SPRING GROVE AREA SCHOOL DISTRICT

PLANNED COURSE OVERVIEW

Course Title: Geometry Concepts	**Length of Course:** 30 cycles
Grade Level(s): 10-12	**Periods Per Cycle:** 6
Units of Credit: 1	**Length of Period:** 43 minutes
Classification: Required	**Total Instructional Time:** 129 hours

Course Description

This course in geometry is designed to provide the student with the necessary background for further study of mathematics. The content is similar to that of the regular geometry course except the concept of the formal proof is deleted. Along with the basics of geometry, this course also aims to strengthen student skills on all Keystone Algebra eligible content.

Prerequisite: Successful completion of Algebra 1 and Algebra 2, or Algebra 1 Concepts and Algebra 2 Concepts

Instructional Strategies, Learning Practices, Activities, and Experiences

Anticipatory Sets	Closure	Guided Practice
Assessments	Critical Thinking	High-Level Questioning
Bell Ringers	Flexible Groups	Homework
Class Discussions	Graphic Organizers	Posted Objectives

Assessments

Assessments (Teacher-Created, College Board)	Projects	Classwork
Higher-Level Questioning		

Materials/Resources

Big Ideas Math: A Bridge to Success Geometry	Keystone Materials	SAT Materials
1st Edition Larson; 2019	Internet Resources	College Board Materials

Adopted: 9/17/03
Revised: 8/17/09; 5/21/12; 5/19/14; 10/30/18; 5/20/2019

Essentials of Geometry	
The Standards of Mathematical Practices	
Make sense of problems and persevere in solving them. **Construct viable arguments and critique the reasoning of others.** **Use appropriate tools strategically.** **Look for and make use of structure.**	**Reason abstractly and quantitatively.** **Model with mathematics.** **Attend to precision.** **Look for and express regularity in repeated reasoning.**
CONTENT/KEY CONCEPTS	**OBJECTIVES/STANDARDS**
Essentials of Geometry • Name and sketch geometric figures • Identify points, lines, and planes • Use segment postulates to identify congruent segments • Use segments and congruence • Solve for lengths of segments in the coordinate plane • Use the Pythagorean Theorem • Name and measure line segments • Use midpoint and distance formulas • Name, measure, and classify angles • Identify congruent angles • Describe angle pair relationships to find angle measures • Use angle postulates to measure and classify angles • Classify polygons • Find perimeter, circumference, and area • Find dimensions of polygons • Estimate distances between points on the coordinate plane • Problem solve and use geometry terms in the real-world	**CC.2.3.HS.A.3** - Verify and apply geometric theorems as they relate to geometric figures. **CC.2.3.HS.A.7** - Apply trigonometric ratios to solve problems involving right triangles. **CC.2.3.HS.A.8** – Apply geometric theorems to verify properties of circles. **CC.2.3.HS.A.9** - Extend the concept of similarity to determine arc lengths and areas of sectors of circles. **CC.2.3.HS.A.11** - Apply coordinate geometry to prove simple geometric theorems algebraically. **CC.2.3.HS.A.13** - Analyze relationships between two-dimensional and three-dimensional objects. **CC.2.3.HS.A.14** - Apply geometric concepts to model and solve real-world problems. **CC.2.2.HS.C.9** - Prove the Pythagorean identity and use it to calculate trigonometric ratios.

Reasoning and Proof	
CONTENT/KEY CONCEPTS	**OBJECTIVES/STANDARDS**
Reasoning and Proof • Use inductive reasoning • Describe and solve patterns • Apply deductive reasoning • Reason using properties from algebra to form logical arguments • Use postulates and diagrams that involve angle and segment measurements • Identify and prove angle pair relationships • Problem solve with real-world situations	**CC.2.3.HS.A.1** - Use geometric figures and their properties to represent transformations in the plane. **CC.2.3.HS.A.2** - Apply rigid transformations to determine and explain congruence. **CC.2.3.HS.A.3** - Verify and apply geometric theorems as they relate to geometric figures. **CC.2.3.HS.A.6** - Verify and apply theorems involving similarity as they relate to plane figures. **CC.2.3.HS.A.14** - Apply geometric concepts to model and solve real world problems.

