



8th Grade Correlation to Mathematics Framework

	Mathematics Curriculum Framework	Lesson Number	Lesson Title
7.6 ARITHMETIC, NUMBER, AND OPERATION CONCEPTS			
M8:1	Demonstrates conceptual understanding of rational numbers with respect to percents as a way of describing change (percent increase and decrease) using explanations, models, or other representations.	MPA-081	Converting Fractions, Decimals, and Percents I
		MPA-082	Converting Fractions, Decimals, and Percents II
		MPA-086	Solving Problems Using Percent
		MPA-087	Finding Percent Increase and Decrease
		MPA-126	Solving Real-World Problems Involving Sales Tax
		MPA-127	Solving Real-World Problems Involving Discounts
		MPA-128	Solving Real-World Problems Involving Simple Interest
		MPA-088	Solving Real-World Problems Involving Percent
		HA1-170	Solving Percent of Change Problems
M8:2	Demonstrates understanding of the relative magnitude of numbers by ordering or comparing rational numbers, common irrational numbers ($\sqrt{2}$, and π), numbers with whole-number or fractional bases and whole-number exponents, square roots, absolute values, integers, or numbers represented in scientific notation using number lines or equality and inequality symbols.	HA1-025	Comparing and Ordering Real Numbers
M8:4	Accurately solves problems involving proportional reasoning (percent increase or decrease, interest rates, markups, or rates); and squares, cubes and taking square or cube roots. (IMPORTANT: Applies the conventions of order of operations.)	MPA-064	Finding Square Roots of Perfect Squares
		MPA-065	Estimating Square Roots
		MPA-078	Expressing Ratios as Fractions and Determining Equivalency
		MPA-079	Unit rates
		MPA-080	Solving Proportions
		MPA-086	Solving Problems Using Percent
		MPA-087	Finding Percent Increase and Decrease
		MPA-088	Solving Real-World Problems Involving Percent
		MPA-110	Solving Problems Using Proportions, Scale Drawings, Models, and Maps
		MPA-117	Modeling Integer Arithmetic Using Cups and Counters
		MPA-126	Solving Real-World Problems Involving Sales Tax
		MPA-127	Solving Real-World Problems Involving Discounts
		MPA-128	Solving Real-World Problems Involving Simple Interest
		HA1-003	Order of Operations
		HA1-170	Solving Percent of Change Problems
		<i>Future Release Lesson</i>	<i>HA1-492 Simplifying Simple Square and Cube Roots</i>
M8:7	Estimates and evaluates the reasonableness of solutions appropriate	MPA-006	Determining Reasonableness of Answers and Appropriate Method of Computation

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	to grade level.		
		Throughout	
M8:8	Applies properties of numbers (greatest common factor [GCF], least common multiple [LCM], prime factorization, divisibility, inverses, and identities), and commutative, distributive, and associative properties of operations to solve problems and to simplify computations.	MPA-002	Adding, Subtracting, Multiplying, and Dividing Whole Numbers
		MPA-010	Solving One-Step Equations of Whole Numbers Using Addition and Subtraction
		MPA-011	Solving One-Step Equations of Whole Numbers Using Multiplication and Division
		MPA-013	Using Powers and Exponents in Expressions
		MPA-020	Multiplying Decimals by Powers of Ten
		MPA-021	Converting Between Standard and Scientific Notation
		MPA-024	Using Divisibility Rules
		MPA-025	Identifying Prime and Composite Numbers
		MPA-026	Using Prime Factorization
		MPA-027	Finding the Greatest Common Factor
		MPA-030	Finding Least Common Multiple of Two or More Numbers
		HA1-050	Multiplying Real Numbers
		HA1-055	Dividing Real Numbers
		HA1-085	Simplifying Expressions Using the Properties of Real Numbers
		HA1-130	Identifying Postulates, Theorems, and Properties
7.7 GEOMETRY AND MEASUREMENT CONCEPTS			
M8:9	Models situations geometrically. Uses properties and attributes of lines, angles, and two-and three-dimensional shapes) to formulate and solve problems.	MPA-056	Classifying Angles
		MPA-057	Identifying and Applying Supplementary and Complementary Angles
		MPA-058	Identifying Polygons
		MPA-059	Classifying Triangles and Quadrilaterals
		MPA-105	Determining the Measure of Angles Made by Parallel Lines and a Transversal
		MPA-121	Identifying Similar and Congruent Polygons Using Proportions
		HA1-520	Finding the Distance Between Two Points on a Coordinate Plane
		HA1-876	Applying Length, Midpoint and Slope of a Segment on a Cartesian Plane
		HA1-889	Complementary and Supplementary Angles
		HA1-890	Using Models to Derive Formulas for Two-Dimensional Geometric Figures
		Throughout	
M8:10	Applies the Pythagorean Theorem to find a missing side of a right triangle, or in problem-solving situations and solves problems by applying the Triangle Inequality Theorem to determine if three line segments with given lengths form a triangle, and the sum of the angles in a convex polygon of any number of sides.	MPA-066	Solving Problems Using the Pythagorean Theorem
		HA1-515	Using the Pythagorean Theorem
		HA1-516	Applications of the Pythagorean Theorem
M8:13	Applies concepts of similarity to determine the impact of scaling on the volume or surface area of three-dimensional figures when linear dimensions are multiplied by a constant factor; to determine the length of sides of similar triangles, or to solve problems involving growth and rate and makes scale drawings.	MPA-111	Comparing Perimeters, Areas, and Volumes of Similar Geometric Figures and Solids
		MPA-120	Applying Dilations in the Coordinate Plane
M8:14	Demonstrates conceptual understanding of surface area or volume by solving problems involving surface area and volume of rectangular prisms, cylinders, or pyramids. Expresses all measures using appropriate units.	MPA-073	Finding the Surface Area of Rectangular Prisms
		MPA-074	Finding the Surface Area of Cylinders

