

**Mathematics Vertical Alignment Matrix  
Grades 5 - 8, Algebra I**

	Grade 5	Grade 6	Grade 7	Grade 8	Algebra 1	
<b>Strand 1: Number, Operation, and Quantitative Reasoning</b>	<b>Numbers and Place Value</b>					
	<b>MATH.5.1A</b> Use place value to read, write, compare and order whole numbers through the 999,999,999,999 in standard, expanded, and written forms.					
	<b>P MATH.5.1B</b> Use place value to read, write, compare, and order decimals through the thousandths place moving from concrete models and pictorial representations to the symbolic level.					
	<b>Fractions and Decimals</b>	<b>Fractions, Decimals and Integers</b>	<b>Rational Numbers</b>	<b>Real Numbers</b>		
	<b>MATH.5.2C</b> Compare two fractional quantities in problem-solving situations using a variety of methods, including common denominators, concrete or pictorial models, and benchmark fractions.	<b>P MATH.6.1A</b> Compare and order non-negative rational numbers and the words associated with them using various methods including benchmarks and place value.	<b>P MATH.7.1A</b> Compare and order integers and positive rational numbers or the words associated with them using concrete or pictorial models, benchmarks and place value.	<b>P MATH.8.1A</b> Compare and order rational numbers in various forms including integers, percents, and positive and negative fractions and decimals.		
	<b>P MATH.5.2A</b> Generate a fraction equivalent to a given fraction such as $1/2$ and $3/6$ or $4/12$ and $1/3$ using various strategies including concrete objects, pictorial models, and patterns to generalize a rule for the process.	<b>P MATH.6.1B</b> Generate equivalent forms of rational numbers including whole numbers, fractions, and decimals using various methods including manipulatives or pictorial models.	<b>MATH.7.1B</b> Convert between fractions, decimals, whole numbers, and percents presented in application problems mentally, on paper, or with a calculator using operations and definitions.			
	<b>P MATH.5.2B</b> Generate a mixed number equivalent to a given improper fraction or generate an improper fraction equivalent to a given mixed number using various strategies including concrete objects, pictorial models, and patterns to generalize a rule for the process.					
	<b>P MATH.5.2D</b> Use models to relate decimals to fractions that name tenths, hundredths, and thousandths with models such as base-ten blocks, fraction bars, and paper grids.					

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<b>Strand 1: Number, Operation, and Quantitative Reasoning</b>	<b>Fractions and Decimals</b>	<b>Fractions, Decimals and Integers</b>	<b>Rational Numbers</b>	<b>Real Numbers</b>		
	<p><b>MATH.5.3D</b> Identify common factors of a set of whole numbers using a variety of strategies and manipulatives.</p>	<p><b>MATH.6.1E</b> Identify factors of a positive integer, common factors, and the greatest common factor of a set of positive integers.</p>	<p><b>MATH.7.1C</b> Represent squares &amp; square roots using geometric models and use technology to estimate and determine exact square roots.</p>	<p><b>MATH.8.1C</b> Approximate (mentally and with calculators) the value of irrational numbers (such as pi and <math>\sqrt{2}</math>) as they arise from algebraic or geometric problem situations.</p>		
	<p><b>MATH.5.5B</b> Identify prime and composite numbers using concrete objects, pictorial models, and patterns in factor pairs.</p>	<p><b>MATH.6.1D</b> Write prime factorizations using exponents for numbers given in real-life situations, using models and factor trees.</p>				
		<p><b>MATH.6.1F</b> Identify multiples of positive integers and common multiples and the least common multiple of a set of positive integers.</p>		<p><b>MATH.8.1D</b> Express numbers in scientific notation, including negative exponents, in appropriate problem situations.</p>		
		<p><b>MATH.6.1C</b> Use integers to represent real-life situations; model integers using manipulatives, and connect vocabulary words to integers.</p>				
	<b>Modeling Operations</b>					
	<p><b>MATH.5.3E</b> Model situations using addition and/or subtraction involving fractions with like denominators using concrete objects, pictures, words, and numbers.</p>	<p><b>MATH.6.2A</b> Model addition and subtraction situations involving fractions with objects, pictures, words, and numbers.</p>	<p><b>MATH.7.2A</b> Represent multiplication and division situations involving fractions, and decimals with concrete objects, pictures, words, expressions, equations.</p>			
			<p><b>MATH.7.2C</b> Use models, such as concrete objects, pictorial models, and number lines to add, subtract, multiply, and divide integers and connect the actions to algorithms.</p>			

