identify a rule that can generate the terms of an arithmetic or geometric sequence.	Analyze, extend, and create sequences or linear functions, and determine algebraic expressions to describe the nth term of a sequence.
***Construct and explain a simple graph.	***Describe and compare qualitative change (i.e. a student grows taller)	***Create, extend, and justify numeric and/or geometric patterns using concrete materials.	***Represent and analyze simple patterns and operations using words, tables, and graphs.	***Demonstrate the ability to determine, describe, and extend a pattern when given a description or pattern sequence.	***Write an expression using variable to represent unknown quantities.	Write an expression using variables to represent unknown quantities.	Write an expression using variables to represent unknown quantities.	Write an expression using variables to represent unknown quantities.

State Goal 8: Use algebraic and analytical methods to identify and describe patterns and relationships in data, solve problems and predict results								
Grade K	Grade One	Grade Two	Grade Three	Grade Four	Grade Five	Grade Six	Grade Seven	Grade Eight
Order, compare, and describe objects by size, length, capacity, and weight.		*Describe and compare quantitative change (student grows 3 in. in one year).	***Extend geometric and simple numeric patterns.	***Write an expression using letters-symbols to represent an unknown quantity.	***Demonstrate in simple situations how a change in one quantity results in a change in another quantity (input/output).	Evaluate algebraic expressions with up to two whole number variable values.	Simplify algebraic expressions by identifying and combining like terms.	Simplify algebraic expressions.
Use estimation skills in solving everyday measurement problems.		*Solve word problems involving unknown quantities.	***Represent the idea of a variable as an unknown quantity using a letter/symbol in a numerical sentence (i.e. $2 \times n = 8$; $n = 4$).	***Evaluate algebraic expressions with a whole number variable (i.e.: $3 + m$ when $m = 4$).	***Represent problems with equations and inequalities.	Determine a rule having two operations from an input—output table (multiply by 2 and add 4).	Recognize equivalent forms of algebraic expressions .	Recognize and generate equivalent forms of algebraic expressions.
*Describe and compare qualitative change (student grows taller).		***Solve problems and justify solutions using patterns.	**Demonstrate how to create a pattern given a set of directions.	***Identify and interpret patterns using words, tables, and graphs.	***Translate between different representations of whole number relationships.	Select a table of values that satisfies a linear equation, and recognize the ordered pairs on a rectangular coordinate system.	Evaluate or simplify algebraic expressions with one or more integer variable values.	Evaluate or simplify algebraic expressions with one or more rational variable values.

State Goal 8: Use algebraic and analytical methods to identify and describe patterns and relationships in data, solve problems and predict results

Grade K	Grade One	Grade Two	Grade Three	Grade Four	Grade Five	Grade Six	Grade Seven	Grade Eight
			Identify errors in a given pattern.	*Translate between different representations of whole number relationships.	***Determine a missing part in a sequence, extend the sequence, identify errors in a sequence, and identify a rule in a sequence.	Translate between different representations (table, written, pictorial) of whole number relationships.	Determine how a change in one variable relates to a change in a second variable.	Recognize, describe, and extend patterns using rate of change.
			Solve one-step linear equations using concrete materials.	*Represent simple mathematical relationships with number sentences (equalities and inequalities).	**Explore and identify properties of square numbers.	Identify graphs of inequalities on a number line.	Represent linear equations and quantitative relationships on a rectangular coordinate system, and interpret the meaning of a specific part of a graph.	Represent linear equations and quantitative relationships on a rectangular coordinate system, and interpret the meaning of a specific part of a graph.

State Goal 8: Use algebraic and analytical methods to identify and describe patterns and relationships in data, solve problems and predict results								
Grade K	Grade One	Grade Two	Grade Three	Grade Four	Grade Five	Grade Six	Grade Seven	Grade Eight
			*Express mathematical relationships using equations.	***Solve for the unknown in an equation with one operation.	**Explore and use exponents.	Represent problems with equations and inequalities.	Translate between different representations (table, written, graphical, pictorial) of whole number relationships and linear expressions.	Translate between different representations (table, written, graphical, pictorial) of whole number relationships and linear expressions.
				***Solve word problems involving unknown quantities.	**Explore and use negative numbers.	Solve for the unknown in an equation with one operation ($8x = 24$, $m \div 2 = 25$).	Identify, graph, and interpret inequalities on a number line.	Interpret the meaning of slope and intercepts in linear situations.
					*Make and test conjectures about mathematical properties and relationships and develop logical argument to justify conclusions.	Solve word problems involving unknown quantities.	Represent and analyze problems with linear equations and inequalities.	Identify, graph, and interpret up to two inequalities with a single variable (including the intersection or union of these inequalities) on a number line.

