Matanuska-Susitna Borough School District
8th Grade Math Standards

MAJOR, SUPPORTING, AND ADDITIONAL CLUSTERS FOR GRADE 8

Students should spend the large majority of their time on the major work of the grade (■) Supporting work (□) and, where appropriate, additional work (○) can engage students in the major work of the grade. Please click on the link for the reference website: Student Achievement Partners (SAP)

Key: ■ Major Clusters	□ Supporting Clusters	○ Additional Clusters

8.NS.A	□	Know that there are numbers that are not rational, and approximate them by rational numbers.
8.EE.A	■	Work with radicals and integer exponents.
8.EE.B	■	Understand the connections between proportional relationships, lines, and linear equations.
8.EE.C	■	Analyze and solve linear equations and pairs of simultaneous linear equations.
8.F.A	■	Define, evaluate, and compare functions.
8.F.B	■	Use functions to model relationships between quantities.
8.G.A	■	Understand congruence and similarity using physical models, transparencies, or geometry software.
8.G.B	■	Understand and apply the Pythagorean Theorem.
8.G.C	○	Solve real-world and mathematical problems involving the volume of cylinders, cones and spheres.
8.SP.A	□	Investigate patterns of association in bivariate data.

1st Semester	2nd Semester
Ready Classroom Standards/Lessons Alignment Coming Soon	

Matanuska-Susitna Borough School District
8th Grade Ready Classroom Textbook to Curriculum Map Alignment for State of Alaska Standards

The Number System

Instructional time should focus on three critical areas: (1) formulating and reasoning about expressions and equations, including modeling an association in bivariate data with a linear equation, and solving linear equations and systems of linear equations; (2) grasping the concept of a function and using functions to describe quantitative relationships; and (3) analyzing two- and three-dimensional space and figures using distance, angle, similarity, and congruence, and understanding and applying the Pythagorean Theorem.

Clusters	State of Alaska Standards	Ready Classroom Lessons	Additional Resources
Know that there are numbers that are not rational and approximate them by rational numbers.	**8.NS.1** Classify real numbers as either rational (the ratio of two integers, a terminating decimal number, or a repeating decimal number) or irrational.	**8.NS.1** **Lesson 24:** Express Rational Numbers as Fractions and Decimals **Lesson 25:** Find Rational Approximations of Irrational Numbers	
	8.NS.2 Students locate rational and irrational numbers on the number line. Students compare and order rational numbers.	**8.NS.2** **Lesson 25**: Find Rational Approximations of Irrational Numbers **Math in Action**: 679-692 **Additional Content:** Lesson 27: Apply the Pythagorean Theorem; Lesson 28: Solve Problems with Volumes of Cylinders, Cones, and Spheres	
	8.NS.3 Identify or write the prime factorization of a number using exponents.	**8.NS.3** **Lesson 19**: Apply Exponent Properties for Positive Integer Exponents **Lesson 20**: Apply Exponent Properties for All Integer Exponents	**Prentice Hall** Prime Factorization w/exponents

Expressions and Equations

Clusters	State of Alaska Standards	Ready Classroom Lessons	Additional Resources
Work with radicals and integer exponents.	**8.EE.1** Apply the properties (product, quotient, power, zero, negative exponents and rational exponents) of integer exponents or generate equivalent numerical expressions. *For example: 32 x 3-5 = 3-3 = 1/33 = 1-27*	**8.EE.1** **Lesson 19**: Apply Exponent Properties for Positive Integer Exponents **Lesson 20:** Apply Exponent Properties for All Integer Exponents **Math in Action**: 541-554 **Additional Content:** Lesson 21: Express Numbers Using Integer Powers of 10; Lesson 22: Work with Scientific Notation	
	8.EE.2 Use square root and cube root symbols to represent solutions to equations of the form x2 = p and x3 = p, where p is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that √2 is irrational.	**8.EE.2** **Lesson 23:** Find Square Roots and Cube Roots to Solve Problems **Lesson 25**: Find Rational Approximations of Irrational Numbers **Math in Action**: 679-692 **Additional Content**:	