Parallel and Perpendicular Lines	
CONTENT/KEY CONCEPTS	**OBJECTIVES/STANDARDS**
Parallel and Perpendicular Lines • Identify and solve angle pairs formed by two intersecting lines • Identify and solve angle pairs formed by three intersecting lines. • Identify and solve angle pairs formed by parallel lines and a transversal • Use angle relationships to prove lines are parallel • Solve and compare slopes of lines • Write and graph equations of lines • Write equation of lines that are parallel • Write equation of lines that are perpendicular • Find the distance between two points on the coordinate plane • Find the distance between a point and a line • Problem solve with real-world situations	**CC.2.3.HS.A.3** - Verify and apply geometric theorems as they relate to geometric figures. **CC.2.3.HS.A.11** - Apply coordinate geometry to prove simple geometric theorems algebraically. **CC.2.3.HS.A.14** - Apply geometric concepts to model and solve real-world problems.

Congruent Triangles	
CONTENT/KEY CONCEPTS	**OBJECTIVES/STANDARDS**
Congruent Triangles • Classify sides and angles of a triangle • Classify sides of a triangle on the coordinate plane • Find the perimeter of a triangle on the coordinate plane • Solve the interior angles of a triangle • Solve the exterior angles of a triangle • Solve angles of a right triangle • Learn properties of congruent triangles • Apply theorems of congruent triangles • Prove triangles congruent by side, side, side (SSS) • Prove triangles are congruent on the coordinate plane • Prove triangles congruent by side, angle, side (SAS) and Hypotenuse, leg (HL) • Prove triangles congruent by angle, side, angle (ASA) and angle, angle, side (AAS) • Solve for angle measurements using isosceles and equilateral triangles theorems • Problem solve with real-world situations	**CC.2.3.HS.A.1** - Use geometric figures and their properties to represent transformations in the plane. **CC.2.3.HS.A.3** - Verify and apply geometric theorems as they relate to geometric figures. **CC2.3.HS.A.4** - Apply the concept of congruence to create geometric constructions. **CC.2.3.HS.A.5** - Create justifications based on transformations to establish similarity of plane figures. **CC.2.3.HS.A.6** - Verify and apply theorems involving similarity as they relate to plane figures. **CC.2.3.HS.A.7** - Apply trigonometric ratios to solve problems involving right triangles. **CC.2.3.HS.A.11** - Apply coordinate geometry to prove simple geometric theorems algebraically. **CC.2.3.HS.A.13** - Analyze relationships between two-dimensional and three-dimensional objects. **CC.2.3.HS.A.14** - Apply geometric concepts to model and solve real-world problems. **CC.2.2.HS.C.9** - Prove the Pythagorean identity and use it to calculate trigonometric ratios.

Relationships Within Triangles	
CONTENT/KEY CONCEPTS	**OBJECTIVES/STANDARDS**
Relationships Within Triangles • Solve and identify perpendicular bisectors for triangles • Solve and identify angle bisectors for triangles • Find the medians and altitudes of triangles • Use properties of inequalities in a triangle to estimate side and angle measurements • Use the hinge theorem to describe the restrictions for side lengths or angle measurements • Problem solve with real-world situations	**CC.2.3.HS.A.3** - Verify and apply geometric theorems as they relate to geometric figures. **CC.2.3.HS.A.9** - Extend the concept of similarity to determine arc lengths and areas of sectors circles. **CC.2.3.HS.A.11** - Apply coordinate geometry to prove simple geometric theorems algebraically. **CC.2.3.HS.A.13** - Analyze relationships between two-dimensional and three-dimensional objects. **CC.2.3.HS.A.14** - Apply geometric concepts to model and solve real-world problems. **CC.2.2.HS.C.9** - Prove the Pythagorean identity and use it to calculate trigonometric ratios.

Surface Area and Volume of Solids	
CONTENT/KEY CONCEPTS	**OBJECTIVES/STANDARDS**
Surface Area and Volume of Solids • Find the areas of triangles and parallelograms • Solve areas of trapezoids, rhombuses, and kites • Draw three-dimensional figures • Identify and explore solids • Solve surface area of prisms and cylinders • Solve surface area of pyramids and cones • Solve volume of prisms and cylinders • Solve volume of pyramids and cones • Solve surface area and volume of spheres • Explore similar solids • Problem solve with real-world situations	**CC.2.3.HS.A.3** - Verify and apply geometric theorems as they relate to geometric figures. **CC2.3.HS.A.4** - Apply the concept of congruence to create geometric constructions. **CC.2.3.HS.A.6** - Verify and apply theorems involving similarity as they relate to plane figures. **CC.2.3.HS.A.8** - Apply Geometric theorems to verify properties of circles. **CC.2.3.HS.A.9** - Extend the concept of similarity to determine arc lengths and areas of sectors circles. **CC.2.3.HS.A.10** - Translate between the geometric description and the equation for a conic section. **CC.2.3.HS.A.12** - Explain volume formulas and use them to solve problems. **CC.2.3.HS.A.13** - Analyze relationships between two-dimensional and three-dimensional objects. **CC.2.3.HS.A.14** - Apply geometric concepts to model and solve real-world problems. **CC.2.2.HS.C.9** - Prove the Pythagorean identity and use it to calculate trigonometric ratios.