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	Grade 5	Grade 6	Grade 7	Grade 8	Algebra 1
<b>Strand 1: Number, Operation, and Quantitative Reasoning</b>	<b>Solving Problems with Addition, Subtraction, Multiplication, and Division</b>				<b>Solving Problems with Real Numbers Using Equations and Their Properties</b>
	<b>MATH.5.3A</b> Use addition and subtraction to solve problems involving whole numbers and decimals using a variety of strategies.	<b>P MATH.6.2B</b> Use addition and subtraction to solve problems involving fractions and decimals using concrete objects, pictorial models, and verbal representations.	<b>P MATH.7.2B</b> Use addition, subtraction, multiplication, and division to solve problems involving fractions and decimals presented in real-world situations which include information expressed in various forms, including pictorial models, graphical representations, numbers, or ranges of numbers.	<b>P MATH.8.1B</b> Select and use appropriate forms of rational numbers to solve real-life problems including those involving proportional relationships.	<b>P ALGI.3A</b> Use manipulatives, drawings, verbal descriptions and symbols to represent unknowns and variables in real world situations.
	<b>MATH.5.3B</b> Use multiplication to solve problems involving whole numbers (no more than three-digits times two-digits without technology) applying array/area models to multiplication algorithms.	<b>P MATH.6.2C</b> Use multiplication and division of whole numbers to solve problems including situations involving equivalent ratios and rates.	<b>MATH.7.2D</b> Use division to find unit rates and ratios in proportional relationships such as speed, density, price, recipes, and student-teacher ratios; and model those relationships concretely, pictorially, and in tabular form.	<b>MATH.8.2D</b> Use multiplication by a constant factor (unit rate) to represent proportional relationships as functions and determine the unit rate for a proportional relationship.	
	<b>MATH.5.3C</b> Use division to solve problems involving whole numbers (no more than two-digit divisors and three-digit dividends without technology), including interpreting the remainder within a given context for sharing equally and measuring out contexts applying models to division algorithms.				
		<b>MATH.6.2E</b> Use order of operations to simplify whole number expressions (without exponents) in problem solving situations.	<b>MATH.7.2E</b> Describe the order of operations in a given numerical expression and simplify numerical expressions involving order of operations and exponents.	<b>MATH.8.2A</b> Select appropriate operations to solve problems involving rational numbers and justify the selections.	<b>ALGI.4A</b> Find specific function values; add, subtract, multiply, or divide to simplify polynomial expressions; transform and solve equations including factoring as necessary in problem situations which are expressed in verbal, algebraic, or pictorial (algebra tiles) representations.
		<b>MATH.7.2F</b> Select and use appropriate operations to solve problems and justify the selections, problem-solving process, and reasonableness of answer, especially in terms of an estimate.	<b>MATH.8.2B</b> Use appropriate operations to solve problems involving rational numbers in problem situations and justify the problem-solving process and the reasonableness of the solution.	<b>ALGI.4B</b> Demonstrate pictorially and algebraically the commutative, associative, and distributive properties to simplify algebraic expressions.	

