

Timing	Sequence	Concept	Competency	Vocabulary	Strategy	Assessment Anchor and Eligible Content	PA Academic Standards
Algebra Topics (1st Semester)							
Essential Question		<i>How can we show that algebraic properties and processes are extensions of arithmetic properties and processes, and how can we use algebraic properties and processes to solve problems?</i>					
Big Idea		Operations with Real Numbers and Expressions (4 Weeks)					
Guiding Topics		<ol style="list-style-type: none"> 1. Students must be able to factor expressions 2. Exponent Rules - factor a radical expression 3. Evaluate, compare and simplify monomials and polynomials 4. Use knowledge of factoring expressions to simplify rational expressions 5. Use Estimation to evaluate the reasonableness of answers 					
Sept		Compare and Order Real Numbers	Represent and use numbers in equivalent forms (e.g. integers, fractions, decimals, percents, square roots, and exponents)	Rational, Irrational and Real Numbers. Integers, Square Root, Radical, Exponent. Equivalent Form	Use number lines to show where numbers are located and show how to change from one form to another	A1.1.1.1.1	
Sept		Simplify Square Roots	Compare and/or order any real numbers. Rational and Irrational may be mixed. Show relationships between real numbers in problem solving settings.	Rational, Irrational and Real Numbers. Integers, Square Root, Radical, Exponent. Equivalent Form	Use factor trees to show students how to find perfect squares within the product and use these to simplify	A1.1.1.1.2	
Sept		Factors and Multiples of Monomials	Find the GCF and LCM for sets of Monomials. Use exponents, roots and/or absolute values to solve problems.	Monomial, GCF, LCM, Factor.	Use factor trees to show students how to find GCF and LCM	A1.1.1.2.1	
Sept		Simplify and Evaluate Expressions	Simplify and Evaluate expressions involving properties and laws of exponents roots and or absolute values to some problems.	Evaluate, Simplify, Expression.	Teach all laws of exponents while also including negative and possibly fractional exponents	A1.1.1.3.1	

Sept		Working with and Factoring Polynomials	Add subtract or multiply polynomials expressions	Evaluate, Simplify, Expression. Factoring, like terms, distribute.	Use algebra tiles as needed to show the concept of foiling and factoring	A1.1.1.5.2	
Sept		Simplfy Rational Expressions	Simplify/reduce a rational algebraic expression	Rational Expression, Algebraic Expression, Reducing, Factoring, Simplifying	Use algebra tiles as needed to provide a visual for combining like terms	A1.1.1.5.3	
Essential Question		<p><i>How can expressions, equations, and inequalities be used to quantify, solve, model, and/or analyze mathematical situations?</i></p> <p><i>How do you write, solve, and interpret systems of two linear equations and inequalities using graphing and algebraic techniques?</i></p>					
Big Idea		Linear Equations and Coordinate Plane Geometry (6 Weeks)					
Guiding Topics		<p>1. Identify slope as a constate rate of change in any real world situation.</p> <p>2. Identify the y intercept as a starting point.</p> <p>3. How do linear equations rfect perpendicular and parallel lines.</p> <p>4.Apply graphing concepts to real life situations.</p>					
Oct		Linear Equations	Write, solve and graph linear equations using vairious methods. Apply linear equations to problem situations	x/y intercept, slope, linear equation	Use a graphing calculator such as desmos.com to introcduce the concept of locating the x and y-intercepts	A1.1.2.1.1, A1.1.2.1.2, A1.1.2.1.3	
		Linear Equation	Use algebraic properties to justify the solution process, and interpret the solutions in the context of real world problems	Properties of Equality: Addition, Subtraction, Multiplication, Division, Substitution, Reflexive, Symmetric and Transitive	Teach students to solve for a given variable such as y to write equations in slope-intercept form		
Oct		Systems of Linear Equations	Write /solve a system of linear equations using graphing, substitution or elimination and interpret solution as it pertains to a real world situation.	Linear equation, system of equations, Substitution and Elimination Methods	Use a graphing calculator such as desmos.com to introduce the concept of solving by graphing and locating the point of intersection	A1.1.2.2.1, A1.1.2.2.2	
Oct		Linear and Compound Inequalities	Solve for and interpret solutions to compound inequalities. Identify and graph solution sets.	Inequality, greater than, less than, greater than or equal, less than or equal, absolute value	Teach students to solve linear inequalities for y	A1.1.3.1.1, A1.1.3.1.2, A1.1.3.1.3	

