Colorado Academic Standards December 2010 **Content Area: Mathematics** **Standard: 1. Number Sense, Properties, and Operations** **Grade Level Expectation: Eighth - M25** **Concepts and skills students master:** 1. In the real number system, rational and irrational numbers are in one to one correspondence to points on the number line **Evidence Outcomes**	**Previously taught in 2009 BVSD CED Grade Level/ Course**	**Notes**	**Transition Materials** **Found in current BVSD materials:** *Connected Math*	 *Prentice Hall*
a. Define irrational numbers.[1]	8	[1] Know that numbers that are not rational are called irrational. (CCSS: 8.NS.1)	Looking for Pythagoras-Investigation 4	Course 3, 4.8
b. Demonstrate informally that every number has a decimal expansion. (CCSS: 8.NS.1)				
i. For rational numbers show that the decimal expansion repeats eventually. (CCSS: 8.NS.1)	8		Supplement-Edition 1 LFP Investigation 4	Course 3, 4.2
ii. Convert a decimal expansion which repeats eventually into a rational number. (CCSS: 8.NS.1)	8		Supplement-Edition 1 LFP Investigation 5	Course 3, 4.2
c. Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions.[2] (CCSS: 8.NS.2)	8	[2] e.g., π^2. (CCSS: 8.NS.2) For example, by truncating the decimal expansion of $\sqrt{2}$, show that $\sqrt{2}$ is between 1 and 2, then between 1.4 and 1.5, and explain how to continue on to get better approximations. (CCSS: 8.NS.2)	Looking for Pythagoras	Course 3, 4.3
d. Apply the properties of integer exponents to generate equivalent numerical expressions.[3] (CCSS: 8.EE.1)	Algebra 1- Negative exponents 8- Positive Exponents	[3] For example, $3^2 \times 3^{-5} = 3^{-3} = \frac{1}{3^3} = \frac{1}{27}$. (CCSS: 8.EE.1)		Course 3, 7.2-7.4
e. Use square root and cube root symbols to represent solutions to equations of the form x^2 = p and x^3 = p where p is a positive rational number. (CCSS: 8.EE.2)	8- Square roots; Algebra 1- Cube roots			Course 3, 4.8, no cube roots
f. Evaluate square roots of small perfect squares and cube roots of small perfect cubes.[4] (CCSS: 8.EE.2)		[4] Know that $\sqrt{2}$ is irrational. (CCSS: 8.EE.2)		Course 3 4.8, no cube roots
g. Use numbers expressed in the form of a single digit times a whole-number power of 10 to estimate very large or very small quantities, and to express how many times as much one is than the other.[5] (CCSS: 8.EE.3)		[5] For example, estimate the population of the United States as 3 times 10^8 and the population of the world as 7 times 10^9, and determine that the world population is more than 20 times larger. (CCSS: 8.EE.3)	No (Growing Growing Growing Ace 56-60)	Course 3 7.1
h. Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. (CCSS: 8.EE.4)	NEW		Growing Growing Growing Investigation 5	Course 3 7.1
i. Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities.[6] (CCSS: 8.EE.4)	NEW	[6] e.g., use millimeters per year for seafloor spreading. (CCSS: 8.EE.4)		Course 3 7.1

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ii. Interpret scientific notation that has been generated by technology. (CCSS: 8.EE.4)	NEW			Course 3 7.1