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	Grade 5	Grade 6	Grade 7	Grade 8	Algebra 1
<b>Strand 1: Quantitative Reasoning</b>	<b>Estimation</b>				
	<b>MATH.5.4A</b> Use strategies, including rounding and compatible numbers to estimate solutions to addition, subtraction, multiplication, and division problems.	<b>MATH.6.2D</b> Estimate and round to approximate reasonable results and to solve problems where exact answers are not required.	<b>MATH.7.2G</b> Determine the reasonableness of a solution to a problem using a variety of strategies such as estimation using rounding or compatible numbers.	<b>MATH.8.2C</b> Evaluate a solution for reasonableness using a variety of strategies such as estimation using rounding or compatible numbers.	<b>ALGI.7C</b> Interpret and determine the reasonableness of solutions to linear equations and inequalities. <b>ALGI.8C</b> Interpret and determine the reasonableness of solutions to systems of linear equations.
<b>Strand 2: Patterns, Relationships, and Algebraic Thinking</b>	<b>Patterns and Generalizations</b>		<b>Proportional Reasoning</b>		
	<b>P MATH.5.5A</b> Describe the relationship between sets of data in graphic organizers such as lists, tables, charts, and diagrams, extend the pattern, and state the rule for non-consecutive related number pairs.	<b>P MATH.6.3A</b> Use ratios to describe proportional situations (such as part-to-whole relationships, part-to-part relationships, and rates), generate equivalent ratios, and match a description of a proportional situation with a ratio.		<b>P MATH.8.3A</b> Compare and contrast proportional and non-proportional relationships using various methods including tables of values, algebraic rules, and graphs.	<b>ALGI.5A</b> Determine whether or not given situations can be represented by linear functions by determining finite differences and writing an algebraic representation.
		<b>MATH.6.3B</b> Represent ratios and percents with concrete models, fractions, and decimals and model equivalent forms of fractions, decimals, and percents using pictorial models and on a number line.	<b>P MATH.7.3A</b> Estimate and find solutions to application problems involving percent using a variety of strategies including concrete or pictorial models, benchmarks, and finding patterns with or without the use of calculators.	<b>MATH.8.3B(2)</b> Estimate and find solutions to application problems involving percents.	
		<b>P MATH.6.3C</b> Use ratios to make predictions in proportional situations using intuitive methods (such as unit-rate method, factor-of-change approach, or a graphical/visual approach).	<b>P MATH.7.3B</b> Estimate and find solutions to application problems involving proportional relationships such as similarity, scaling, unit costs, and related measurement units using intuitive methods (such as unit-rate method, factor-of-change, or a graphical/visuals approach).	<b>P MATH.8.3B(1)</b> Estimate and find solutions to application problems involving proportional relationships such as similarity and rates using intuitive methods (such as unit rate method, factor-of-change approach, or a graphical/visual approach) as well as procedural methods.	
	<b>Expressing Relationships and Making Predictions</b>				
<b>P MATH.5.6A</b> Select from and use diagrams and equations such as $y = 5 + 3$ to represent meaningful problem situations involving addition, subtraction, multiplication, or division.	<b>P TH.6.4B</b> Use tables of data to generate formulas representing relationships involving perimeter, area, volume of a rectangular prism, measurement conversions, numeric patterns, etc.	<b>MATH.7.4A</b> Generate formulas involving unit conversions, perimeter, area, circumference, volume, scaling, and sequences of numbers from a variety of representations including verbal descriptions, tables of data, and diagrams.	<b>MATH.8.4A</b> Generate a different representation of data given another representation of data (such as a table, graph, equation, or verbal description).	<b>ALGI.1C</b> Describe a functional relationships for given problem situations, and write linear equations or inequalities and quadratic equations to answer questions arising from the situation. <b>ALGI.1D</b> Represent relationships among quantities by using and building concrete models, completing tables, constructing graphs or diagrams, writing verbal descriptions, and writing equations or inequalities.	

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<b>Strand 2: Patterns, Relationships, and Algebraic Thinking</b>	<b>Expressing Relationships and Making Predictions</b>				<b>Patterns, Relationships, and Making Predictions</b>
		<p><b>MATH.6.4A</b> Use tables and symbols to represent and describe proportional and other relationships such as those involving conversions, arithmetic sequences (with a constant rate of change), perimeter, and area; and graph relationships represented in tables to determine whether the relationships are proportional or non-proportional.</p>	<p><b>MATH.7.4B</b> Graph data to demonstrate relationships in familiar concepts such as conversions, perimeter, area, circumference, volume, scaling, and sequences of numbers; and use the graphical data to determine whether the relationships are proportional.</p>		<p><b>ALGI.3B</b> Look for patterns in finite differences, determine the value of the zero term, and write the algebraic representation.</p> <p><b>ALGI.6A</b> Develop the concept of slope as rate of change, determine slopes from graphs, tables, and algebraic representations, and express slope as a ratio, decimal, or percent.</p> <p><b>ALGI.6G</b> Relate direct variation to linear functions and solve problems involving proportional change using concrete, pictorial, symbolic, verbal, and written representations.</p> <p><b>ALGI.11B</b> Analyze data and represent situations involving inverse variation using concrete models, tables, graphs, or algebraic methods.</p>
			<p><b>MATH.7.4C</b> Use words and symbols to describe the terms in an arithmetic sequence (with a constant rate of change) and their positions in a sequence; and represent those sequences using a variety of strategies (including concrete models, tables, algebraic rules, and graphs).</p>	<p><b>MATH.8.5B</b> Write and evaluate an algebraic expression to determine any term in an arithmetic sequence (with a constant rate of change) and identify the appropriate algebraic expression given terms in a sequence.</p>	<p><b>ALGI.11A</b> Use patterns to generate properties of exponents and apply these properties in problem-solving situations when given like numerical or variable bases and integer exponents.</p>
					<p><b>ALGI.11C</b> Analyze data, and identify and represent situations involving exponential growth and exponential decay using concrete models, tables, graphs, or algebraic methods.</p>