Oct		Systems of Linear Inequalities	Write and solve systems of linear inequalities algebraically and graphically.	Linear inequality, system of inequalities	Teach students to solve and graph linear inequalities and make sure they are able to shade the correct area on the graph	A1.1.3.2.1, A1.1.3.2.2	
Oct		Constant Rate of Change	Describe, compute, and/or use the rate of change of a line. Identifying slope as a constant rate of change.	Slope, Constant Rate of Change	Teach students to use slope in various word problems as it correlates to a constant rate of change	A1.2.2.1.1, A1.2.2.1.2	
Nov		Find the Slope and y-intercept	Determine the slope and y-intercept represented by a linear equation or graph. Interpret the meaning of slope and y-intercept.	Constant Rate of Change, y-intercept, coordinate plane,	Teach students to write equations in slope-intercept form and identify the slope and y-intercept	A1.2.2.1.4	
Nov		Identify Linear Equations Using Given Information	Write and graph a linear equation. Identifying different forms of linear equations: point-slope, slope-intercept, and standard form.	point slope, standard form, slope-intercept	Teach students how to change from one form to another and which form is best to use when graphing by hand or on a graphing calculator	A1.2.2.1.3	
Nov		Lines of Best fit	Given a set of data, determine a line of best fit and create a linear equation to match that line.	Linear Model, Line of Best Fit, Prediction	Use slope and y-intercept to teach lines of best fit	A1.2.2.2.1	
Essential Question	<i>How can patterns be used to describe relationships in mathematical situations?</i>						
Big Idea	Functions (4 Weeks)						
Guiding Topics	<ol style="list-style-type: none"> 1. Write/create a function that models the relationship between two quantities 2. What makes a relation a function and how to determine that a relation is a function. 3. Use the roster method to determine if a relation is a function and to graph relation 4. Translating a function from one representation to another. 5. Using inverse operations to solve function problems 						

Nov		Relations and Functions	Determine whether a relation is a function, given a set of points or a graph.	Relation, Function, Vertical Line Test, Domain, Range	Have students graph a relation and use the vertical line test to determine if that relation is a function	A1.2.1.1.2	
Nov		Domain and Range	Identify Domain and Range of a function. Using a graph, ordered pairs or table interpret the functions in real world context.	Domain, Range, Relation.	Identify x values as domain and y values as range and write in either set or interval notations	A1.2.1.1.3	
Dec		Linear Functions	Identify and interpret linear functions represented by various forms (ordered pairs, tables, graphs, and equations)	Linear Function	Use linear functions in problem situations and have students interpret the meaning	A1.2.1.2.1	
Dec		Translate between representations of functions	Translate from one representation of a function to another. Translate between graphs, tables, and equations.	Equations, tables, graphs	Have students represent data from a table on a coordinate plane and vice versa	A1.2.1.2.2	
Essential Question		<i>How can data be organized and represented to provide insight into the relationship between quantities?</i>					
Big Idea		Data Analysis and Probability (2 Weeks)					
Guiding Topics		<ol style="list-style-type: none"> 1. Summarize, represent, and interpret single-variable data and two-variable data. 2. Determine the best representation of a set of data. 3. Understand compound probability and the difference between and/or when it comes to events. 4. Develop a strong understand of permutations and combinations 					
Dec		Circle and Bar Graphs	Interpret and understand data in Circle Graphs and Bar Graphs.	Bar Graph, Circle Graph, Percents	Have students create bar graphs from data they have collected using angles and percentages	A1.2.3.2.1	

Dec		Box and Whisker/Stem and Leaf Plots	Calculate and/or interpret the range, quartiles, and interquartile range of data	Range, quartile, interquartile range, median, box and whisker plot, outliers	Have students create plots and then in turn interpret this data	A1.2.3.1.1, A1.2.3.2.2	
Dec		Line Graphs and Scatter Plots	Make predictions using the equations using the equations or graphs of best-fit lines of scatter plots	Line Graph, Scatter Plot, Correlation, Line of Best Fit	Use slope and y-intercept to make predictions regarding lines of best fit	A1.2.3.2.1, A1.2.3.2.2, A1.2.3.2.3	
Dec		Probability	Find probabilities for compound events (e.g. find probability of red and blue, find probability or red or blue) and represent as a fraction, decimal, or percent	Probability, Odds, Outcomes, Dependent, independent events, Fundamental counting principle, Complementary Event, Combinations, Permutations,	Have students interpret probability from an experiment and then use this to teach probability of independent and compound events	A1.2.3.3.1	
Essential Question							
Big Idea		Topic Review (1 Week)					
Guiding Topics		Identify major topics for Keystone and review topics					
Geometry Topics (2nd Semester)							
Essential Question		How are spatial relationships, including shape and dimension, used to draw, construct model and represent real situations or solve pro					
Guiding Topics		1. What can be built using line segments? 2. What are the fundamental terms of geometry and how do they relate? 3. What could be a bisector and how can they be used in a real world application? 4. How can you use and apply various formulas in conjunction with algebraic processes to calculate various relationships with geometric concepts and/or shapes. ***Guiding topics are presented as examples and do not encompass the entire content area. Teacher should include additional guiding topics to fit classroom needs					
Jan	1.1	Points,Lines and Planes	Use the basic defined and undefined terms in geometry. Model the intersections of lines and planes	Definition, point, line, plane, collinear points, coplanar points, segment, endpoints, initial point, rays, opposite rays, intersect, intersection	Sketch, describe and name geometric concepts in a diagram	CC 23 HS A1	2.9.8A, 2.9.G.A