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		MPA-075	Finding the Volume of Rectangular Prisms
		MPA-076	Finding the Volume of Cylinders
		MPA-115	Finding the Volumes of Prisms, Cylinders, Pyramids, and Cones Using Models
		HA1-891	Using Models to Derive Formulas for Three-Dimensional Solids
M8:15	Measures and uses units of measures appropriately and consistently when solving problems across the content strands. Makes conversions within or across systems.	MPA-061	Converting Metric Units of Length, Capacity, and Mass
		MPA-062	Converting Units in Customary System
		MPA-130	Developing a Sense of Relative Sizes of Measures
		Throughout	
M8:17	Sketches a variety of three-dimensional objects using orthogonal views (projections and isometric views), or constructs or accurately represents angle bisector, perpendicular bisector, congruent segments and regular polygons. Draws nets of three-dimensional shapes.	MPA-072	Identifying 3-D Figures
		MPA-106	Identifying a Solid Figure From a Net
		MPA-107	Constructing Three-Dimensional Figures and Examining Their Dimensions
		HA1-893	Constructing Solids from Different Perspectives
7.8 FUNCTIONS AND ALGEBRA CONCEPTS			
M8:19	Identifies and extends to specific cases a variety of patterns (linear and nonlinear) represented in models, tables, sequences, graphs, or in problem situations; and generalizes a linear relationship (nonrecursive explicit equation); generalizes a linear relationship to find a specific case; generalizes a nonlinear relationship using words or symbols; or generalizes a common nonlinear relationship to find a specific case.	MPA-104	Recognizing Patterns
		HA1-095	Translating Word Phrases into Algebraic Expressions
		HA1-104	Translating Word Statements into Equations
		HA1-447	Identifying Number Patterns
		HA1-448	Finding the n th Term of a Pattern
M8:20	Demonstrates conceptual understanding of linear relationships ($y = kx$; $y = mx + b$) as a constant rate of change by solving problems involving the relationship between slope and rate of change; informally and formally determining slopes and intercepts represented in graphs, tables, or problem situations; or describing the meaning of slope and intercept in context; and distinguishes between linear relationships (constant rates of change) and nonlinear relationships (varying rates of change) represented in tables, graphs, equations, or problem situations; or describes how change in the value of one variable relates to change in the value of a second variable in problem situations with constant and varying rates of change.	MPA-102	Graphing Equations by Plotting Points
		HA1-385	Finding the Slope of a Line from its Graph or from the Coordinates of Two Points
		HA1-398	Graphing Linear Equations Using Slope and y -Intercept or Slope and a Point
		HA1-401	How Variations of " m " and " b " Affect the Graph of $y = mx + b$
		HA1-441	Applications of Functions and Relations Involving Distance, Rate, and Time
		HA1-450	Solving Problems Involving Direct Variation
		HA1-960	Real-World Applications of Linear Functions
M8:21	Demonstrates conceptual understanding of algebraic expressions by evaluating and simplifying (including those with square roots, whole-number exponents, or rational numbers); or by evaluating an expression within an equation (e.g., determine the value of y when $x =$	HA1-965 HA1-005	Determining the Best-Fitting Line Evaluating Algebraic Expressions

