SUBJECT: Geometry	GRADE: Grade 8 (Identical to grades 9-12 except for unit 7)
Unit Title: Basics of Geometry	**Time Frame: 3 Weeks**

UNIT OVERVIEW

In this unit, we will learn about:

- Patterns and Inductive Reasoning
- Points, Lines and Planes
- Segments and their Measures
- Angles and their Measures
- Segment and Angle Bisectors
- Angle Pair Relationships
- Introduction to Perimeter, Circumference, and Area

LRG SKILLS AND DISPOSITIONS	PA STANDARDS
	CC.2.1.HS.F CC.2.2.HS.A CC.2.2.HS.B CC.2.3.HS.A

COMPETENCIES	LEARNING TARGETS
Sequences and Series I can identify, describe, and represent various types of sequences and series.	• I can write a rule for the nth term of a sequence. (K1MAB14O1)
Logic and Reasoning I can identify, state, and construct valid arguments to prove statements with mathematical logic and reasoning.	• I can determine if a logic statement is true or false and use a counterexample, if necessary. (*K1MAB8O10)*
Geometry	• I can construct and interpret diagrams involving points, lines, segments, rays, and planes. (K1MAB9O1)

I can describe, analyze, and apply geometric relationships to solve problems.	• I can calculate lengths of segments using properties of midpoints, distance formula, Pythagorean theorem, and/or the segment addition postulate. (K1MAB9O2) • I can differentiate between and calculate measurements of angles using properties of angle bisectors, adjacent angles, linear pairs, vertical angles, complementary angles, supplementary angles, and/or the angle addition postulate. (K1MAB9O3) • I can apply my knowledge of perimeter, circumference, and area of rectangles, triangles, and circles to solve real-world problems. (K1MAB9O4)

SUBJECT: Geometry	GRADE: 9-12
Unit Title: Reasoning and Proof	**Time Frame: 3 Weeks**

UNIT OVERVIEW

In this unit, we will learn about:

- Conditional Statements: Converses, Inverses and Contrapositives
- Definitions and Biconditional Statements
- Deductive Reasoning
- Reasoning with Properties from Algebra
- Proving Statements about Segments
- Proving Statements about Angles

LRG SKILLS AND DISPOSITIONS	PA STANDARDS
• Critical Thinking & Problem Solving: Law of Syllogism Project (S4C) • Critical Thinking & Problem Solving: Proofs (S4C) • Creativity & Innovation: Law of Syllogism Project (S3C)	CC.2.1.HS.F CC.2.2.HS.D CC.2.3.HS.A

COMPETENCIES	LEARNING TARGETS
Logic and Reasoning I can identify, state, and construct valid arguments to prove statements with mathematical logic and reasoning.	• I can distinguish between the hypothesis and conclusion of conditional statements. (K1MAB8O1) • I can identify and rewrite conditional statements in different forms (inverse, converse, contrapositive, and biconditional). (K1MAB8O2) • I can infer which point, line, and plane postulate a diagram or statement is representing. (K1MAB8O3) • I can recognize and use the properties of algebra to justify a logical argument. (K1MAB8O4)

	• I can prove statements involving algebra, segments, and angles with theorems, postulates, definitions, and algebraic properties. (K1MAB8O5)

SUBJECT: Geometry	GRADE: 9-12
Unit Title: Perpendicular and Parallel Lines	**Time Frame: 4 Weeks**

UNIT OVERVIEW

In this unit, we will learn about:

- Lines and Angles
- Proofs and Perpendicular Lines
- Parallel Lines and Transversals
- Proving Lines are Parallel
- Using Properties of Parallel Lines
- Parallel and Perpendicular Lines in a Coordinate Plane

LRG SKILLS AND DISPOSITIONS	PA STANDARDS
• Critical Thinking & Problem Solving: Proofs (S4C)	CC.2.1.HS.F CC.2.2.HS.A CC.2.2.HS.B CC.2.2.HS.D CC.2.3.HS.A

COMPETENCIES	LEARNING TARGETS
Geometry I can describe, analyze, and apply geometric relationships to solve problems.	• I can differentiate between parallel lines, perpendicular lines, and skew lines. (K1MAB9O5) • I can differentiate between and calculate with special angle pairs (corresponding angles, consecutive interior angles, alternate interior angles, alternate exterior angles). (K1MAB9O6) • I can apply concepts from algebra regarding graphing, linear equations, and slope to prove lines are parallel, perpendicular, or neither. (K1MAB9O7)