Standard: 1. Number Sense, Properties, and Operations **Content Area: Mathematics** **2. Patterns, Functions, and Algebraic Structures** **Grade Level Expectation: Eighth - M25** **Concepts and skills students master:** 1. Linear functions model situations with a constant rate of change and can be represented numerically, algebraically, and graphically **Evidence Outcomes**	**Previously taught in 2009 BVSD CED Grade Level/ Course**	**Notes**	**Transition Materials** **Found in current BVSD materials:** *Connected Math*	*Prentice Hall*	*McDougal-Little*
a. Describe the connections between proportional relationships, lines, and linear equations. (CCSS: 8.EE)					
b. Graph proportional relationships, interpreting the unit rate as the slope of the graph. (CCSS: 8.EE.5)	8		Moving Straight Ahead	Course 3 3.3	
c. Compare two different proportional relationships represented in different ways.[1] (CCSS: 8.EE.5)	8	[1] For example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed. (CCSS: 8.EE.5)	Moving Straight Ahead	Course 3 Chapter 5	
d. Use similar triangles to explain why the slope m is the same between any two distinct points on a non-vertical line in the coordinate plane. (CCSS: 8.EE.6)	NEW				
e. Derive the equation y = mx for a line through the origin and the equation y = mx + b for a line intercepting the vertical axis at b. (CCSS: 8.EE.6)	8		Moving Straight Ahead, Thinking With Mathematical Models Investigation 2	Course 3 3.4 and Supplement	

Colorado Academic Standards December 2010 **Content Area: Mathematics** **Standard: 2: Patterns, Functions, and Algebraic Structures** **Grade Level Expectation: Eighth - M 25** **Concepts and skills students master:** 2. Properties of algebra and equality are used to solve linear equations and systems of equations **Evidence Outcomes**	**Previously taught in 2009 BVSD CED Grade Level/ Course**	**Notes**	**Transition Materials** **Found in current BVSD materials:**		
			Connected Math	*Prentice Hall*	*McDougal-Little*
a. Solve linear equations in one variable. (CCSS: 8.EE.7)					
i. Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions.[2] (CCSS: 8.EE.7a)	Algebra 1	[2] Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form x = a, a = a, or a = b results (where a and b are different numbers). (CCSS: 8.EE.6a)			
ii. Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms. (CCSS: 8.EE.7b)	Algebra 1			Partial Course 3 2.2	
b. Analyze and solve pairs of simultaneous linear equations. (CCSS: 8.EE.8)	Algebra 1		Shapes of Algebra Investigations 1-4		
i. Explain that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously. (CCSS: 8.EE.8a)	Algebra 1		Shapes of Algebra Investigations 2-4		
ii. Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. Solve simple cases by inspection.[3] (CCSS: 8.EE.8b)	Algebra 1	[3] For example, 3x + 2y = 5 and 3x + 2y = 6 have no solution because 3x + 2y cannot simultaneously be 5 and 6. (CCSS: 8.EE.8b)	Shapes of Algebra Investigations 2-4		
iii. Solve real-world and mathematical problems leading to two linear equations in two variables.[4] (CCSS: 8.EE.8c)	Algebra 1	[4] For example, given coordinates for two pairs of points, determine whether the line through the first pair of points intersects the line through the second pair. (CCSS: 8.EE.8c)	Shapes of Algebra Investigations 2-4		