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	4 given $y = 7\sqrt{x + 2x}$.		
		HA1-065	Evaluating Expressions Containing Exponents
		HA1-070	Evaluating Formulas for Given Values of the Variables
		HA1-075	Simplifying Algebraic Expressions by Combining Like Terms
		HA1-076	Basic Distributive Property
		HA1-080	Simplifying and Evaluating Algebraic Expressions Containing Grouping Symbols
		HA1-085	Simplifying Expressions Using the Properties of Real Numbers
		HA1-090	Simplifying Expressions Using the Property of -1
		HA1-095	Translating Word Phrases into Algebraic Expressions
		HA1-860	Using the Laws of Exponents
M8:22	Demonstrates conceptual understanding of equality by showing equivalence between two expressions (expressions consistent with the parameters of the left - and right-hand sides of the equations being solved at this grade level) using models or different representations of the expressions, solving formulas for a variable requiring one transformation (e.g., $d = rt$; $d/r = t$); by solving multistep linear equations with integer coefficients; by showing that two expressions are or are not equivalent by applying commutative, associative, or distributive properties, order of operations, or substitution; and by informally solving problems involving systems of linear equations in a context.	HA1-076	Basic Distributive Property
		HA1-085	Simplifying Expressions Using the Properties of Real Numbers
		HA1-115	Using the Addition and Subtraction Properties for Equations
		HA1-120	Using the Multiplication and Division Properties for Equations
		HA1-125	Solving Equations Using More Than One Property
		HA1-140	Solving Equations by Combining Like Terms
		HA1-145	Solving Equations with Variables on Both Sides
		HA1-175	Solving Literal Equations
		HA1-382	Solving Linear Equations Using the Graphing Calculator
		HA1-455	Solving Systems of Linear Equations by Graphing
		HA1-460	Solving Systems of Linear Equations by the Substitution Method
		HA1-465	Solving Systems of Linear Equations by the Addition/Subtraction Method
		HA1-470	Solving Systems of Linear Equations by the Multiply/Add/Subtract Method
		HA1-806	Solving Systems of Linear Equations Using the Graphing Calculator
7.9 DATA, STATISTICS, AND PROBABILITY CONCEPTS			
M8:23	Interprets a given representation (line graphs, scatter plots, histograms, or box-and-whisker plots) to analyze the data to formulate or justify conclusions, to make predictions, or to solve problems. (IMPORTANT: Analyzes data consistent with concepts and skills in M8:24.)	MPA-092	Reading and Interpreting Bar, Line, and Circle Graphs
		MPA-093	Choosing Appropriate Scales and Intervals for Data
		MPA-097	Constructing Box-and-Whisker Plots
		MPA-098	Making Predictions from Graphs and Choosing the Correct Graph
		MPA-129	Choosing Appropriate Scales and Intervals for Data (an Introduction)
		MPA-131	Interpreting and Creating Histograms
		MPA-132	Interpreting and Creating Scatter Plots
		HA1-885	Histograms and the Normal Distribution
M8:24	Analyzes patterns, trends, or distributions in data in a variety of contexts by determining or using measures of central tendency (mean, median, or mode), dispersion (range or variation), outliers, quartile values, or estimated line of best fit to analyze situations, or to solve problems; and evaluates the sample from which the statistics	MPA-095	Find the Mean, Median, and Mode