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<b>Strand 2: Patterns, Relationships, and Algebraic Thinking</b>	<b>Equations</b>				<b>Equations and Functions</b>
			<p><b>MATH.7.5A</b> Use concrete and pictorial models to represent and solve equations involving rational numbers, use pictures and symbols to record the steps of the solution process, and verify the solution using substitution.</p>	<p><b>MATH.8.5A</b> Predict, find, and justify solutions to application problems using appropriate tables, graphs, and algebraic equations.</p>	<p><b>ALGI.5C</b> Use, translate, and make connections among algebraic, tabular, graphical, or verbal descriptions of linear functions.</p>
		<p><b>MATH.6.5A</b> Formulate equations from problem situations described by linear relationships that are represented in various forms (such as concrete or pictorial models, or as data displayed in a table, chart, or as labels on a graphic) and match an equation with a given context.</p>	<p><b>MATH.7.5B</b> Write problem situations when given a simple equation and write an equation when given a problem situation.</p>		<p><b>ALGI.8A</b> Analyze a problem situation that can be represented by a linear system in two unknowns, and develop a plan for solving the system using a concrete representation and linear equations.</p>
					<p><b>ALGI.7A</b> Analyze situations involving linear functions in forms of a graph, table, equation, or verbal description in order to formulate a linear equation or inequality to solve a problem.</p>
					<p><b>ALGI.7B</b> Investigate methods for solving linear equations and inequalities using concrete models, graphs, and the properties of equality, select a method, and solve the equations and inequalities involving one or two variables.</p>
					<p><b>ALGI.8B</b> Solve systems of linear equations using concrete models, graphs, tables, and algebraic methods (substitution and elimination).</p>
					<p><b>ALGI.9A</b> Determine the domain and range for quadratic functions from graphic, tabular, symbolic, verbal, and written representations.</p>
			<p><b>ALGI.5B</b> Determine the domain and range for linear functions in given situations which are represented graphically, tabularly, symbolically, verbally, and in writing.</p>		
				<p><b>ALGI.10A</b> Solve quadratic equations in applied settings using concrete models, tables, graphs, and algebraic methods including factoring and the quadratic formula.</p>	

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	Grade 5	Grade 6	Grade 7	Grade 8	Algebra 1
<b>Strand 2: Patterns, Relationships, and Algebraic Thinking</b>					<b>Attributes of Functions</b>
					<b>P ALGI.1A</b> Describe and identify independent and dependent quantities and express them in functional relationships.
					<b>P ALGI.2B</b> Identify mathematical domains and ranges and determine reasonable domain and range values for given situations, described by continuous or discrete data.
					<b>ALGI.4C</b> Connect the function notation of "y = " and "f(x) = " for example, $y = x + 1$ and $f(x) = x + 1$ .
					<b>ALGI.6B</b> Interpret the meaning of positive, negative, zero, and undefined slopes and x- and y-intercepts in situations using data, symbolic representations, or graphs.
					<b>ALGI.6E</b> Determine the intercepts of the graphs of linear functions and zeros of linear functions from graphs, tables, and algebraic representations.
					<b>P ALGI.10B</b> Make connections among the solutions (roots) of quadratic equations, the zeros of their related functions, and the horizontal intercepts (x-intercepts) of the graph of the function on graphs, tables, or algebraic expressions.
<b>Strand 3: Geometry and Spatial Reasoning</b>	<b>Geometric Language</b>				
	<b>P MATH.5.7A</b> Identify essential attributes including parallel, perpendicular, and congruent parts of two- and three-dimensional geometric figures and use formal geometric vocabulary to describe and compare given figures.	<b>P MATH.6.6B</b> Identify relationships involving angles in triangles and quadrilaterals shown individually or as part of a complex figure; and use models to verify the sum of the angles in triangles as $180^\circ$ and in quadrilaterals as $360^\circ$ .	<b>MATH.7.6B</b> Identify properties of triangles and quadrilaterals shown individually or as part of a more complex figure and use them to classify the figures.		