Logic and Reasoning I can identify, state, and construct valid arguments to prove statements with mathematical logic and reasoning.	• I can prove statements by using special angle pair properties, postulates, and theorems. (K1MAB8O6) • I can prove statements involving parallel and perpendicular lines with properties, theorems, and postulates. (K1MAB8O7)

SUBJECT: Geometry	GRADE: 9-12
Unit Title: Congruent Triangles	**Time Frame: 4 Weeks**

UNIT OVERVIEW

In this unit, we will learn about:

- Triangles and Angles
- Congruence and Triangles
- Proving Triangles are Congruent (SSS, SAS, ASA, AAS, HL)
- Using Congruent Triangles
- Isosceles, Equilateral, and Right Triangles

LRG SKILLS AND DISPOSITIONS	PA STANDARDS
● Critical Thinking & Problem Solving: Proofs (S4C)	CC.2.1.HS.D CC.2.1.HS.F CC.2.2.HS.B CC.2.3.HS.A
COMPETENCIES	**LEARNING TARGETS**
Geometry I can describe, analyze, and apply geometric relationships to solve problems.	● I can classify triangles by angles and sides. (K1MAB9O8) ● I can distinguish between the triangle congruence shortcuts (SSS, SAS, AAS, ASA, and HL). (K1MAB9O9) ● I can use the triangle congruence shortcuts to conclude that triangles are congruent. (K1MAB9O10) ● I can apply the triangle congruence shortcuts, postulates, and theorems to write algebraic equations and solve application problems. (K1MAB9O11)
Logic and Reasoning	● I can write proofs using triangle congruence theorems and postulates. (K1MAB8O8)

I can identify, state, and construct valid arguments to prove statements with mathematical logic and reasoning.	

SUBJECT: Geometry	GRADE: 9-12
Unit Title: Properties of Triangles	**Time Frame: 3 Weeks**

UNIT OVERVIEW

In this unit, we will learn about:

- Perpendicular and Bisectors
- Bisectors of a Triangles
- Medians and Altitudes of a Triangle
- Midsegment Theorem
- Inequalities in One Triangle

LRG SKILLS AND DISPOSITIONS	PA STANDARDS
	CC.2.1.HS.D CC.2.2.HS.B CC.2.3.HS.A

COMPETENCIES	LEARNING TARGETS
Geometry I can describe, analyze, and apply geometric relationships to solve problems.	• I can solve problems with perpendicular and angle bisectors. (K1MAB9O12) • I can differentiate between the circumcenter, incenter, centroid, and orthocenter of a triangle and their identifying segments. (K1MAB9O13) • I can solve problems using the properties of the circumcenter, incenter, centroid, and orthocenter of a triangle. (K1MAB9O14) • I can solve problems using the midsegment of a triangle. (K1MAB9O15) • I can use my knowledge of inequalities to use the Third Side Theorem and/or the Converse to the Pythagorean Theorem in triangles. (K1MAB9O16)

SUBJECT: Geometry	GRADE: 9-12
Unit Title: Quadrilaterals	**Time Frame: 4 Weeks**

UNIT OVERVIEW

In this unit, we will learn about:

- Polygons
- Properties of Parallelograms and Using Parallelograms to Prove Statements
- Proving Quadrilaterals and Parallelograms
- Special Parallelograms: Rhombuses, Rectangles and Squares
- Trapezoids and Kites
- Special Quadrilaterals and their Properties
- Quadrilateral Areas

LRG SKILLS AND DISPOSITIONS	PA STANDARDS
● Critical Thinking & Problem Solving: Proofs (S4C)	CC.2.1.HS.D CC.2.1.HS.F CC.2.2.HS.B CC.2.3.HS.A
COMPETENCIES	**LEARNING TARGETS**
Geometry I can describe, analyze, and apply geometric relationships to solve problems.	● I can classify polygons using polygon names, concave, convex, equiangular, equilateral, and regular. (K1MAB9O17) ● I can apply the quadrilateral properties, postulates, and theorems for parallelograms, rectangles, rhombi, squares, kites, trapezoids, and isosceles trapezoids. (K1MAB9O18) ● I can calculate the area of quadrilaterals. (K1MAB9O19) ● I can apply my knowledge of the area of quadrilaterals to real-world problems. (K1MAB9O20)