		Lesson 26: Understand the Pythagorean Theorem and Its Converse; Lesson 27: Apply the Pythagorean Theorem	
	8.EE.3 Use numbers expressed in the form of a single digit times an integer power of 10 to estimate very large or very small quantities, and to express how many times as much one is than the other.	**8.EE.3** **Lesson 21:** Express Numbers Using Integer Powers of 10 **Math in Action**: 541-554 **Additional Content:** Lesson 22: Work with Scientific Notation	
Understand the connections between proportional relationships, lines, and linear equations.	**8.EE.4** Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities. Interpret scientific notations that has been generated by technology.	**8.EE.4** **Lesson 22**: Work with Scientific Notation **Math in Action:** 541-554 **Additional Content:** Lesson 21: Express Numbers Using Integer Powers of 10	
	8.EE.5 Graph linear equations such as y = mx + b, interpreting m as the slope or rate of change of the graph and b as the y-intercept or starting value. Compare two different proportional relationships represented in different ways.	**8.EE.5** **Lesson 8**: Graph Proportional Relationships and Define Slope **Lesson 17**: Compare Different Representations of Functions **Math in Action:** 331-344; 431-444 **Additional Content:** Lesson 9: Derive and Graph Linear Equations of the Form y = mx + b	
	8.EE.6 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; 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.	**8.EE.6** **Lesson 8**: Graph Proportional Relationships and Define Slope **Lesson 9**: Derive and Graph Linear Equations of the Form y = mx + b **Additional Content:** Lesson 15: Understand Functions; Lesson 16: Use Functions to Model Linear Relationships	
Analyze and solve linear equations and pairs of simultaneous linear equations.	**8.EE.7** Solve linear equations in one variable. a. Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. 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). b. Solve linear equations with rational coefficients, including equations whose solutions require expanding expressions using the distributive property and combining like terms.	**8.EE.7** **Lesson 10:** Solve Linear Equations in One Variable **Lesson 11**: Determine the Number of Solutions to One-Variable Equations **8.EE.7a** **Lesson 11:** Determine the Number of Solutions to One-Variable Equations **Math in Action**: 331-344 **Additional Content:**	

		Lesson 12: Understand Systems of Linear Equations in Two Variables; Lesson 13: Solve Systems of Linear Equations Algebraically **8.EE.7b** **Lesson 10:** Solve Linear Equations in One Variable **Math in Action:** 331-344 **<u>Additional Content:</u>** Lesson 9: Derive and Graph Linear Equations of the Form y = mx + b; Lesson 11: Determine the Number of Solutions to One-Variable Equations; Lesson 12: Understand Systems of Linear Equations in Two Variables; Lesson 13: Solve Systems of Linear Equations Algebraically; Lesson 14: Represent and Solve Problems with Systems of Linear Equations; Lesson 24: Express Rational Numbers as Fractions and Decimals	
	8.EE.8 Analyze and solve systems of linear equations. a. Show that the solutions to a system of two linear equations in two variables is the intersection of the graphs of those equations because points of intersection satisfy both equations simultaneously. b. Solve systems of two linear equations in two variables algebraically and estimate solutions by graphing the equations. Solve simple cases by inspection.	**8.EE.8** **Lesson 12**: Understand Systems of Linear Equations in Two Variables **Lesson 13**: Solve Systems of Linear Equations Algebraically **Lesson 14**: Represent and Solve Problems with Systems of Linear Equations **8.EE.8a** **Lesson 12**: Understand Systems of Linear Equations in Two Variables **Math in Action**: 331-344 **<u>Additional Content:</u>** Lesson 13: Solve Systems of Linear Equations Algebraically; Lesson 14: Represent and Solve Problems with Systems of Linear Equations **8.EE.8b** **Lesson 12**: Understand Systems of Linear Equations in Two Variables **Lesson 13:** Solve Systems of Linear Equations Algebraically **Math in Action**: 331-344 **<u>Additional Content:</u>** Lesson 14: Represent and Solve Problems with Systems of Linear Equations	