Jan	1.2	Segments and Their Measures	Apply formulas such as distance formula and postulates such as the Segment Addition Postulate	Distance Formula, Congruent Segments, Coordinate, distance, length, postulates, axioms,	Use postulates, formulas and algebra to find missing lengths	CC 23 HS A3	2.8.G.B,
Jan	1.21	Segment and Angle Bisector	Bisect a segment and an angle using constructions and algebra	Midpoints, bisects, segment bisectors, compass, straightedge, constructions, congruent segments, Midpoint Formula, Angle Bisectors, congruent angles	Use Midpoint formula to find the midpoint or endpoint. Use algebra to find the missing piece of an angle bisector	CC 23 HS A3	2.9.11.C
Jan	1.4	Angles and Their Measures	Classify angles and use postulates such as the Angle Addition Postulate	Angle, sides, vertex, congruent angles, measures, interior, exterior, acute, right, obtuse, straight, adjacent angles,protractors	Determine the different angles based on measurements from a protractor as well as using algebra to find the missing angle	CC 23 HS A3	2.8.G.B, 2.3.8.C
Feb	1.5	Angle Pair Relationships	Identify vertical angles, linear pairs, complementary and supplementary angles	Vertical Angles, Linear Pairs, Complementary, Supplementary, Adjacent, Nonadjacent	Identify the types of angles and set up an equation based on related postulates or theorems	CC 23 HS A3	2.3.11.C
Feb	1.6	Polygons	Identify, name, and describe polygons and use the sum of the measured interior angles of a quadrilateral	Polygon, Vertex, Sides, Convex, Concave, Equilateral, Equiangular, Regular Polygon	Identify polygons by number of sides	CC 23 HS A3	2.3.8.C
Feb	2.5	Reason Using Properties from Algebra	Use and apply properties of equality such as distributive, reflexive, symmetric, and transitive properties	Inductive reasoning,conjecture, intuition, counterexample,	Use properties of Algebra to solve problems involving lengths of segments and measures of angles within real-world problem situations	CC 23 HS A3	2.4.8.A, 2.4.11A, 2.4.G.A
Essential Question	<p>How can recognizing repetition or regularity assist in solving problems more efficiently?</p> <p>How can geometric properties and theorems be used to describe, model and analyze situations?</p>						
Guiding Topics	<p>1. What are parallel lines and how are they determined to be parallel?</p> <p>2. How do perpendicular lines impact our everyday life and have real world application?</p> <p>3. How do the slopes of parallel and perpendicular lines relate in the coordinate plane?</p> <p>4. How can parallel and perpendicular lines be identified by the equation of a line?</p> <p>5. How can you the angles formed by parallel lines and a transversal be used to write equations to solve for the variable(s) within variable expressions and then used to find measures of certa</p>						
Feb	3.1	Lines and Angles	Identify relationships between lines and the angles formed by transversals. Construct a perpendicular Line	Parallel Lines, Skew Lines, Parallel Planes, Transversals, Corresponding, Alternate Interior, Alternate Exterior, Consecutive Interior or Same Side Interior	Identify the types of angles formed	CC 23 HS A3	2.9.G.A
March	3.2	Parallel Lines and Transversals	use properties of parallel lines and transversals to solve problems	PCA, PAI, PAE, PSSIS, PSSSES, PCI, PCE	Writing proofs and solving problems using parallel lines	CC 23 HS A3	2.8.G.B 2.9.11.A