Colorado Academic Standards December 2010 **Content Area: Mathematics** **Standard: 2: Patterns, Functions, and Algebraic Structures** **Grade Level Expectation: Eighth - M 25** **Concepts and skills students master:** 3. Graphs, tables and equations can be used to distinguish between linear and nonlinear functions **Evidence Outcomes**	**Previously taught in 2009 BVSD CED Grade Level/ Course**	**Notes**	**Transition Materials** **Found in current BVSD materials:** *Connected Math*	*Prentice Hall*	*McDougal-Littel*
a. Define, evaluate, and compare functions. (CCSS: 8.F)					
i. Define a function as a rule that assigns to each input exactly one output.[5] (CCSS: 8.F.1)	Algebra 1	[5] Function notation is not required in 8th grade. (CCSS: 8.F.11)			
ii. Show that the graph of a function is the set of ordered pairs consisting of an input and the corresponding output. (CCSS: 8.F.1)	8- equations; Algebra 1- functions		equations - Variables and Patterns and MSA; no - "functions"		
iii. Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).[6] (CCSS: 8.F.2)	Algebra 1	[6] For example, given a linear function represented by a table of values and a linear function represented by an algebraic expression, determine which function has the greater rate of change. (CCSS: 8.F.2)	Thinking WMM (inv 1); Growing GG (inv 1); Frogs FPC (inv 2,3,4)		
iv. Interpret the equation y = mx + b as defining a linear function, whose graph is a straight line. (CCSS: 8.F.3)	8- equations; Algebra 1- functions		Moving Straight Ahead, Thinking WMM (Inv 2, 3), Growing GG (inv 5), Say IWS (inv 4), Shapes of A (inv 3, 4)		
v. Give examples of functions that are not linear.[7]	Algebra 1 & Algebra 2	[7] For example, the function $A=s^2$ giving the area of a square as a function of its side length is not linear because its graph contains the points (1,1), (2,4) and (3,9), which are not on a straight line. (CCSS: 8.F.3)	Growing, GG, Frogs FAPC		
b. Use functions to model relationships between quantities. (CCSS: 8.F)					
i. Define a function as a rule that assigns to each input exactly one output.5 (CCSS: 8.F.1)	8- equations; Algebra 1- functions		MSA (equations), Thinking WMM (inv 1), Say IWS (inv 4)		
ii. Determine the rate of change and initial value of the function from a description of a relationship or from two (x, y) values, including reading these from a table or from a graph. (CCSS: 8.F.4)	8- equations; Algebra 1- functions		MSA (equations), Thinking WMM (inv 1), Say IWS (inv 4)		
iii. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values. (CCSS: 8.F.4)	8- equations; Algebra 1- functions		MSA (equations), Thinking WMM (inv 1), Say IWS (inv 4)		

Colorado Academic Standards December 2010 **Content Area: Mathematics** **Standard: 2: Patterns, Functions, and Algebraic Structures** **Grade Level Expectation: Eighth - M 25** **Concepts and skills students master:** 3. Graphs, tables and equations can be used to distinguish between linear and nonlinear functions **Evidence Outcomes**	**Previously taught in 2009 BVSD CED Grade Level/ Course**	**Notes**	**Transition Materials** **Found in current BVSD materials:** *Connected Math*	*Prentice Hall*	*McDougal-Little*
iv. Describe qualitatively the functional relationship between two quantities by analyzing a graph.[8] (CCSS: 8.F.5)	8- equations; Algebra 1- functions	[8] e.g., where the function is increasing or decreasing, linear or nonlinear. (CCSS: 8.F.5)	Moving Straight Ahead (equations); Thinking with MM, Growing, GG; Say IWS (inv 4)		
v. Sketch a graph that exhibits the qualitative features of a function that has been described verbally. (CCSS: 8.F.5)	8- equations; Algebra 1- functions		MSA (equations); Growing, GG; Frogs, FPC		
vi. Analyze how credit and debt impact personal financial goals (PFL)	Personal Finance Course; Online Money Management course	This concept is covered in the graduation requirement Personal Finance Course; Online Money Management course			

Colorado Academic Standards December 2010

Content Area: Mathematics

Standard: 3: Data Analysis, Statistics, and Probability

Grade Level Expectation: Eighth - M25

Concepts and skills students master:

1. Visual displays and summary statistics of two-variable data condense the information in data sets into usable knowledge