State Goal 8: Use algebraic and analytical methods to identify and describe patterns and relationships in data, solve problems and predict results								
Grade K	Grade One	Grade Two	Grade Three	Grade Four	Grade Five	Grade Six	Grade Seven	Grade Eight
							Solve linear equations in one variable ($2x + 3 = 13$) and inequalities involving $<$ or $>$ ($2x < 6$, $x + 7 > 10$.)	Represent and analyze problems with linear equations and inequalities.
						Solve word problems involving unknown quantities.	Solve linear equations and inequalities in one variable over the rational numbers.	
								Solve word problems involving unknown quantities.

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State Goal 9: Use geometric methods to analyze, categorize, and draw conclusions about points, lines, planes and space								
Grade K	Grade One	Grade Two	Grade Three	Grade Four	Grade Five	Grade Six	Grade Seven	Grade Eight
***Recognize geometric shapes and structures in the environment.	***Recognize, describe, and extend patterns and translate from one representation to another (red-blue-red-blue; a-b-a-b; snap, clap, square, circle, square, circle).	***Compare and contrast characteristics of two- and three-dimensional geometric shapes noting similarities and differences and using appropriate vocabulary.	***Show and explain perimeter/area of an object.	***Graph and identify ordered pairs.	***Graph, locate, identify points, and describe paths using ordered pairs.	Classify, describe, and sketch regular/irregular two-dimensional shapes according to the number of sides, length of sides, number of vertices, and interior angles.	Classify, describe, and sketch regular/irregular two-dimensional shapes according to the number of sides, length of sides, number of vertices, and interior angles.	Solve problems involving two- and three-dimensional shapes.
***Identify and name basic shapes.	*** Identify, describe, and extend simple geometric and numeric patterns.	***Perform translations (slides), reflections (flips), and rotations (turns) with concrete objects.	***Identify and plot coordinates on a grid.	***Determine congruence and similarity of given shapes.	***Classify, describe, and sketch two-dimensional shapes according to the number of sides, vertices, and interior angles. Graph, locate, identify points, and describe paths using ordered pairs.	Identify and describe three-dimensional shapes (cubes, spheres, cones, cylinders, prisms, and pyramids) according to their characteristics (faces, edges, vertices).	Solve problems involving two- and three-dimensional shapes.	Solve problems that require knowledge of triangle and quadrilateral properties.

State Goal 9: Use geometric methods to analyze, categorize, and draw conclusions about points, lines, planes and space								
Grade K	Grade One	Grade Two	Grade Three	Grade Four	Grade Five	Grade Six	Grade Seven	Grade Eight
Recognize, describe, create, and extend patterns in various formats.	* Identify related two- and three-dimensional geometric shapes	*** Construct and identify lines of symmetry in simple figures using various concrete materials.	***Describe the difference between congruence and similarity and sort objects by their attributes.	***Distinguish images resulting from flips, slides, and/or turns. Identify and draw parallel, intersecting, and perpendicular lines.	***Sketch and identify lines of symmetry in a figure.	Solve problems using properties of triangles and quadrilaterals	Solve problems using properties of triangles and quadrilaterals	Find the length of any side of a right triangle using the Pythagorean theorem.
Describe some attributes of two and three dimensional shapes.	* Model two-dimensional shapes by drawing or building.	***Identify objects that are congruent.	***Sort two and three-dimensional shapes according to their attributes and explain characteristics of each group.	***Draw and measure angles using a protractor.	***Identify, compare and analyze attributes of two- and three-dimensional shapes and develop vocabulary to describe the attributes.	Identify, describe, and sketch circles, including radius, diameter, and chord.	Identify, describe, and determine the radius and diameter of a circle.	Identify, describe, and determine the radius, diameter, and circumference of a circle and their relationship to each other and to pi.