Functions			
Clusters	**State of Alaska Standards**	**Ready Classroom Lessons**	**Additional Resources**
Understand the connections between proportional relationships, lines, and linear equations.	**8.F.3** Interpret the equation y = mx + b as defining a linear function, whose graph is a straight line; give examples of functions that are not linear.	**8.F.3** **Lesson 15:** Understand Functions **Math in Action**: 431-444 **<u>Additional Content:</u>** Lesson 9: Derive and Graph Linear Equations of the Form y = mx + b; Lesson 16: Use Functions to Model Linear Relationships; Lesson 17: Compare Different Representations of Functions; Lesson 30: Write and Analyze an Equation for Fitting a Linear Model to Data	
	8.F.4 Construct a function to model a linear relationship between two quantities. 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. 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.	**8.F.4** **Lesson 16**: Use Functions to Model Linear Relationships **Math in Action**: 431-444 **<u>Additional Content</u>**: Lesson 12: Understand Systems of Linear Equations in Two Variables; Lesson 13: Solve Systems of Linear Equations Algebraically; Lesson 14: Represent and Solve Problems with Systems of Linear Equations; Lesson 17: Compare Different Representations of Functions; Lesson 18: Analyze Functional Relationships Qualitatively; Lesson 30: Write and Analyze an Equation for Fitting a Linear Model to Data	
Define, evaluate, and compare functions.	**8.F.1** Understand that a function is a rule that assigns to each input (domain) exactly one output (the range). The graph of a function is the set of ordered pairs consisting of an input and the corresponding output. *For example: Use the vertical line test to determine functions and non-functions.*	**8.F.1** **Lesson 15**: Understand Functions **Math in Action**: 431-444 **<u>Additional Content:</u>** Lesson 17: Compare Different Representations of Functions	
	8.F.2 Compare properties of two functions, each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).	**8.F.2** **Lesson 17**: Compare Different Representations of Functions **Math in Action:** 431-444 **<u>Additional Content:</u>** Lesson 16: Use Functions to Model Linear Relationships	

	8.F.5 Given a verbal description between two quantities, sketch a graph. Conversely, given a graph, describe a possible real-world example. *For example: Graph the position of an accelerating car or tossing a ball in the air.*	**8.F.5** **Lesson 18:** Analyze Functional Relationships Qualitatively **Math in Action:** 431-444 **Additional Content:** Lesson 16: Use Functions to Model Linear Relationships; Lesson 17: Compare Different Representations of Functions; Lesson 29: Analyze Scatter Plots and Fit a Linear Model to Data	
Geometry, Statistics and Probability			
Clusters	**State of Alaska Standards**	**Ready Classroom Lessons**	**Additional Resources**
Understand congruence and similarity using physical models, transparencies, or geometry software.	**8.G.1** Through experimentations, verify the properties of rotations, reflections, and translations (transformations) to figures on a coordinate plane. a. Lines are taken to lines, and line segments to line segments of the same length. b. Angles are taken to angles of the same measure. c. Parallel lines are taken to parallel lines.	**8.G.1** **Lesson 1**: Understand Rigid Transformations and Their Properties **8.G.1a** **Lesson 1**: Understand Rigid Transformations and Their Properties **Math in Action**: 65-78 **Additional Content:** Lesson 2: Work with Single Rigid Transformations in the Coordinate Plane; Lesson 3: Work with Sequences of Transformations and Congruence **8.G.1b** **Lesson 1**: Understand Rigid Transformations and Their Properties **Additional Content:** Lesson 2: Work with Single Rigid Transformations in the Coordinate Plane; Lesson 3: Work with Sequences of Transformations and Congruence **8.G.1c** **Lesson 1**: Understand Rigid Transformations and Their Properties **Additional Content**: Lesson 2: Work with Single Rigid Transformations in the Coordinate Plane; Lesson 3: Work with Sequences of Transformations and Congruence	Possible Module 9 and 10 replacement (approx. 2 weeks)