March	3.21	Using Properties of Parallel Lines	Use properties of parallel lines to solve problems. Construct parallel lines		Use properties of parallel lines	CC 23 HS A3	2.9.11.A
March	3.4	Parallel Lines in the Coordinate Plane	Find the slopes of lines and use slope to identify parallel lines. Write equations of parallel lines in a coordinate plane	Slope, Rise/Run,	Find the value of slope, determine if the lines are parallel and write equations of parallel lines	CC 23 HS A3	2.9.A.2.C
March	3.41	Perpendicular Lines in the Coordinate Plane	Find the slopes of lines and use slope to identify perpendicular lines. Write equations of perpendicular lines in a coordinate plane	Slope, Rise/Run,	Find the value of slope, determine if the lines are perpendicular and write equations of perpendicular lines	CC 23 HS A3	2.9.A.2.C
Essential Question		How are spatial relationships, including shape and dimension, used to draw, construct model and represent real situations or solve problems?					
Guiding Topics		<p>1. How do triangles impact real world construction. 2. What methods can be used to prove triangles are congruent and why do those methods work to show congruency? 3. What methods cannot be used to prove triangles are congruent and why do these methods not work? 4. Why does proving right triangles congruent take less information to do than other types of triangles?</p> <p>***Guiding topics are presented as examples and do not encompass the entire content area. Teacher should include additional guiding topics to fit classroom needs.</p>					
March	4.1	Triangles and Angles	Classification of triangles by sides and angles and then find the angle measures in the triangle	Equilateral, Isosceles, Scalene, Acute, Equiangular, Right, Obtuse Triangles, Legs, Hypotenuse, Base, Vertex, Adjacent Sides, Interior Angles, Exterior Angles, Corollary	Identify the triangles. Find the missing angles using Exterior Angle Theorem, Triangle Sum Theorem	CC 23 HS A3, A4, A5, A6	2.3.11.C
March	4.2	Congruence and Triangles	Identify congruent figures and corresponding parts and prove that two triangles are congruent	Congruent, Corresponding angles, Corresponding sides, Reflexive, Symmetric, Transitive Properties	Name corresponding parts and corresponding triangles	CC 23 HS A3, A4, A5, A6	2.9.G.B 2.9.11.A
March	4.5	Isosceles, Equilateral and Right Triangles	Use properties of isosceles and equilateral triangles as well as right triangles	Base Angles, Vertex Angles, Base Angle Theorem, Converse of the Base Angle Theorem, HL theorem	Write proofs using isosceles, equilateral and right properties and theorems	CC 23 HS A3, A4, A5, A6	2.9.11.A 2.9.11B
Apr	10.1	Tangents to Circles	Identify segments and lines related to circles and use properties of a tangent to a circle	Circle, Center, Radius, Diameter, Chord, Secant, Tangent, Tangent Circles, Concentric Circles, Common Tangent Lines, Interior/Exterior of a Circle, Point of Tangency	Sketch, describe and name geometric concepts in a circle	CC 23 HS A8	2.9.8A

Apr	10.2	Arcs and Chords	Use properties of arcs of a circle and chords of a circle to solve problems	Central Angle, Minor Arc, Major Arc, Semi Circle, Congruent Arcs, Intercepted Arc	Use properties of arcs and chords to find the measure of the missing value	CC 23 HS A8	2.9.8A
Apr	10.4	Inscribed Angles	Use inscribed angles and polygons to solve problems	Inscribed Angles, Intercepted Arc, Inscribed Polygons, Circumscribed, Inscribed	Use properties of arcs and chords to find the measure of the missing value	CC 23 HS A8, CC 23 HS A9	2.9.8A
Apr	10.5	Other Relationships in Circles	Use angles formed by tangents and chords to solve problems in geometry. Use angles formed by lines that intersect a circle to solve problems.		Use formulas to find the missing angle or arc value based on the type of segment or lines intersecting	CC 23 HS A8	2.9.8A
Apr	10.6	Segment Lengths in Circle	Find the lengths of intersecting chords, intersecting secants, and intersecting tangent and secant segments	Secant Segment, External Segment, Tangent Segments	Use formulas to find the missing length based on the type of segment or lines intersecting	CC 23 HS A8	2.9.8A
Apr	5.1	Midsegments of a Triangle	Use properties of Midsegments to solve problems	Midsegments of a Triangle,	Use properties of Midsegments		2.9.8A
Apr	5.2	Perpendiculars and Bisectors	Use properties of perpendicular bisectors and use properties of angle bisectors to identify equal distances. Construct Perpendicular Bisectors	Perpendicular Bisectors, Equidistant,		CC 23 HS A4	2.9.8A
Essential Questions		How can the application of the attributes of geometric shapes support mathematical reasoning and problem solving?					
Guiding Topics		1. Why is it important to understand the inscribed and circumscribed circles with angle and perpendicular bisectors? 2. What are indirect proofs and why are they important for geometric reasoning? 3. What are midsegments and how are they applicable for construction? 4. How are perpendicular bisectors useful for micro and macro construction projects? ***Guiding topics are presented as examples and do not encompass the entire content area. Teacher should include additional guiding topics to fit classroom needs.					
May	5.3	Bisectors of a Triangle	Use properties of perpendicular bisectors and use properties of angle bisectors. Construct Perpendicular Bisector and Angle Bisectors of a Triangle	Perpendicular Bisectors of a Triangle, Concurrent Lines, Point of Concurrency, Circumcenter of a Triangle, Angle Bisector, Incenter	Use properties of Angle and Perpendicular Bisectors	CC 23 HS A4	2.9.8A