State Goal 9: Use geometric methods to analyze, categorize, and draw conclusions about points, lines, planes and space								
Grade K	Grade One	Grade Two	Grade Three	Grade Four	Grade Five	Grade Six	Grade Seven	Grade Eight
Show understanding of and use direction, location, and position of words.	* Identify and compare characteristics, similarities, and differences of geometric shapes.	* Explore and describe perimeter and area using concrete materials.	***Predict and describe the results of translations, rotations, and reflections of two-dimensional shapes.	***Identify, draw, and label segments, rays, acute angles, obtuse angles, right angles, and acute, obtuse, right, scalene, isosceles, and equilateral triangles.	***Identify two-dimensional components of a three-dimensional object.	Graph, locate, identify points, describe paths, and plot figures using ordered pairs.	Graph points and identify coordinates of points on the Cartesian coordinate plane.	Graph points, and identify coordinates of points on the Cartesian coordinate plane.
	*** Identify lines of symmetry in simple figures.	***Investigate the results of putting together/taking apart two- and three-dimensional shapes (i.e. two triangles put together to form a quadrilateral).	***Extend geometric and simple patterns using concrete objects or paper and pencil.	***Construct a circle with a specified radius or diameter using a compass.	***Identify a three-dimensional object from its net.	Identify, describe, and predict results of reflections, translations, and rotations of two-dimensional shapes.	Represent and identify geometric figures using coordinate geometry.	Represent and identify geometric figures using coordinate geometry, including those resulting from transformations.

State Goal 9: Use geometric methods to analyze, categorize, and draw conclusions about points, lines, planes and space								
Grade K	Grade One	Grade Two	Grade Three	Grade Four	Grade Five	Grade Six	Grade Seven	Grade Eight
			***Identify, draw, and build polygons.	***Identify the two-dimensional components of a three-dimensional object.	***Predict the result of composing/decomposing shapes/figures.	Identify and sketch parallel, perpendicular, and intersecting lines.	Analyze the results of a combination of transformations.	Analyze the results of a combination of transformations, and determine a different transformation that could produce the same result.
				***Identify a three-dimensional object from its net. Predict the result of putting together and taking apart shapes and figures.	***Identify congruent and similar figures.	Identify and sketch acute, right, and obtuse angles.	Identify or analyze relationships of angles formed by intersecting lines..	Identify or analyze relationships of angles formed by intersecting lines and angles formed by radii of a circle
				***Identify congruent and similar figures.	***Determine if figures are similar, and identify relationships between corresponding parts of similar figures.	Identify a three-dimensional object from its net.	Identify and sketch acute, right, and obtuse angles.	Solve problems involving vertical, complementary, and supplementary angles.

State Goal 9: Use geometric methods to analyze, categorize, and draw conclusions about points, lines, planes and space								
Grade K	Grade One	Grade Two	Grade Three	Grade Four	Grade Five	Grade Six	Grade Seven	Grade Eight
				***Determine the distance between two points on the number line in whole numbers.	***Determine the distance between two points on a horizontal/vertical number line. ***Solve problems using properties of triangles.	Recognize which attributes (shape, perimeter, and area) change or don't change when plane figures are composed, decomposed, or rearranged.	Solve problems involving complementary and supplementary angles.	Identify front, side, and top views of a three-dimensional solid built with cubes.
					***Identify, describe, and sketch circles, including radius and diameter.	Identify congruent and similar figures by visual inspection.	Identify a three-dimensional object from its net.	Solve problems involving congruent and similar figures.
					***Identify, sketch, and measure parallel, perpendicular, and intersecting lines.	Determine if figures are similar, and identify relationships between corresponding parts of similar figures.	Recognize which attributes (shape, perimeter, and area) change or don't change when plane figures are composed, decomposed or rearranged.	Relate absolute value to distance on the number line.

State Goal 9: Use geometric methods to analyze, categorize, and draw conclusions about points, lines, planes and space								
Grade K	Grade One	Grade Two	Grade Three	Grade Four	Grade Five	Grade Six	Grade Seven	Grade Eight
					***Identify, sketch, and measure straight, acute, right, and obtuse angles.	Determine the distance between two points on a horizontal or vertical number line.	Describe the difference between congruence and similarity.	
					***Demonstrate congruence of plane figures using transformations (translation, rotation, reflection).		Determine if figures are similar, and identify relationships between corresponding parts of similar figures.	
							Determine the distance between two points on a horizontal or vertical number line.	

