

# PRE-K THROUGH 12 MATHEMATICS CURRICULUM

	Pre-K	Kindergarten	Primary	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6	Pre-algebra 1.5 years Grade 6/7	Pre-Algebra 1 yr Grade 6/7	Algebra 1 Grade 7/8	Geometry	Advanced Algebra	FST	PDM		ADDITIONAL COURSES: AP Calculus AB, AP Calculus BC, AP Statistics, Linear Algebra
<b>Time &amp; Money</b>			Intro to telling time: analog and digital; on the hour; intervals; identify coins-by name and value Count groups of coins by 1s, 2s, 5s, 10s	Money: identify, sort, count coins; add coins up to 50 cents; analog & digital clocks (1/2 hour intervals)	Counting money; making change; telling time	Review, assess, reteach time & money concepts	Money operations; time	Money operations; time		Integrated into problem-solving; I=prt; Stock Market (7th gr)	Integrated into problem-solving	Word problems; exponential growth		Stock project, word problems, exponential growth	Exponential growth of money			
<b>Counting</b>	Counting orally: dice, calendar, games	Recognizing events happening in sequential order; counting by 2's, 5's, 10's; Mathland	Counting forward and backwards 2's, 5's, 10's	Counting by 2's, 5's, 10's (count 1-120)	Skip counting; counting by 3's, 4's, 10's, 20's	Skip counting; multiplication	Skip counting;	Number systems: roman numerals, binary numbers	Decimals; square roots	GCF, LCM, prime factorization, multiples, decimals; square roots	GCF, LCM, prime factorization, multiples, decimals; square roots	Multiples & factors		Introduction to complex numbers	Complex numbers	Proofs involving integers	<b>Number Sets</b>	
<b>Computation</b>			Addition & subtraction (including computations with 10); doubling numbers; square roots; ratio & proportion; Begin to use equations to describe a math operation	Addition & subtraction to 10; open equations; skip counting	Subtraction, addition; skip-counting; place-value & regrouping addition	Plus & minus; place-value; multiplication by repeated addition; Addition up to 4 digit numbers; subtraction with re-grouping; multiplications facts to 10; concept of division	4-digit addition & subtraction with borrowing and carrying; multiplication; different methods; mental math	Multiplication and long division; fraction & decimal operations	Operations for whole numbers; math facts; money operations; adding & subtracting on number line; order of operations; operations with negative numbers; exponents, powers of 10 and of negative numbers	Operations for whole numbers; math facts; adding & subtracting on number line; order of operations; operations with negative numbers; exponents, powers of 10, absolute value	Basic computation; order of operations; operations with fractions; square roots; exponents	Positive & negative numbers; order of operations; absolute value on number line; simplifying radicals; exponents	Side measures; angles, area, perimeter,	Square roots; absolute value; rational functions; complex numbers	Complex numbers; combinatorics			
<b>Reading, Writing, Understanding, Numbers</b>	Number recognition: write numerals 1-10	How to write (draw) numerals	Understand the meaning of two digit numbers, i.e. a digit's placement determines its value. Intro to three digit numbers	Number recognition; odd & even; place-value: 1, 10, 100	Place value	Place value		Reading large numbers & decimal numbers	Writing numbers like millions	Writing numbers like millions; Associative, commutative, distributive, transitive properties	Associative, commutative, distributive, transitive properties	Associative, commutative, distributive, transitive properties	Associative, commutative, distributive, transitive properties	Associative, commutative, distributive, transitive properties	Solving and factoring over different number sets	Mathematical induction	<b>Axioms, Properties, Theorems, Proofs</b>	
<b>Number Sense</b>	Estimate number of objects in container; 1-1 correspondence	1-1 Correspondence used for counting; comparing height, weight, shapes; pre-adding; number appearance; arrangement of objects	Compare and contrast numbers; explore greater than, less than, equal to through estimation activities, counting games, etc.	Determine number in a group; more vs. less vs. equal; fast vs. slow	Predicting and estimating; compare & order numbers	Great than; lesser than; equal to; estimating	Estimates	Place value, estimation, negative numbers	Number sense; scientific notation	Number sense; scientific notation; estimation & reasonableness	Square roots; estimation & reasonableness	Scientific notation; exponents; estimation; radicals	Estimation; nth terms	Asymptotic behavior; Estimation	Asymptotic behavior; Estimation; conceptualizing infinity	Conceptualizing infinity; Asymptotic behaviour; estimation		