May	5.4	Medians and Altitudes of a Triangle	Use properties of Medians and Altitudes of a triangle. Construct Median and Altitudes of a Triangle	Medians of a Triangle, Centroid of a Triangle, Altitudes of a Triangle, Orthocenter of a Triangle	Use properties of Medians and Altitudes of a Triangle	CC 23 HS A4	2.9.8A
May	5.5	Inequalities in One Triangle	Use triangle measurements to order side lengths and angle measures. Use triangle inequality theorem	Long Side, Short Side, Small Angle, Large Angle	Use the triangle inequality theorem to list sides and angles	CC 23 HS A4	2.8.8.F
May	6.1	Ratio and Proportions	Find and Simplify the ratio of two numbers and use proportions to solve problems in real life and in geometry	Ratios, Proportions, extremes, means, Cross multiply, Properties of Proportions,	Simplify Ratios and solve proportions. Set up proportions in real life	CC 23 HS A7	2.1.G.C 2.2.8.D
June	11.1	Circumference and Arc Length	Find the circumference of circle and arc length vs. the measure of the arc	Arc Length, Semi Circle, Circumference	Use the formula to find the circumference or arc length of a circle	CC 23 HS A9	2.4.11.C
June	11.2	Introduction to Perimeter, Circumference and Area	Find the perimeter, area and circumference of plane figures and use a general problem solving plane	Perimeter, Circumference, Area, radius, square, rectangle, triangle, circle, verbal models	Use formulas to find the missing information	CC 23 HS A 13	2.5.G.A,2.5.11.A
June	11.2	Areas of Circles and Sectors	Find the Area of a Circle and specific sectors of a circle	Sector of a Circle, Segment of a Circle	Use formula to find the area of a circle and sector of a circle	CC 23 HS A9	2.4.11.C
June	11.3	Area of a Regular Polygon	Find the area of a regular polygon	Apothem, radius, center of a polygon, central angle of a polygon	Find area of a regular polygon	CC 23 HS A13	2.3.8.C 2.9.8.A

Textbook/Other Resources	
Coach Lesson 1	
Coach Lesson 2	
Coach Lesson 3	
Coach Lesson 4/5	

Coach Lesson 6/7	
Coach Lesosn 8	
Coach Lesson 9	
Coach Lesson 9	
Coach Lesson 10	
Coach Lesson 11	

Coach Lesson 12		
Coach Lesson 18		
Coach Lesson 19		
Coach Lesson 9/20		
Coach Lesson 21		

Coach Lesson 14	
Coach Lesson 15	
Coach Lesson 16	
Coach Lesson 17	
Coach Lesson 22/24	

Coach Lesson 23	
Coach Lesson 24	
Coach Lesson 25	

blems?		
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1.2 Use Segments and Congruence pp. 9-14		
1.2 Use Segments and Congruence pp. 9-14 1.3 Use Midpoint & Distance Formula pp. 15-21 1.4 Measure & Classify Angles pp. 24-34		
1.4 Measure & Classify Angles pp. 33-34		
1.5 Describe Angle Pair Relations pp. 35-41		
1.6 Classify Polygons p. 42		
2.5 Reason Using Properties from Algebra pp. 97-103		

in angles?

3.1 Identify Pairs of lines and angles pp. 139-145 p. 190		
3.2 Use Parallel Lines and Transversals pp. 145-151		

3.2 Use Parallel Lines and Transversals pp. 190		
3.4 Find & Use Slopes of Lines pp. 163-169		
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4.1 Apply Triangle Sum Properties p. 207-214		
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4.5 Prove Triangles by HL pp. 238-244 4.8 Use Isosceles & Equilateral Triangles pp. 264-271		
10.1 Use Properties of tangents pp. 641-648		

10.2 Find one measure 10.3 Apply Properties of Chords pp. 649-659		
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10.5 Apply Other Angle Relationships in Circles		
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6.1 Using Similar Polygons pp. 358-365		
11.1 Circumference & Arc Length pp. 710-718		
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11.2 Areas of Circles & Sectors pp. 719-724		
11.3 Areas of Regular Polygon pp. 726-732		