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<b>Strand 3: Geometry and Spatial Reasoning</b>	<b>Geometric Language</b>				
			<b>MATH.7.6C</b> Identify properties of three-dimensional figures, including pyramids, cones, prisms, and cylinders and use their properties to classify the figures.		
		<b>P MATH.6.6C</b> Describe the relationship between radius, diameter, and circumference of a circle; and develop the formula for circumference of a circle.	<b>MATH.7.6D</b> Use critical attributes to define similarity (including corresponding parts and congruent angles); use those attributes to determine if two figures are similar, and to identify proportional relationships of similar shapes.		
		<b>MATH.6.6A</b> Use angle measurements and estimates to define and classify angles as acute, obtuse, or right.	<b>MATH.7.6A</b> Use angle measurements to define and classify pairs of angles as complementary or supplementary.		
	<b>Graphing and Transformations</b>				
	<b>MATH.5.8B</b> Identify the transformation that generates one figure from the other when given two congruent figures on a Quadrant I coordinate grid.			<b>MATH.8.6A</b> Generate similar figures using dilations including enlargements and reductions, describe the relationship between the pre-image and the image using scale factor and magnitude, and apply scale factors in problem solving situations.	<b>ALGI.6C</b> Investigate, describe, and predict the effects of changes in $m$ and $b$ on the graph of $y = mx + b$ .
					<b>P ALGI.6F</b> Interpret and predict the effects of changing slope and $y$ -intercept in applied situations using tabular, graphical, symbolic, and written representations.
	<b>P MATH.5.8A</b> Sketch the results of translations, rotations, and reflections on a Quadrant I coordinate grid and name points using ordered pairs.		<b>P MATH.7.7B</b> Graph reflections across the horizontal or vertical axis, graph translations on a coordinate plane, and describe and predict the relationships between the original shapes and their images.	<b>P MATH.8.6B</b> Graph dilations, reflections, and translations on a coordinate plane and describe the relationships between the pre-image and the image.	<b>P ALGI.9B</b> Investigate, describe, and predict the effects of changes in $a$ on the graph of $y = ax^2 + c$ .
					<b>P ALGI.9C</b> Investigate, describe, and predict the effects of changes in $c$ on the graph of $y = ax^2 + c$ .
	<b>MATH.5.9A</b> Locate and name points on a coordinate grid using ordered pairs of whole numbers.	<b>P MATH.6.7A</b> Locate and name points on a coordinate plane using ordered pairs of non-negative rational numbers based on their relationships with other points, lines, and/or polygons.	<b>MATH.7.7A</b> Locate and name points on a coordinate plane using ordered pairs of integers and identify the origin, axes, and quadrants.	<b>MATH.8.7D</b> Locate and name points on a coordinate plane using ordered pairs of rational numbers based on algebraic (equations or inequalities) or geometric situations.	<b>ALGI.6D</b> Graph and write equations of lines given characteristics such as two points, a point and a slope, or a slope and $y$ -intercept when given graphically, symbolically or in written representations.

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<b>Strand 3: Geometry and Spatial Reasoning</b>	<b>Geometric Models</b>					<b>Geometric Models and Graphing</b>
			<b>MATH.7.8A</b> Sketch a figure when given the top, side, and front views and match those views to a given figure.	<b>MATH.8.7A</b> Draw three-dimensional figures from different perspectives and match drawings of top, front, and side views to figures.	<b>ALGI.2A</b> Identify and sketch the graphs of the general forms of linear ( $f(x) = x$ ) and quadratic ( $f(x) = x^2$ ) parent functions, and describe the graphs verbally and in writing.	
			<b>MATH.7.8B</b> Make a net (two-dimensional model) of the surface area of a three-dimensional figure and construct three-dimensional models of solids given a net.		<b>ALGI.9D</b> Analyze maximum or minimum points, direction of opening, symmetry, and $x$ - and $y$ -intercepts of graphs of quadratic functions and draw conclusions from the graph and analysis.	
			<b>MATH.7.8C</b> Use geometric concepts (including symmetry and transformations, scaling and similarity, and congruence) and properties of two- and three-dimensional figures to solve problems in fields such as art and architecture.	<b>MATH.8.7B</b> Use geometric concepts (including symmetry, similarity, congruence, and transformations) and properties of two- and three-dimensional figures to solve problems in fields such as art and architecture.	<b>ALGI.2C</b> Interpret situations in terms of given graphs or create situations that fit given graphs.	
				<b>MATH.8.7C</b> Use pictures or models to demonstrate the Pythagorean Theorem.		
<b>Strand 4: Measurement</b>	<b>Measuring</b>					
	<b>MATH.5.10B</b> Connect concrete models and pictorial representations for perimeter, area, and volume with their respective formulas.		<b>MATH.7.9B</b> Connect models for volume of prisms (triangular and rectangular) and cylinders to formulas for volume of prisms (rectangular and triangular) and cylinders.	<b>MATH.8.8B</b> Connect models of prisms, cylinders, pyramids, spheres, and cones to formulas for volume of these objects.		
	<b>MATH.5.10C</b> Select and use appropriate units and formulas to measure length, perimeter, area, and volume in customary system and SI (metric) system.	<b>MATH.6.8B</b> Select and use appropriate units, tools, or formulas (such as those given on the TAKS Grade 6 Mathematics Chart) to measure and to solve problems involving length (including perimeter), area, time, temperature, volume, and weight; and apply a problem-solving model when doing so.		<b>MATH.8.8A</b> Find lateral and total surface area of prism, pyramids, and cylinders using concrete and/or pictorial models and nets (two-dimensional models.)		
		<b>MATH.6.8C</b> Measure angles using a protractor, or a pictorial representation of a protractor, and estimate the measure of given angles.				