Logic and Reasoning I can identify, state, and construct valid arguments to prove statements with mathematical logic and reasoning.	• I can prove statements involving quadrilaterals. (K1MAB8O9)

SUBJECT: Geometry	**GRADE: 9-12**
Unit Title: Surface Area and Volume	**Time Frame: 3 Weeks**

UNIT OVERVIEW

In this unit, we will learn about:

- Exploring Solids and Polyhedrons: Vocabulary and Euler's Theorem
- Surface Area of Prisms, Cylinders, Pyramids, Cones and Spheres
- Volume of Prisms, Cylinders, Pyramids, Cones and Spheres
- Surface Area and Volume of Composite Solids

LRG SKILLS AND DISPOSITIONS	PA STANDARDS
• Creativity & Innovation: Build a Polyhedron (SC3)	CC.2.1.HS.D CC.2.1.HS.F CC.2.2.HS.B CC.2.3.HS.A

COMPETENCIES	LEARNING TARGETS
Geometry I can describe, analyze, and apply geometric relationships to solve problems.	• I can classify solids using the terminology concave, convex, faces, edges, vertices, cross-sections, prisms, cones, pyramids, cylinders, and spheres. (K1MAB9O21) • I can use the properties of solids and Euler's theorem to solve problems. (K1MAB9O22) • I can calculate the surface area of 3D solids. (K1MAB9O23) • I can calculate the volume of 3D solids. (K1MAB9O24)

	• I can calculate the surface area and volume of composite solids. (K1MAB9O25)

SUBJECT: Math	**GRADE: 8**
Unit Title: Chapter 7 Transformations	**Time Frame: 12 Days**

UNIT OVERVIEW

In this unit, we will learn about:

- Translation of a shape on a coordinate plane
- Rotation of a shape on a coordinate plane
- Reflection of a shape on a coordinate plane
- Dilation of a shape on a coordinate plane and Scale Factor
- Writing directions for the transformation of a shape

LRG SKILLS AND DISPOSITIONS	**PA STANDARDS**
Collaboration and Teamwork: collaborative problem at the vertical whiteboards (S1B) Critical Thinking and Problem Solving: Four Movement Activity Set (S4B)	**CC.2.3.8.A.2** - Understand and apply congruence, similarity, and geometric transformations using various tools.

COMPETENCIES	**LEARNING TARGETS**
Geometry: I can describe, analyze, and apply geometric relationships to solve problems.	**Rigid Transformations (translating):** I can transform shapes by translating them on a coordinate graph. (K1MAB9I6) **Rigid Transformations (reflecting):** I can transform shapes by reflecting them on a coordinate graph. (K1MAB9I7)

	Rigid Transformations (rotation): I can transform shapes by rotating them on a coordinate graph. (K1MAB9I8) **Transformations (dilations):** I can transform shapes through dilation on a coordinate plane. (K1MAB9I9) **Transformations (algebraic expressions):** I can describe movement on a graph using coordinates and expressions. (K1MAB9I10)
Ratios and Proportional Relationships: I can recognize, represent, and utilize ratios and proportional relationships to solve problems.	**Scale Factor:** I can compare shapes and use similarity to find missing side lengths of polygons, especially triangles. (K1MAB3I3)

SUBJECT: Geometry	**GRADE: 9-12**
Unit Title: Similarity	**Time Frame: 3 Weeks**
UNIT OVERVIEW	
In this unit, we will learn about: ● Ratios and Proportions ● Problem Solving in Geometry with Proportions ● Similar Polygons ● Similar Triangles ● Using Similarity Theorems and Proving Triangles are Similar ● Proportions and Similar Triangles ● Similar Solids	
LRG SKILLS AND DISPOSITIONS	**PA STANDARDS**
	CC.2.1.HS.D CC.2.1.HS.F