Evidence Outcomes	Previously taught in 2009 BVSD CED Grade Level/ Course	Notes	Transition Materials — Found in current BVSD materials: Connected Math	Prentice Hall	McDougal-Little
a. Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. (CCSS: 8.SP.1)	8		samples and Pops, inv 4	course 3, 10-5	
b. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association. (CCSS: 8.SP.1)	High School		samples and Pops	course 3, 10-5	
c. For scatter plots that suggest a linear association, informally fit a straight line, and informally assess the model fit by judging the closeness of the data points to the line.[1] (CCSS: 8.SP.2)	High School	[1] Know that straight lines are widely used to model relationships between two quantitative variables. (CCSS: 8.SP.2)	Thinking w MM, inv 2 and Samp & Pop, Inv 4	course 3, 10-5	
d. Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept.[2] (CCSS: 8.SP.3)	High School	[2] For example, in a linear model for a biology experiment, interpret a slope of 1.5 cm/hr as meaning that an additional hour of sunlight each day is associated with an additional 1.5 cm in mature plant height. (CCSS: 8.SP.3)	intro in Samp & Pops, Thinkin with MM, Inv 2Shapes of Algebra, inv 2 & 3	Course 3, 3-3 to 3-6	
e. Explain patterns of association seen in bivariate categorical data by displaying frequencies and relative frequencies in a two-way table. (CCSS: 8.SP.4)					
i. Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects. (CCSS: 8.SP.4)	High School		no (see Data about Us and Samples and Pops, inv 2)		
ii. Use relative frequencies calculated for rows or columns to describe possible association between the two variables.[3] (CCSS: 8.SP.4)	High School	[3] For example, collect data from students in your class on whether or not they have a curfew on school nights and whether or not they have assigned chores at home. Is there evidence that those who have a curfew also tend to have chores? (CCSS: 8.SP.4)	no (see Data about Us and Samples and Pops, inv 2)		

Colorado Academic Standards December 2010 **Content Area: Mathematics** **Standard: 4: Shape, Dimension, and Geometric Relationships** **Grade Level Expectation: Eighth - M25** **Concepts and skills students master:** 1. Transformations of objects can be used to define the concepts of congruence and similarity **Evidence Outcomes**	**Previously taught in 2009 BVSD CED Grade Level/ Course**	**Notes**	**Transition Materials** **Found in current BVSD materials:** *Connected Math*	*Prentice Hall*	*McDougal-Little*
a. Verify experimentally the properties of rotations, reflections, and translations.[1] (CCSS: 8.G.1)	8		Kaleidoscopes, Hubcabs and Mirrors (KHM)	Course 3, 3-8 through 3-10	
b. Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates. (CCSS: 8.G.3)	8		Stretching & S (inv 1); KHM (inv 2, 5)	Course 3, 3-8 through 3-10	
c. Demonstrate that a two-dimensional figure is **congruent** to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations. (CCSS: 8.G.2)	Geometry		KHM (inv 3)	Course 3, 3-8 through 3-10	
d. Given two congruent figures, describe a sequence of transformations that exhibits the congruence between them. (CCSS: 8.G.2)	Geometry		KHM (inv 3)	Course 3, 3-8 through 3-10	
e. Demonstrate that a two-dimensional figure is **similar** to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations. (CCSS: 8.G.4)	Geometry				
f. Given two similar two-dimensional figures, describe a sequence of transformations that exhibits the similarity between them. (CCSS: 8.G.4)	Geometry				
g. Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles.[2] (CCSS: 8.G.5)	Geometry		Shapes and Designs for part I	partial 8.2	

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Content Area: Mathematics

Standard: 4: Shape, Dimension, and Geometric Relationships

Grade Level Expectation: Eighth - M25

Concepts and skills students master:

2. Direct and indirect measurement can be used to describe and make comparisons

Evidence Outcomes	Previously taught in 2009 BVSD CED Grade Level/ Course	Notes	Transition Materials — Found in current BVSD materials: *Connected Math*	*Prentice Hall*	*McDougal-Little*
a. Explain a proof of the Pythagorean Theorem and its converse. (CCSS: 8.G.6)	Geometry		Looking For Pythagoras (LFP)		
b. Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions. (CCSS: 8.G.7)	8- 2-D; Geometry- 3D		2D - LFP (inv 1 - 4)	Course 3, 4-9	
c. Apply the Pythagorean Theorem to find the distance between two points in a coordinate system. (CCSS: 8.G.8)	Algebra 1		LFP (inv 3) partial	Course 3, 4-9	
d. State the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems. (CCSS: 8.G.9)	8- Cylinders; Geometry- all others		Filling and Wrapping (inv 3, 4)	Course 3, Chapter 9	