Course:	High School Geometry		
Credits:	1		
Prerequisites:	Algebra		
Description:	A logical approach to the study of real objects and shapes: i.e. parallel lines, triangles, circles, solids, etc. Emphasis is placed on algebraic applications.		
Academic Standards:	Wisconsin State Standards in Mathematics (2011)		
Units:	**Unit Length:**	**Unit Standards:**	**Unit Outcomes:**
Basics of Geometry	13 days	HSG-CO.A.1, HSG-CO.D.12, HSG-GPE.B.7, HSG-MG.A.1	In this unit, students will be introduced to the basic topics of geometry. They will apply the knowledge of the basics to the midpoint, distance, area, and perimeter formulas.
Introduction to Reasoning and Proof	12 days	HSG- CO.C.9, HSG-CO.C. 10, HSG-CO.C.11, and HSG-SRT.B.4	In this unit, students will be exploring logical reasoning. They will be working on proofs in many forms including algebraic proofs, two column, and paragraph.
Parallel and Perpendicular Lines	10 days	HSG-CO.A.1, HSG-CO.C.9, HSG-CO.D.12, HSG-GPE.B. 5, HSG-GPE.B.6	Students will be exploring parallel and perpendicular lines and the relationships of angles formed by transversals. They will also be demonstrating understanding of those relationships by using proofs.

Transformations	12 days	HSG-CO.A.2, HSG-CO.A.4, HSG-CO.A.5, HSG-CO.B.6, HSG-CO.A.3, HSG-MG.A.3, HSG-SRT.A.1a, HSG-SRT. 1A.b, HSG-SRT.A.2	Students will explore the four transformations of plane figures. They will be able to discern the differences between them. They will also be able to identify composites of the transformations. Students will also be able to describe the differences between similarity and congruence as it relates to transformations.
Congruent Triangles	13 days	HSG-CO.C.10, HSG-MG.A.1, HSG-CO.B.7, HSG-C).B.8, HSG-CO.D.13, HSG-MG.A.3, HSG-SRT.B. 5	Students will work with a variety of proof formats as they investigate triangle congruence. They will see the connection between the ways of proving triangles congruent with the rigid motions learned in the previous unit.
Relationships Within Triangles	8 days	HSG-CO.C.9, HSG-MG.A.1, HSG-CO.D.12, HSG-C.A.3, HSG-MG.A.3, HSG-CO.C.10	Students will explore the special segments within a triangle including perpendicular bisectors, angle bisectors, medians, altitudes, and midsegments.
Quadrilaterals and Other Polygons	9 days	HSG-CO..C.11, HSG-SRT.B. 5, HSG-MG.A.1, HSG-MG.A. 3	In this unit, students will be introduced to quadrilaterals and other polygons. They will also be introduced to the qualities of the basic quadrilaterals.

Unit Name: **Basics of Geometry**	Length: **13 days**
Standard(s): HSG-CO.A.1, HSG-CO.D.12, HSG-GPE.B.7, HSG-MG.A.1	**Outcomes:** In this unit, students will be introduced to the basic topics of geometry. They will apply the knowledge of the basics to the midpoint, distance, area, and perimeter formulas.
Essential Questions: How can you find the midpoint and distance between two points in the plane? How can one construct and measure a line segment? An angle? How are a point, line, and plane named? What is the difference between a defined and undefined term? What does it mean for an angle to be a part of a linear pair? A complementary pair? A supplementary pair?	**Learning Targets:** The students will use vocabulary to identify and correctly name the basics of geometry. Students will apply the distance and midterm formulas to find perimeter and area of plane figures. Students will construct, measure, and identify angles. Students will synthesize their knowledge of angles and the pairs they form.
Topic 1: **Points, lines, segments, planes, and their properties**	Length: **4 days**
Standard(s): HSG-CO.A.1, HSG-CO.D.12	**Academic Vocabulary:** undefined terms, point, line, plane, collinear points, coplanar points, defined terms, line segment, endpoints, ray, opposite rays, intersection, postulate, axiom, coordinate, distance, construction, congruent segment, between
Lesson Frame:	We will explore the basics of geometry.
	I will name points, lines, and planes.
Lesson Frame:	We will explore constructions of segments and angles.
	I will construct segments and apply the segment addition postulate.
Lesson Frame:	We will explore the idea of betweenness.
	I will demonstrate the concept of betweenness with points, segments, and angles.
Performance Tasks: Using geometry software, students will construct, name, and manipulate segments, rays, angles, and other basic geometric shapes.	Notes:
Topic 2: **The Midpoint and Distance formula and its application to area and perimeter of figures in the plane**	Length: **4 days**
Standards: HSG-CO.D.12, HSG-GPE.B.7, HSG-MG.A.1	**Academic Vocabulary:** midpoint and segment bisector
Lesson Frame:	We will explore the midpoint formula.
	I will find the midpoint of a segment as well as other applications of the midpoint formula.
Lesson Frame:	We will explore the distance formula.