<b>Reasoning &amp; Problem-solving</b>		Logical thinking: concept of 1 more; sorting; distinguishing between groups; more vs. less	Explore a variety of math story problems; practice problem solving strategies i.e. draw pictures, diagrams, lists, etc.	Story problems involving addition & subtraction; reading & following directions; sorting treasures by 1 or 2 attributes	Problem-solving strategies; logical thinking; classification and sorting; making groups	Strategies such as: Make a list; Draw a picture or diagram; logical thinking; working backwards	Story problems; Math Olympiads	Math Olympiads; logic problems	Recognizing key words; logic puzzles, Math Olympiads	Recognizing key words; logic puzzles, Math Olympiads	Problem-solving; writing verbal models; interpret word problems into algebraic equations	Problem-solving strategies; growth & decay (exponents); word problems	Logic puzzles; problem-solving strategies	Problem-solving strategies; direct and inverse variation	Problem-solving strategies	Problem-solving strategies; logic, truth tables		
<b>Patterns, Sequences, Series</b>		Recognize, create, extend patterns	Build, repeat and extend patterns in two and three dimensions. Explore patterns in our base ten number system, counting by 2's, 5's, 10's	Patterns on the 100-board: create and label	Pattern & sequences; extending and transforming patterns	Skip counting		Patterns & sequences	Sequences	Sequences; perfect squares; fractals; Fibonacci	Fibonacci series; triangular numbers; perfect numbers	Exponential patterns	Inductive logic; basic sequences; nth term	Series	Arithmetic and geometric; sequences (honors)	Sequences & series		
<b>Measuring</b>			Explore non-standard and standard measurement; linear, solids and liquids through real life projects, i.e. cooking, arts and crafts, etc.	Explore non-standard and standard measurement; linear, solids and liquids through real life projects, i.e. cooking, arts and crafts, etc.	Measurement: length, weight	Area, perimeter, volume, length as it relates to fractions	Length, weight, temperature	Inches, cm, temperature	Customary unit conversion	Dream Backyard Project; area; perimeter; volume	Area; perimeter		Area, length, angles, perimeter	Distance, magnitude; 2D representation				
<b>Fractions &amp; Decimals</b>			Intro to fractions through measurement explorations and use of decimal in money	Introduction to basic fractions & decimals in money	Fractions: 1/2, 3/4, 1/3, 1/4	Explore fractions	Adding and subtracting fractions	Fractions, decimals, percents (how they relate); the four operations	Ratios; rates	Ratios; rates; computation; place value; converting	computation, place value, converting	Fractions: order, computations	Similar triangles; ratios	Simplifying rational expressions; complex fractions; rational functions	Rational functions	Partial fractions	<b>Rational Functions</b>	
<b>Graphing</b>			Intro to data collection and how to record data on a simple bar graph	Intro to data collection and how to record data on a simple bar graph	Bar graphs, plot graphs	How to record/interpret data on a graph		4 quadrants; types of graphs	Graphing	Line plots, bar graphs, scatter plots; coordinate graphing	Line plots, bar graphs, scatter plots; coordinate graphing	Graphs & solving; graphing inequalities	Graphing shapes; parallel & perpendicular lines	Graphing quadratics; absolute value functions, piecewise functions; systems of linear inequalities; parent functions	all elementary functions; parent functions; parametric equations (honors)	Trigonometric, polar, polynomial functions; parametric equations		
<b>Transformations</b>			Explore symmetry in art and nature		Introduction to concept of symmetry	Congruency, symmetry	Identify symmetrical objects, lines of symmetry	Flip, slide, & rotational transformations				Graphing lines	Transformations	Transformations; parent functions	Transformations; parent functions	Transformations; parent functions		