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<b>Strand 4: Measurement</b>	<b>Proportional Reasoning in Measurement</b>				
	<b>MATH.5.10A</b> Perform simple conversions within the same measurement system (SI (metric) or customary).	<b>MATH.6.8D</b> Convert measures within the same measurement system (customary and metric) based on relationships between units and use measurements given as dimensions of a figure to solve problems.		<b>MATH.8.10A</b> Using concrete or pictorial models as well as verbal or algebraic descriptions, describe the resulting effects on perimeter and area when dimensions of a shape are changed proportionally.	
				<b>MATH.8.10B</b> Using concrete or pictorial models as well as verbal or algebraic descriptions, describe the resulting effect on volume when dimensions of a solid are changed proportionally.	
				<b>MATH.8.9B</b> Use proportional relationships in similar two-dimensional figures or similar three-dimensional figures to find missing measurements.	
	<b>Solving Problems Using Measurement</b>				
	<b>MATH.5.11A</b> Solve problems involving changes in temperature (in degrees Fahrenheit and Celsius).	<b>MATH.6.8A</b> Estimate measurements (including circumference, length, perimeter, weight, time, temperature, area, and volume) and evaluate reasonableness of results.	<b>MATH.7.9A</b> Estimate measurements, solve application problems involving length (including perimeter and circumference) and area of polygons and other figures utilizing conversions and formulas such as those given on the TAKS Grade 7 Mathematics Chart and distinguish between the types of units used (linear or square units).	<b>MATH.8.9A</b> Identify appropriate contextual situations for the use of the Pythagorean Theorem and use the Pythagorean Theorem to solve real-life problems.	
<b>MATH.5.11B</b> Solve problems involving elapsed time.		<b>MATH.7.9C</b> Estimate measurements, solve application problems involving volume of prisms (rectangular and triangular) and cylinders using the dimensions of a given figure and conversions and formulas such as those given on the TAKS Grade 7 Mathematics Chart, and distinguish the type of units used as cubic units.	<b>MATH.8.8C</b> Estimate measurements and use formulas and conversions such as those given on the TAKS Grade 8 Mathematics Chart to solve application problems involving lateral and total surface area and volume.		

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<b>Stand 5: Probability and Statistics</b>	<b>Displaying and Interpreting Data</b>				
		<b>MATH.6.10C</b> Sketch circle graphs to display data using knowledge of fractional parts of a whole and match a circle graph with a data set listed in table, chart, graph, or sentence form.	<b>MATH.7.11A</b> Select and use an appropriate representation for presenting and displaying relationships among collected data, including line plot, line graph, bar graph, stem and leaf plot, circle graph, and Venn diagrams, justify the selection, and determine whether the graphical representation of a given set of data is appropriate and/or accurate.	<b>MATH.8.12C</b> Select and use an appropriate representation for presenting and displaying relationships among collected data, including line plots, line graphs, stem and leaf plots, circle graphs, bar graphs, box and whisker plots, histograms, and Venn diagrams, with and without the use of technology.	<b>ALGI.1B</b> Gather and record data and use data sets to determine functional relationships between quantities and write a general equation describing the functional relationship.
	<b>MATH.5.13A</b> Use tables of related number pairs to make line graphs.	<b>MATH.6.10A</b> Select and use an appropriate representation for presenting and displaying different graphical representations of the same data including line plot, line graph, bar graph, and stem and leaf plot.			<b>ALGI.1E</b> Interpret and make decisions, predictions, and critical judgments from functional relationships.
	<b>MATH.5.13C</b> Graph a given set of data using an appropriate graphical representation such as a picture or line graph.				
		<b>MATH.6.10D</b> Solve problems by collecting, organizing, displaying, and interpreting data.	<b>MATH.7.11B</b> Make inferences and convincing arguments based on an analysis of given or collected data and use them to draw conclusions and make predictions.	<b>MATH.8.12B</b> Draw conclusions and make predictions by analyzing trends in scatterplots by identifying and describing positive, negative, or no correlation in them.	<b>ALGI.2D</b> Collect and organize data, make and interpret scatterplots (including recognizing positive, negative, or no correlation for data approximating linear situations), and model, predict, and make decisions and critical judgments in problem situations.
				<b>MATH.8.13B</b> Recognize misuses of graphical or numerical information and conclusions based on data analysis.	
				<b>MATH.8.13A</b> Evaluate methods of sampling to determine validity of an inference made from a set of data.	
	<b>MATH.5.13B</b> Describe characteristics of data presented in tables and graphs including median, mode, and range.	<b>MATH.6.10B</b> Identify mean (using concrete objects and pictorial models), median, mode, and range of a set of data and match the mean, median, mode, and/or range with a given data set which may be listed in the text of a problem or presented in a graphical representation.	<b>MATH.7.12A</b> Describe a set of data using mean, median, mode, and range, match the mean, median, mode, and/or range with a given data set and identify the missing piece of data that will produce a target mean, median, mode, and/or range.  <b>MATH.7.12B</b> Choose among mean, median, mode, or range to describe a set of data and justify the choice for a particular situation.	<b>MATH.8.12A</b> Select the appropriate measure of central tendency or range to describe a set of data, justify the selection for a particular situation, and identify the missing piece of data that will produce a target mean, median, mode, and/or range for a data set.	