	I will find the distance between any two points on the coordinate plane.
Lesson Frame:	We will explore the origins of the distance formula.
	I will be able to describe the connections between the distance formula and the Pythagorean Theorem.
Performance Tasks: Students will use Geometry software as well as paper and pencil to explore the distance and midpoint formula.	Notes:
Topic 3: **Exploring Angles and special pairs of angles**	Length: **3 days**
Standard(s): HSG-CO.A.1, HSG-CO.D.12	**Academic Vocabulary:** angle, vertex, sides of an angle, interior of an angle, exterior of an angle, measure of an angle, acute angle, right angle, obtuse angle, straight angle, congruent angles, angle bisector, complementary angles, supplementary angles, adjacent angles, linear pair, and vertical angles.
Lesson Frame:	We will explore construction of angles and their pairs.
	I will construct and angle and be able to accurately measure it.
Lesson Frame:	We will discuss the angle bisector theorem and its application.
	I will be able to bisect a given angle and find the measures of angles even if they are bisected.
Lesson Frame:	We will explore the differences between complementary and supplementary angles.
	I will find the complements and supplements of given angles.
Performance Tasks: Students will be asked to construct an angle as well as a linear pair containing an angle. They will also be asked to construct the angle bisector of a given angle.	Notes:

Unit Name: **Introduction to Reasoning and Proof**	Length: **12 days**
Standards: HSG- CO.C.9, HSG-CO.C.10, HSG-CO.C.11, HSG-SRT.B.4	**Outcomes:** In this unit, students will be exploring logical reasoning. They will be working on proofs in many forms including algebraic proofs, two column, and paragraph.
Essential Questions: When is a conditional statement true or false? How can reasoning be used to solve problems? What is the difference between deductive and inductive reasoning? What can be assumed from a geometric diagram? How can algebraic properties be applied to solving a problems? How can a proof be constructed?	**Learning Targets:** Students will be able to write conditional and biconditional statements. Students will be able to use inductive and deductive reasoning. Students will be able to accurately sketch diagrams of geometric situations. Students will be able to use the properties of equality to justify the steps in an algebraic proof. Students will be able to construct their own proofs with little prompting.
Topic 1: **Conditional Statements, Inductive and Deductive Reasoning**	Length: **4 days**
Standard(s): HSG-CO.C.9, HSG-CO.C.10, HSG-CO.C.11, HSG-SRT.B.4	**Academic Vocabulary:** conditional statement, if-then form, hypothesis, conclusion, negation, converse, inverse, contrapositive, equivalent statements, perpendicular lines, biconditional statement, truth value, truth table, conjecture, inductive reasoning, counterexample, deductive reasoning
Lesson Frame:	We will write conditional statements and assess their truth values.
	I will be able to assess the truth value of various conditional statements.
Lesson Frame:	We will explore deductive and inductive reasoning and their applications.
	I will be able to discern the differences between deductive and inductive reasoning as well as their best applications.
Performance Tasks: Students will be able to construct a group of conditional statements and determine the truth values for each. Students will also be able to apply deductive and inductive reasoning to real world situations and determine which approach would work best.	Notes:
Topic 2: **Postulates and Diagrams**	Length: **2 days**
Standard(s): HSG-CO.C.9, HSG-CO.C.10, HSG-CO.C.11, HSG-SRT.B.4	**Academic Vocabulary:** postulate, point, line, plane, and perpendicular
Lesson Frame:	We will be exploring postulates and the diagrams that demonstrate them.
	I will be able to identify a postulate using a diagram.
Lesson Frame:	We will practice sketching diagrams from descriptions.
	I will be able to sketch a diagram using a postulate description.