<b>Statistics &amp; Probability</b>			Collect, sort and interpret data using graphs and charts	Gathering, organizing, reporting data; drawing conclusions; games of chance; dice, coins, spinners, simple probability	Collection, analysis, interpretation graphing data (bar & plot graphs); probability	Probability; predicting results	Probability; data collection; predicting results; displaying data, graphs	Statistics: data collection, mean, median & mode	Line plots, bar graphs, scatter plots; probability	Line plots, bar graphs, scatter plots; probability; Counting Principle; permutations; mean, median, mode, range	Line plots, bar graphs, scatter plots; probability; Counting Principle; permutations; mean, median, mode, range	Exploring data; picture graphs, pie charts, scatter plots; linear equations from points; matrices (arrays); mean, median, mode		Regression, scatter plots, data analysis	Descriptive & inferential statistics; probability; central tendency, variance; distributions; hypothesis testing; [research design; density curves; chi-square (honors)]			
<b>Equations &amp; Inequalities</b>			Intro on how to write equations; vertically and horizontally	Cover each number in a simple equation and solve for it; writing equations using + and -; equations with 2 or 3 terms added	Equations	Basic equation solving; multi-operation equations	Fact families; prealgebra (variables)	Equations with 2 or 3 terms added	Basic equation solving	Basic equation solving; solutions of inequalities	Equations & inequalities, 2 step, variables on both sides	Solving equations; systems of equations; solving inequalities; expression vs. equation	Translating shapes to equations	Radical equations; rational equations	Solving and graphing linear & quadratic inequalities	Systems of equations; linear programming		
<b>Geometry</b>	Reorganizing geometric shapes		Explore two and three-dimensional shapes: i.e. squares vs. cubes, circle vs. spheres, etc. Identify basic two-dimensional shapes: square, rectangle, triangle, diamond, circle, oval, etc.	Record 2D patterns on grid paper; classification of geometric shapes by number of sides	Geometric shapes, definitions, concrete modeling, 3D shape comparison	Geometric investigations: shapes, symmetry; patterns in fractions; rhombus, trapezoid, hexagon	Classifying shapes; build polyhedra; division, avg, area, perimeter	Polygons, angles, tessellations, circles; shapes classified by number of sides; perimeter, area, volume	Angles, lines, perimeter, area, volume; Pythagorean Theorem; identifying shapes	Angles, lines, perimeter, area, volume; Pythagorean Theorem; identifying shapes	Pythagorean theorem; geometric constructions; polyhedra		Angles: measures, properties; congruence; similarity; construction; perspective; area, volume, distance; Pythagorean Theorem; circles & arcs; parallel line relationships; right triangle trigonometry	Distance with line segments; magnitude	Right triangle & circular trigonometry; trigonometric functions & graphs; unit circle; identities; solving trigonometric equations; Law of Sine & Cosines	<b>Trigonometry</b>		
<b>Functions</b>							Function tables	Function tables			Introduction to functions; domain & range	Linear and beginning quadratic functions		Functions; domain, range; parent functions; transformations	Domain, range, operations, inverses; all elementary functions	Parametric equations		
<b>Lines</b>									basic linear equations	linear equations	Line equation forms: slope-intercept, point-slope, standard; find equation of line through two points		Linear equations; parallel & perpendicular lines; distance, midpoint, slope	Linear programming; linear functions; linear approximations	Linear functions, systems of equations (honors)	Systems of equations, linear programming		
<b>Quadratic &amp; polynomial functions</b>												Quadratics; multiplying polynomials; factoring quadratics		Factoring; roots of quadratic equations; polynomials; quadratic approximations	Polynomials: long division, synthetic division; Fundamental Theorem of Algebra			
<b>Exponential &amp; logarithmic functions</b>							Square numbers	Scientific notation; squares and cubes				Rules of exponents; basic graphs		Review rules of exponents; exponential & logarithmic functions	Review exponential & logarithmic functions			
<b>Conics</b>												Parabolas	Circles	(Regular) parabolas; (honors): parabolas, ellipses, hyperbolas	Parabolas	Parabolas, ellipses, hyperbolas; rotations in parametric, rectangular, and polar form		
<b>Matrices</b>												Basic addition, subtraction, multiplication; data entry		Matrix operations; determinants; solving systems by matrix inverse method	Honors: Matrix operations; determinants; solving systems by matrix inverse method	Review of Matrix operations; determinants; solving systems by matrix inverse method		