Similarity	
CONTENT/KEY CONCEPTS	**OBJECTIVES/STANDARDS**
Similarity • Simplify and write ratios • Solve problems by writing ratios into proportions • Determine the Geometric Mean • Create proportions to solve geometry problems • Use proportions to identify similar polygons • Prove triangles are similar by angle, angle (AA), SSS and SAS • Use proportions with similar triangles • Problem solve with real-world situations	**CC.2.3.HS.A.1** - Use geometric figures and their properties to represent transformations in the plane. **CC.2.3.HS.A.3** - Verify and apply geometric theorems as they relate to geometric figures. **CC2.3.HS.A.4** - Apply the concept of congruence to create geometric constructions. **CC.2.3.HS.A.5** - Create justifications based on transformations to establish similarity of plane figures. **CC.2.3.HS.A.6** - Verify and apply theorems involving similarity as they relate to plane figures. **CC.2.3.HS.A.11** - Apply coordinate geometry to prove simple geometric theorems algebraically. **CC.2.3.HS.A.13** - Analyze relationships between two-dimensional and three-dimensional objects. **CC.2.3.HS.A.14** - Apply geometric concepts to model and solve real-world problems. **CC.2.2.HS.C.9** - Prove the Pythagorean identity and use it to calculate trigonometric ratios.

Quadrilaterals	
CONTENT/KEY CONCEPTS	**OBJECTIVES/STANDARDS**
Quadrilaterals • Establish the classifications of polygons • Find the interior and exterior angle measures in polygons • Develop the properties of parallelograms • Discover the theorems for angles and sides of a parallelogram • Show by proving on the coordinate plane that a quadrilateral is a parallelogram • Discover and use properties of rhombuses, rectangles, and squares • Show by proving on the coordinate plane that a quadrilateral is a parallelogram and then prove if it is a rhombus, rectangle, or square • Discover and use properties of trapezoids and kites • Solve for isosceles trapezoids • Use and prove the mid-segment of a trapezoid • Show by proving on the coordinate plane that a quadrilateral is a trapezoid or kite • Identify Special Quadrilaterals • Use the coordinate plane to prove the specific type of quadrilateral • Problem solve with real-world situations	**CC.2.3.HS.A.1** - Use geometric figures and their properties to represent transformations in the plane. **CC.2.3.HS.A.3** - Verify and apply geometric theorems as they relate to geometric figures. **CC2.3.HS.A.4** - Apply the concept of congruence to create geometric constructions. **CC.2.3.HS.A.5** - Create justifications based on transformations to establish similarity of plane figures. **CC.2.3.HS.A.6** - Verify and apply theorems involving similarity as they relate to plane figures. **CC.2.3.HS.A.9** - Extend the concept of similarity to determine arc lengths and areas of sectors circles. **CC.2.3.HS.A.11** - Apply coordinate geometry to prove simple geometric theorems algebraically. **CC.2.3.HS.A.13** - Analyze relationships between two-dimensional and three-dimensional objects. **CC.2.3.HS.A.14** - Apply geometric concepts to model and solve real-world problems.

Properties of Circles	
CONTENT/KEY CONCEPTS	**OBJECTIVES/STANDARDS**
Properties of Circles • Solve for the circumference and area of circles • Find lengths in circles in a coordinate plane • Use Properties of Tangents to solve for angles and segments • Find arc measures • Identify arcs, congruent arcs, and congruent circles • Use congruent chords to find an arc measurement • Apply Properties of Chords • Use inscribed angles and polygons to solve for angles and arc measurements • Find the measure of an intercepted arc • Use inscribed polygons and circumscribed circles to solve for angle measurements • Apply and find angle measurements inside and outside a circle • Find segment lengths in circles • Write and graph equations of circles • Problem solve with real-world situations	**CC.2.3.HS.A.3** - Verify and apply geometric theorems as they relate to geometric figures. **CC.2.3.HS.A.8** - Apply Geometric theorems to verify properties of circles. **CC.2.3.HS.A.9** - Extend the concept of similarity to determine arc lengths and areas of sectors of circles. **CC.2.3.HS.A.13** - Analyze relationships between two-dimensional and three-dimensional objects. **CC.2.3.HS.A.14** - Apply geometric concepts to model and solve real-world problems. **CC.2.2.HS.C.9** - Prove the Pythagorean identity and use it to calculate trigonometric ratios.