**Mathematics Vertical Alignment Matrix  
Grades 5 - 8, Algebra I**

	Grade 5	Grade 6	Grade 7	Grade 8	Algebra 1
<b>Stand 5: Probability and Statistics</b>	<b>Probability</b>				
	<b>MATH.5.12C</b> List all possible outcomes of a probability experiment such as tossing a coin using a variety of representations such as tables, charts, and tree diagrams.	<b>MATH.6.9A</b> Construct sample spaces using lists and tree diagrams, match a situation with a sample space that lists all possible combinations, and select the missing portion of a given sample space.	<b>MATH.7.10A</b> Construct sample spaces for simple or composite experiments, match a situation with a sample space that lists all possible combinations, or select the missing portion of a given sample space.		
	<b>MATH.5.12A</b> Use fractions to describe the results of an experiment.	<b>MATH.6.9B</b> Find the probabilities of a simple event and its complement and describe the relationship between the two.	<b>MATH.7.10B</b> Find the probability of independent events using an experiment and compare the theoretical and experimental probabilities.	<b>MATH.8.11A</b> Find the probabilities of dependent and independent events in real world situations.	
	<b>MATH.5.12B</b> Use experimental results to make predictions.			<b>MATH.8.11B</b> Use theoretical probabilities and experiments to make predictions and decisions about the data set of a given situation.	
				<b>MATH.8.11C</b> Select and use different models (such as organized lists, tree diagrams, area models, spinners, dice, cards, or computer simulations) to simulate an event.	
<b>Stand 6: Underlying Processes and Mathematical Tools</b>	<b>Underlying Processes and Mathematical Tools</b>				
	<b>MATH.5.14A</b> Identify the mathematics in everyday situations.	<b>MATH.6.11A</b> Identify and apply mathematics to everyday experiences, to activities in and outside of school, with other disciplines, and with other mathematical topics.	<b>MATH.7.13A</b> Identify and apply mathematics to everyday experiences, to activities in and outside of school, with other disciplines, and with other mathematical topics.	<b>MATH.8.14A</b> Identify and apply mathematics to everyday experiences, to activities in and outside of school, with other disciplines, and with other mathematical topics.	<b>ALGI(8.14A)</b> Identify and apply mathematics to everyday experiences, to activities in and outside of school, with other disciplines, and with other mathematical topics.
	<b>MATH.5.14B</b> Solve problems that incorporate understanding the problem, making a plan, carrying out the plan, and evaluating the solution for reasonableness.	<b>MATH.6.11B</b> Use a problem-solving model that incorporates understanding the problem, making a plan, carrying out the plan, and evaluating the solution for reasonableness.	<b>MATH.7.13B</b> Use a problem-solving model that incorporates understanding the problem, making a plan, carrying out the plan, and evaluating the solution for reasonableness.	<b>MATH.8.14B</b> Use a problem-solving model that incorporates understanding the problem, making a plan, carrying out the plan, and evaluating the solution for reasonableness.	<b>ALGI(8.14B)</b> Use a problem-solving model that incorporates understanding the problem, making a plan, carrying out the plan, and evaluating the solution for reasonableness.
	<b>MATH.5.14C</b> Select or develop an appropriate problem-solving plan or strategy, including drawing a picture, looking for a pattern, systematic guessing and checking, acting it out, making a table, working a simpler problem or working backwards to solve a problem.	<b>MATH.6.11C</b> Select or develop an appropriate problem-solving strategy from a variety of different types, including drawing a picture, looking for a pattern, systematic guessing and checking, acting it out, making a table, working a simpler problem or working backwards to solve a problem.	<b>MATH.7.13C</b> Select or develop an appropriate problem-solving strategy from a variety of different types, including drawing a picture, looking for a pattern, systematic guessing and checking, acting it out, making a table, working a simpler problem or working backwards to solve a problem.	<b>MATH.8.14C</b> Select or develop an appropriate problem-solving strategy from a variety of different types, including drawing a picture, looking for a pattern, systematic guessing and checking, acting it out, making a table, working a simpler problem or working backwards to solve a problem.	<b>ALGI(8.14C)</b> Select or develop an appropriate problem-solving strategy from a variety of different types, including drawing a picture, looking for a pattern, systematic guessing and checking, acting it out, making a table, working a simpler problem or working backwards to solve a problem.