	8.G.2 Demonstrate understanding of congruence by applying a sequence of translations, reflections, and rotations on two-dimensional figures. Given two congruent figures, describe a sequence that exhibits the congruence between them.	**8.G.2** **Lesson 3:** Work with Sequences of Transformations and Congruence **Math in Action**: 65-78 **<u>Additional Content:</u>** Lesson 1: Understand Rigid Transformations and Their Properties; Lesson 2: Work with Single Rigid Transformations in the Coordinate Plane; Lesson 6: Describe Angle Relationships; Lesson 7: Describe Angle Relationships in Triangles	
	8.G.3 Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.	**8.G.3** **Lesson 2:** Work with Single Rigid Transformations in the Coordinate Plane **Lesson 3:** Work with Sequences of Transformations and Congruence **Lesson 5:** Perform and Describe Transformations Involving Dilations **Math in Action**: 65-78; 159-172	
	8.G.4 Demonstrate understanding of similarity by applying a sequence of translations, reflections, rotations, and dilations on two-dimensional figures. Describe a sequence that exhibits the similarity between them.	**8.G.4** **Lesson 4**: Understand Dilations and Similarity **Lesson 5**: Perform and Describe Transformations Involving Dilations **Math in Action**: 159-172 **<u>Additional Content:</u>** Lesson 7: Describe Angle Relationships in Triangles; Lesson 8: Graph Proportional Relationships and Define Slope	
	8.G.5 Justify using informal arguments to establish facts about: • The angle sum of triangles (sum of the interior angles of a triangle is 180º) • Measures of exterior angles of triangles • Angles created when parallel lines are cut be a transversal (e.g., alternate interior angles) • Angle-angle criterion for similarity of triangles	**8.G.5** **Lesson 6:** Describe Angle Relationships **Lesson 7:** Describe Angle Relationships in Triangles **Math in Action**: 159-172 **<u>Additional Content</u>**: Lesson 8: Graph Proportional Relationships and Define Slope; Lesson 10: Solve Linear Equations in One Variable	
Understand and apply the Pythagorean Theorem.	**8.G.6** Explain the Pythagorean Theorem and its converse.	**8.G.6** **Lesson 26**: Understand the Pythagorean Theorem and Its Converse **<u>Additional Content</u>**: Lesson 27: Apply the Pythagorean Theorem	

	8.G.7 Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.	**8.G.7** **Lesson 27:** Apply the Pythagorean Theorem **Math in Action**: 679-692 **Additional Content:** Lesson 28: Solve Problems with Volumes of Cylinders, Cones, and Spheres	
	8.G.8 Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.	**8.G.8** **Lesson 27:** Apply the Pythagorean Theorem	
Solve real-world and mathematical problems involving volume of cylinders, cones, and spheres.	**8.G.9** Identify and apply the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.	**8.G.9** **Lesson 28:** Solve Problems with Volumes of Cylinders, Cones, and Spheres **Math in Action**: 679-692	
Investigate patterns of association in bivariate data.	**8.SP.1** Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association.	**8.SP.1** **Lesson 29:** Analyze Scatter Plots and Fit a Linear Model to Data **Math in Action**: 779-792 **Additional Content**: Lesson 30: Write and Analyze an Equation for Fitting a Linear Model to Data	
	8.SP.2 Explain why straight lines are widely used to model relationships between two quantitative variables. 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.	**8.SP.2** **Lesson 29:** Analyze Scatter Plots and Fit a Linear Model to Data **Math in Action**: 779-792 **Additional Content**: Lesson 30: Write and Analyze an Equation for Fitting a Linear Model to Data	
	8.SP.3 Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept. *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.*	**8.SP.3** **Lesson 30:** Write and Analyze an Equation for Fitting a Linear Model to Data **Math in Action**: 779-792 **Additional Content:** Lesson 16: Use Functions to Model Linear Relationships	
	8.SP.4 Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects and use relative frequencies	**8.SP.4** **Lesson 31**: Understand Two-Way Tables **Lesson 32**: Construct and Interpret Two- Way Tables	

	calculated for rows or columns to describe possible association between the two variables. *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?*	**Math in Action**: 779-792	