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State Goal 10: Collect, organize and analyze data using statistical methods; predict results; and interpret uncertainty using concepts of probability								
Grade K	Grade One	Grade Two	Grade Three	Grade Four	Grade Five	Grade Six	Grade Seven	Grade Eight
***Represent data using concrete objects, pictures, and graphs.	*** Organize, describe, and label simple data displays (pictographs, charts, tallies, tables, bar graphs).	***Gather, evaluate, and make predictions based on data and displays (pictures, tallies, charts, and/or bar graphs).	***Collect, represent, and interpret data using tables, tallies, and graphs.	***Read and interpret data represented in a pictograph, bar graph, line plot, Venn diagram, tally, chart, table, line/circle graph.	***Read, interpret, infer, predict, draw conclusions, and evaluate data from any table or graph.	Read, interpret, and make predictions from data represented in a bar graph, line (dot) plot, Venn diagram (with two circles), chart/table, line graph, or circle graph.	Read, interpret, and make predictions from data represented in a bar graph, line (dot) plot, Venn diagram (with two circles), chart/table, line graph, scatter plot, circle graph, or histogram.	Read, interpret (including possible misleading characteristics), and make predictions from data represented in a bar graph, line (dot) plot, Venn diagram (with two/three circles), chart/table, line graph, scatter plot, circle graph, stem-and-leaf plot, or histogram.
*** Compare, interpret, and analyze information presented in graph form.	***Make predictions and answer questions on given data.	**Formulate questions, collect, organize, and describe data using displays in order to analyze the data, draw conclusions, and communicate results.	***Predict, create, and perform a probability experiment.	***Create a pictograph, bar graph, tally chart, or table for a given set of data.	***Predict and calculate probability of a simple event.	Compare different representations of the same data.	Compare different representations of the same data.	Compare and contrast the effectiveness of different representations of the same data.

State Goal 10: Collect, organize and analyze data using statistical methods; predict results; and interpret uncertainty using concepts of probability								
Grade K	Grade One	Grade Two	Grade Three	Grade Four	Grade Five	Grade Six	Grade Seven	Grade Eight
***Make reasonable predictions based on information gathered in graph form.	*Design surveys to gather data.	** Identify and discuss likely, unlikely, and impossible probability events.	***Express probability of events using a response format (i.e. "3 out of 4").	***Determine the mode and range, given a set of data.	***Apply the fundamental counting principle in a simple problem (i.e.:).	Create a bar graph, chart/table, line graph, or circle graph with common referents for a given set of data.	Create a bar graph, chart/table, line graph, or circle graph for a given set of data.	Create a bar graph, chart/table, line graph, or circle graph, and solve a problem using the data in the graph for a given set of data.
*Gather and analyze data about themselves or their environment.	* Identify possible/impossible results of probability events using concrete materials.	** Record results of activities involving chance and make predictions based on data.	***Describe events as likely, unlikely, certain, equally likely, and impossible.	***List all possible outcomes of a single event and tell whether an outcome is certain, impossible, likely, or unlikely.	***How many combinations of one-scoop ice cream cones can be made with 3 flavors and 2 types of cones?).	Determine the mode, range, median, and mean, given a set of data or a graph.	Identify a reasonable approximation of the line of best fit from a set of data or a scatter plot.	Identify or draw a reasonable approximation of the line of best fit from a set of data or a scatter plot, and use the line to make predictions.
			***Organize, describe, and make predictions from existing data.	***Describe the probability of an event using terminology such as "3 chances out of 4".	***Using a data set, determine mean, median, mode, and range.	Solve problems involving the probability of a simple event, including representing the probability as a fraction, decimal, or percent.	Determine and use the mode, range, median, and mean to interpret data.	Analyze and apply measures of central tendency (mode, median, and mean) in problem-solving situations.

State Goal 10: Collect, organize and analyze data using statistical methods; predict results; and interpret uncertainty using concepts of probability								
Grade K	Grade One	Grade Two	Grade Three	Grade Four	Grade Five	Grade Six	Grade Seven	Grade Eight
			***Represent data using tables and graphs such as tallies and bar graphs.	**Differentiate representations of whole number relationships using tables, written words, and/or pictures.	***Discuss how mean, median, mode, and range help to interpret a given set of data.	Apply the fundamental counting principle in a simple problem (e.g., How many different 3-digit numbers can be made with the digits 1, 2, and 2?).	Solve problems involving the probability of a simple or compound event, including representing the probability as a fraction, decimal, or percent.	Solve problems involving the probability of an event composed of repeated trials, compound events (including independent events), or future events with/without replacement.
			***Describe the important features of a set of data represented by a graph.	**Describe shape and features of a set of data and compare related data sets.	***Identify and express ratios, proportions, and percents to solve problems.		Represent all possible outcomes for simple events.	Represent all possible outcomes for simple (sample space) or compound events (tables, grids, tree diagrams).
			***Determine the mean, median, and mode of a data set and on a graph.	**Propose and justify conclusions and predictions that are based on data.			Solve simple problems involving the number of ways objects can be arranged (permutations/combinations).	Solve simple problems involving the number of ways objects can be arranged (permutations/combinations).

State Goal 10: Collect, organize and analyze data using statistical methods; predict results; and interpret uncertainty using concepts of probability								
Grade K	Grade One	Grade Two	Grade Three	Grade Four	Grade Five	Grade Six	Grade Seven	Grade Eight
			**Describe situations with constant rate of change using words, tables, and graphs.					

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