**Mathematics Vertical Alignment Matrix  
Grades 5 - 8, Algebra I**

	Grade 5	Grade 6	Grade 7	Grade 8	Algebra 1
<b>Stand 6: Underlying Processes and Mathematical Tools</b>	<b>Underlying Processes and Mathematical Tools</b>				
	<b>MATH.5.14D</b> Use tools such as real objects, manipulatives, and technology to solve problems.	<b>MATH.6.11D</b> Select tools such as real objects, manipulatives, paper/pencil, and technology or techniques such as mental math, estimation, and number sense to solve problems.	<b>MATH.7.13D</b> Select tools such as real objects, manipulatives, paper/pencil, and technology or techniques such as mental math, estimation, and number sense to solve problems.	<b>MATH.8.14D</b> Select tools such as real objects, manipulatives, paper/pencil, and technology or techniques such as mental math, estimation, and number sense to solve problems.	<b>ALGI(8.14D)</b> Select tools such as real objects, manipulatives, paper/pencil, and technology or techniques such as mental math, estimation, and number sense to solve problems.
	<b>MATH.5.15A</b> Explain and record observations using objects, words, pictures, numbers, and technology.	<b>MATH.6.12A</b> Communicate mathematical ideas using language, efficient tools, appropriate units, and graphical, numerical, physical, or algebraic mathematical models.	<b>P MATH.7.14A</b> Communicate mathematical ideas using language, efficient tools, appropriate units, and graphical, numerical, physical, or algebraic mathematical models.	<b>P MATH.8.15A</b> Communicate mathematical ideas using language, efficient tools, appropriate units, and graphical, numerical, physical, or algebraic mathematical models.	<b>P ALGI(8.15A)</b> Communicate mathematical ideas using language, efficient tools, appropriate units, and graphical, numerical, physical, or algebraic mathematical models.
	<b>MATH.5.15B</b> Relate informal language to mathematical language and symbols.	<b>MATH.6.12B</b> Evaluate the effectiveness of different representations to communicate ideas.	<b>MATH.7.14B</b> Evaluate the effectiveness of different representations to communicate ideas.	<b>MATH.8.15B</b> Evaluate the effectiveness of different representations to communicate ideas.	<b>ALGI(8.15B)</b> Evaluate the effectiveness of different representations to communicate ideas.
	<b>MATH.5.16A</b> Make generalizations from patterns or sets of examples and nonexamples.	<b>MATH.6.13A</b> Make conjectures from patterns or sets of examples and nonexamples.	<b>MATH.7.15A</b> Make conjectures from patterns or sets of examples and nonexamples.	<b>MATH.8.16A</b> Make conjectures from patterns or sets of examples and nonexamples.	<b>ALGI(8.16A)</b> Make conjectures from patterns or sets of examples and nonexamples.
	<b>MATH.5.16B</b> Justify why an answer is reasonable and explain the solution process.	<b>MATH.6.13B</b> Validate conclusions using mathematical properties and relationships.	<b>MATH.7.15B</b> Validate conclusions using mathematical properties and relationships.	<b>MATH.8.16B</b> Validate conclusions using mathematical properties and relationships.	<b>ALGI(8.16B)</b> Validate conclusions using mathematical properties and relationships.