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	were developed (bias, random, or nonrandom).		
		MPA-097	Constructing Box-and-Whisker Plots
		HA1-540	Finding the Mean, Median, and Mode from Data and Frequency Distribution Tables
		HA1-541	Analyzing Data Using the Measures of Central Tendency and the Range
		HA1-555	Computing the Range, Variance, and Standard Deviation of a Set of Data
		HA1-877	Drawing Inferences and Making Predictions from Tables and Graphs
		HA1-885	Histograms and the Normal Distribution
		HA1-965	Determining the Best-Fitting Line
M8:25	Organizes and displays data using scatter plots to answer questions related to the data, to analyze the data to formulate or justify conclusions, to make predictions, or to solve problems; or identifies representations or elements of representations that best display a given set of data or situation, consistent with the representations required in M8:23. (IMPORTANT: Analyzes data consistent with concepts and skills in M8:24.)	MPA-132	Interpreting and Creating Scatter Plots
		HA1-877	Drawing Inferences and Making Predictions from Tables and Graphs
		HA1-965	Determining the Best-Fitting Line
M8:26	Uses counting techniques to solve problems in context involving combinations or permutations using a variety of strategies (e.g., organized lists, tables, tree diagrams, models, Fundamental Counting Principle, or others).	MPA-089	Using Tree Diagrams
		MPA-091	Finding the Number of Combinations of a Set of Objects
		MPA-112	Constructing Sample Spaces for Compound Events (Dependent and Independent)
		HA1-879	Applying Counting Techniques to Permutations and Combinations
M8:27	For a probability event in which the sample space may or may not contain equally likely outcomes, determines the possible outcomes by either sample space (organized list, table, tree model, area model) or Fundamental Counting Principle and determines the theoretical probability of that event as a ratio of favorable outcomes to possible outcomes. Expresses the ratio as a fraction, decimal, or percent.	MPA-089	Using Tree Diagrams
		MPA-090	Finding the Probability of Simple Real-Life Events
		MPA-091	Finding the Number of Combinations of a Set of Objects
		MPA-112	Constructing Sample Spaces for Compound Events (Dependent and Independent)
		MPA-113	Finding the Probability of Compound Events Through Experimentation
		MPA-114	Finding the Odds of Events and Experimental Probability from a Math Model
		HA1-560	Determining Probability of an Event and Complementary Event from a Random Experiment
		HA1-565	Solving Problems Involving Independent, Dependent, and Mutually Exclusive and Inclusive Events
		HA1-879	Applying Counting Techniques to Permutations and Combinations
M8:28	In response to a teacher- or student-generated question, makes a hypothesis, collects appropriate data, organizes the data, appropriately displays/represents numerical and/or categorical data, analyzes the data to draw conclusions about the questions or hypothesis being tested, and when appropriate to make predictions, asks new questions, or makes connection to real-world situations. (See also GLEs M:24, M:25 and M:29.)	MM1-385	Collecting Data
		MPA-098	Making Predictions from Graphs and Choosing the Correct Graph
M8:29	Compares and contrasts theoretical and experimental probabilities of compound events using fractions, decimals, or percents; and uses theoretical or experimental probabilities to determine the fairness of a game.	MPA-090	Finding the Probability of Simple Real-Life Events
		MPA-113	Finding the Probability of Compound Events Through Experimentation
		MPA-114	Finding the Odds of Events and Experimental Probability from a Math Model

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		HA1-560	Determining Probability of an Event and Complementary Event from a Random Experiment
		HA1-565	Solving Problems Involving Independent, Dependent, and Mutually Exclusive and Inclusive Events
2.5 MATHEMATICAL DIMENSIONS, 7.10 MATHEMATICAL PROBLEM SOLVING AND REASONING - APPLICATIONS			
M8:30	Demonstrate understanding of mathematical problem solving and communication through:		
	<ul style="list-style-type: none"> • Approach & Reasoning—The reasoning, strategies, and skills used to solve the problem; 	Throughout	
	<ul style="list-style-type: none"> • Connections—Demonstration of observations, applications, extensions, and generalizations; 	Throughout	
	<ul style="list-style-type: none"> • Solution—All of the work that was done to solve the problem, including the answer; 	Throughout	
	<ul style="list-style-type: none"> • Mathematical Language—The use of mathematical language in communicating the solution; 	Throughout	
	<ul style="list-style-type: none"> • Mathematical Representation—The use of mathematical representation to communicate the solution; and 	Throughout	
	<ul style="list-style-type: none"> • Documentation—Presentation of the solution. 	Throughout	

MM1-Fundamentals of Mathematics

MPA- Pre-Algebra

HA1-Algebra 1

Note: Standards were taken from the Grade Expectations for Vermont's Framework of Standards and Learning Opportunities document adopted by the Vermont State Board of Education in Spring 2004.