	CC.2.2.HS.A CC.2.2.HS.B CC.2.3.HS.A
COMPETENCIES	**LEARNING TARGETS**
Ratios and Proportions I can recognize, represent, and utilize ratios and proportional relationships to solve problems.	● I can apply my knowledge of ratios and proportions from Algebra to similar figures and geometric mean. (K1MAB3O1) ● I can use scale factor, perimeter ratio, and area ratio to find the perimeter and area of similar polygons & the surface area and volume of similar solids. (K1MAB3O2)
Geometry I can describe, analyze, and apply geometric relationships to solve problems.	● I can use the properties of similar triangles to solve real-world problems (indirect measurement). (K1MAB9O26) ● I can distinguish between similarity properties, similarity theorems, and congruence and/or apply them. (K1MAB9O27)

SUBJECT: Geometry	**GRADE: 9-12**
Unit Title: Right Triangles and Trigonometry	**Time Frame: 3 Weeks**
UNIT OVERVIEW	
In this unit, we will learn about: ● Similar Right Triangles ● The Pythagorean Theorem ● Converse to the Pythagorean Theorem & Pythagorean Inequalities ● Special Right Triangles ● Trigonometric Ratios and Inverse Trig Ratios ● Angle of Elevation and Depression Applications ● Solving Right Triangles	

LRG SKILLS AND DISPOSITIONS	PA STANDARDS
	CC.2.1.HS.D CC.2.1.HS.F CC.2.2.HS.A CC.2.2.HS.B CC.2.3.HS.A
COMPETENCIES	**LEARNING TARGETS**
Ratios and Proportions I can recognize, represent, and utilize ratios and proportional relationships to solve problems.	• I can use properties and proportions of special right triangles (30-60-90 and 45-45-90) to solve problems with missing angles and sides. (K1MAB3O3)
Geometry I can describe, analyze, and apply geometric relationships to solve problems.	• I can use my knowledge of inequalities to use the Third Side Theorem and/or the Converse to the Pythagorean Theorem in triangles. (K1MAB9O16) • I can solve for lengths of similar right triangles using geometric means. (Heartbeat and Boomerang) (K1MAB9O28) • I can determine which trigonometric ratio can be used to solve for missing sides or angles in a right triangle and use it appropriately. (K1MAB9O29) • I can apply my knowledge of trigonometric ratios and Pythagorean theorem to solve real world problems (angle of elevation/depression). (K1MAB9O30)

SUBJECT: Geometry	**GRADE: 9-12**
Unit Title: Circles	**Time Frame: 3 Weeks**
UNIT OVERVIEW	
In this unit, we will learn about:	

- Tangents to Circles
- Arcs and Chords
- Inscribed Angles and Polygons
- Other Angle Relationships in Circles
- Segment Lengths in Circles

LRG SKILLS AND DISPOSITIONS	PA STANDARDS
	CC.2.1.HS.D CC.2.1.HS.F CC.2.2.HS.A CC.2.2.HS.B CC.2.3.HS.A
COMPETENCIES	**LEARNING TARGETS**
Geometry I can describe, analyze, and apply geometric relationships to solve problems.	• I can distinguish between circle terms and identify them in diagrams. (K1MAB9O31) • I can determine angle relationships in circles and solve for missing measures. (K1MAB9O32) • I can determine segment relationships in circles and solve for missing lengths. (K1MAB9O33)

SUBJECT: Geometry	**GRADE: 9-12**
Unit Title: Area of Polygons and Circles	**Time Frame: 2 Weeks**

UNIT OVERVIEW

In this unit, we will learn about:

- Circumference and Arc Length
- Areas of Circles and Sectors
- Angle Measures in Polygons - Interior and Exterior

- Areas of Regular Polygons
- Perimeter and Areas of Similar Figures

LRG SKILLS AND DISPOSITIONS	PA STANDARDS
	CC.2.1.HS.D CC.2.1.HS.F CC.2.2.HS.A CC.2.2.HS.B CC.2.3.HS.A
COMPETENCIES	**LEARNING TARGETS**
Geometry I can describe, analyze, and apply geometric relationships to solve problems.	• I can apply my knowledge of circumference of circles to calculate arc length. (K1MAB9O34) • I can apply my knowledge of area of circles to calculate sector area. (K1MAB9O35) • I can calculate angle measures in polygons (interior and exterior). (K1MAB9O36) • I can apply my knowledge of angle measures, Pythagorean theorem, and trigonometric functions to find the area/perimeter of regular polygons. (K1MAB9O37)