Performance Tasks: Students will be able to critically read a description of a postulate and/or a geometric situation and sketch it accurately.	Notes:
Topic 3: **Algebraic Reasoning**	Length: **2 days**
Standard(s): HSG-CO.C.9, HSG-CO.C.10, HSG-CO.C.11, HSG-SRT.B.4	**Academic Vocabulary:** equation, solving an equation, formula
Lesson Frame:	We will review algebraic properties of equality and apply them to proofs.
	I will use algebraic properties to prove each step in an algebraic proof.
Performance Tasks: Students will use algebraic properties to successfully prove algebraic equations are true.	Notes:
Topic 4: **Proving Geometric Relationships and Statements about Segments and Angles**	Length: **4 days**
Standard(s): HSG-CO.C.9	**Academic Vocabulary:** proof, two-column proof, flow-chart proof, paragraph proof, theorem
Lesson Frame:	We will explore writing proofs.
	I will be able to write two-column proofs to prove geometric relationships.
Lesson Frame:	We will explore writing different kinds of proofs.
	I will be able to write a paragraph proof to prove geometric relationships.
Performance Tasks: Students will be able to write well constructed and reasoned proofs of geometric relationships.	Notes:

Unit Name: **Parallel and Perpendicular Lines**	Length: **10 days**
Standards: HSG-CO.A.1, HSG-CO.C.9, HSG-CO.D.12, HSG-GPE.B.5, HSG-GPE.B.6	**Outcomes:** Students will be exploring parallel and perpendicular lines and the relationships of angles formed by transversals. They will also be demonstrating understanding of those relationships by using proofs.
Essential Questions: What are parallel and perpendicular lines? How are they related to each other? What are the properties of lines that are parallel and perpendicular? What does it mean to find the distance between a point and a line?	**Learning Targets:** Students will be able to identify lines, planes, parallel, perpendicular lines, and pairs of angles formed by transversals. Students will also successfully prove lines parallel and perpendicular. Students will be able to write equations of parallel and perpendicular lines. Students will also be able to find the distance between a line and a point.
Topic 1: **Pairs of parallel lines and the angles formed**	Length: **4 days**
Standard(s): HSG-CO.A.1, HSG-CO.C.9, HSG-CO.D.12	**Academic Vocabulary:** parallel lines, skew lines, parallel planes, transversal, corresponding angles, alternate interior angles, alternate exterior angles, consecutive angles
Lesson Frame:	We will explore pairs of lines and the angles formed by transversals.
	I will be able to identify the pairs of lines formed by a transversal.
Lesson Frame:	We will explore parallel, perpendicular, and skew lines.
	I will be able to discern the differences between parallel, perpendicular, and skew lines by examining a diagram.
Lesson Frame:	We will examine properties of parallel lines.
	I will be able to apply the properties of parallel lines.
Performance Tasks: Students will be able to successfully identify parallel, perpendicular, and skew lines. They will also be able to apply the properties of parallel lines to the angles formed by a transversal.	Notes:
Topic 2: **Proving lines parallel and perpendicular**	Length: **3 days**
Standard(s): HSG-CO.C.9, HSG-CO.D.12	**Academic Vocabulary:** converse, perpendicular bisector
Lesson Frame:	We will explore theorems about parallel lines.
	I will be able to prove theorems about parallel lines.

Lesson Frame:	We will explore theorems about perpendicular lines.
	I will be able to prove theorems about perpendicular lines.
Performance Tasks: Students will be able to prove lines parallel or perpendicular. Students will be able to apply the previously examined properties and how they apply to parallel and perpendicular lines.	Notes:
Topic 3: **Equations of parallel and perpendicular lines**	Length: **3 days**
Standard(s): HSG-GPE.B.5, HSG-GPE.B.6	**Academic Vocabulary:** slope
Lesson Frame:	We will explore the slopes of parallel and perpendicular lines.
	I will be able to successfully make a conjecture about the relationship between two or more lines based solely on their slopes and y- intercepts.
Lesson Frame:	We will examine the best way to find the distance between a line and a point.
	I will be able to successfully find the distance between a point and a line.
Lesson Frame:	We will practice finding the equations of parallel and perpendicular lines.
	I will be able to find the equations of parallel and perpendicular lines given different conditions.
Performance Tasks: Students will be able to find the equations of parallel and perpendicular lines given different conditions. Students will be able to successfully identify parallel and perpendicular lines based on limited information. Students will also be able to find the distance between a point and a line.	Notes:

Unit Name: **Transformations**	Length: **12 days**
Standards: HSG-CO.A.2, HSG-CO.A.4, HSG-CO.A.5, HSG-CO.B.6, HSG-CO.A.3, HSG-MG.A.3, HSG-SRT.A.1a, HSG-SRT.1A. b, HSG-SRT.A.2	**Outcomes:** Students will explore the four transformations of plane figures. They will be able to discern the differences between them. They will also be able to identify composites of the transformations. Students will also be able to describe the differences between similarity and congruence as it relates to transformations.
Essential Questions: What are the four rigid transformations and how can they be represented both in a geometric diagram and algebraically? How are similar figures related to dilations? What is the difference between a congruent and a similar transformation?	**Learning Targets:** Students will be able to perform each of the four transformations: translation, rotation, reflection, and dilation. Students will also be able to perform compositions of each of the transformations. They will also be able to discuss the differences between congruence and similarity and the transformations that are used to create congruence and similarity.
Topic 1: **Translations**	Length: **2 days**
Standard(s): HSG-CO.A.2, HSG-CO.A.4, HSG-CO.A.5, HSG-CO.B.6	**Academic Vocabulary:** vector, initial point, terminal point, horizontal component, vertical component, component form, transformation, image, preimage, translation, rigid motion, composition of transformations
Lesson Frame:	We will explore translations.
	I will be able to perform a translation of a figure using vector form.
Lesson Frame:	We will explore translations.
	I will be able to perform a translation using a translation rule.
Performance Tasks: Students will be able to perform translations using different methods.	Notes:
Topic 2: **Reflections**	Length: **2 days**
Standard (s): HSG-CO.A.2, HSG-CO.A.3, HSG-CO.A.4, HSG-CO.A.5, HSG-CO.B.6, HSG-MG.A.3	**Academic Vocabulary:** reflection, line of reflection, glide reflection, line symmetry, line of symmetry
Lesson Frame:	We will explore reflections.
	I will be able to perform reflections.
Lesson Frame:	We will explore reflections.

	I will be able to identify line symmetry and the lines of symmetry in relation to reflections.
Performance Tasks: Students will successfully perform reflections and be able to identify lines of symmetry and glide reflections.	Notes:
Topic 3: **Rotations**	Length: **2 days**
Standard(s): HSG-CO.A.2, HSG-CO.A.3, HSG-CO.A.4, HSG-CO.A.5, HSG-CO.B.6	**Academic Vocabulary:** rotation, center of rotation, angle of rotation, rotational symmetry, center of symmetry
Lesson Frame:	We will explore rotations.
	I will perform rotations using both the algebraic rules and other methods.
Lesson Frame:	We will explore rotational symmetry.
	I will be able to describe the rotational symmetry of a figure including its angle and center of rotation.
Performance Tasks: Students will be able to perform rotations of plane figures by any method of their choosing. They will also be able to describe the rotational symmetry of different figures.	Notes:
Topic 4: **Congruent figures**	Length: **2 days**
Standard(s): HSG-CO.A.5, HSG-CO.B.6	**Academic Vocabulary:** congruent figures, congruence transformations
Lesson Frame:	We will explore congruent figures.
	I will be able to identify congruent figures.
Lesson Frame:	We will explore congruence transformations.
	I will be able to describe the congruence transformations that map one congruent figure onto another.
Performance Tasks: Students will be able to identify and describe the congruence transformations that map one figure onto another.	Notes:
Topic 5: **Dilations**	Length: **2 days**

Standard(s): HSG-CO.A.2, HSG-SRT.A.1a, HSG-SRT.A.1b	**Academic Vocabulary:** dilations, center of dilation, scale factor, enlargement, reduction
Lesson Frame:	We will perform dilations.
	I will be able to perform dilations of figures in the coordinate plane.
Lesson Frame:	We will explore scale factor.
	I will be able to find the scale factor of a dilation and be able to describe it based on that scale factor.
Performance Tasks: Students will be able to perform dilations in the coordinate plane, find the scale factors of such dilations, and describe them as either enlargements or reductions based on the scale factors.	Notes:
Topic 6: **Similarity and Transformations**	Length: **2 days**
Standard(s): HSG-CO.A.5, HSG-SRT.A.2	**Academic Vocabulary:** similarity transformation, similar figures
Lesson Frame:	We will explore similar figures.
	I will be able to identify the transformations performed to map one figure onto a similar figure.
Performance Tasks: Students will be able to identify the similarity transformation (s) performed to map one similar figure to another.	Notes:

Unit Name: **Congruent Triangles**	Length: **13 days**
Standard(s): HSG-CO.C.10, HSG-MG.A.1, HSG-CO.B.7, HSG-C).B.8, HSG-CO.D.13, HSG-MG.A.3, HSG-SRT.B. 5	**Outcomes:** Students will work with a variety of proof formats as they investigate triangle congruence. They will see the connection between the ways of proving triangles congruent with the rigid motions learned in the previous unit.
Essential Questions: How are the angles in a triangle related? How can rigid motions be used to map one triangle onto another congruent one? How can you use two sides and the included angle to prove two triangles congruent? What conjectures can be made about the side lengths and angles of equilateral and isosceles triangles? How can two triangles with the same side lengths be proven congruent? What information is sufficient to prove two triangles are congruent? How can congruent triangles be used to solve real-world problems?	**Learning Targets:** Students will classify triangles, find the interior and exterior angles of triangles, prove triangles and other polygons congruent using different methods, explore equilateral and isosceles triangles, and also explore applications of congruent triangles.
Topic 1: **Angles of triangles and polygons**	Length: **3 days**
Standard(s): HSG-CO.B.7, HSG-CO.C.10, HSG-MG.A.1	**Academic Vocabulary:** interior angles, exterior angles, corollary to a theorem, corresponding parts
Lesson Frame:	We will classify triangles by sides and angles.
	I will be able to describe the differences between the different types of triangles and their side lengths and angles.
Lesson Frame:	We will explore the interior and exterior angles of triangles.
	I will be able to find the exterior and interior angles of triangles.
Lesson Frame:	We will apply the concept of corresponding parts.
	I will be able to find the missing parts of polygons using properties of corresponding parts.
Performance Tasks: Students will be asked to find the missing parts of triangles and other congruent polygons. They will also be asked to classify different triangles by angles and side lengths.	Notes:
Topic 2: **Proving triangles congruent using SAS**	Length: **2 days**

Standard(s): HSG-CO.B.8, HSG-MG.A.1	**Academic Vocabulary:** congruent figures, rigid motion
Lesson Frame:	We will use the Side-Angle-Side Theorem.
	I will prove two triangles congruent using the Side-Angle-Side Theorem.
Lesson Frame:	We will explore applications of the S-A-S Theorem.
	I will be able to solve application problems using the S-A-S Theorem.
Performance Tasks: Students will apply knowledge of two column proofs to prove two triangles congruent using the Side-Angle-Side Theorem.	Notes:
Topic 3: **Isosceles and Equilateral Triangles**	Length: **2 days**
Standard(s): HSG-CO.C.10, HSG-CO.D.13, HSG-MG.A.1	**Academic Vocabulary:** leg, vertex angle, base, base angles
Lesson Frame:	We will explore equilateral and isosceles triangles.
	I will be able to apply the base angles theorem to find missing parts of triangles.
Lesson Frame:	We will apply knowledge of equilateral and isosceles triangles.
	I will be able to find missing parts of triangles using the theorems related to equilateral and isosceles triangles.
Performance Tasks: Students will use prior knowledge of triangles and their angle measures and apply that to the special types of triangles known as isosceles and equilateral. They will also recognize these special triangles in the world around them.	Notes:
Topic 4: **Proving Triangles Congruent using SSS, ASA, and AAS**	Length: **4 days**
Standard(s): HSG-CO.B.8, HSG-MG.A.1, HSG-MG.A.3	**Academic Vocabulary:** legs, hypotenuse
Lesson Frame:	We will prove triangles congruent using SSS.
	I will be able to prove two triangles congruent using SSS.
Lesson Frame:	We will explore HL congruence.
	I will be able to prove two right triangles congruent using HL theorem.

Lesson Frame:	We will explore ASA Theorem.
	I will be able to prove triangles congruent using ASA.
Lesson Frame:	We will explore AAS Theorem.
	I will be able to prove triangles congruent using AAS.
Performance Tasks: Students will be presented with two triangles and must decide the best method to use to prove them congruent. They will also have to list the information that must be included to successfully prove the triangles congruent.	Notes:
Topic 5: **Applying Knowledge about Congruent Triangles**	Length: **2 days**
Standard(s): HSG-SRT.B.5	**Academic Vocabulary:** congruent figures
Lesson Frame:	We will use congruent triangles to solve problems.
	I will be able to solve a variety of problems using congruent triangles.
Performance Tasks: Students will use prior knowledge and experience to demonstrate a clear understanding of the applications of congruent triangles to practical problems.	Notes:

Unit Name: **Relationships Within Triangles**	Length: **8 days**
Standards: HSG-CO.C.9, HSG-MG.A.1, HSG-CO.D.12, HSG-C.A.3, HSG-MG.A.3, HSG-CO.C.10	**Outcomes:** Students will explore the special segments within a triangle including perpendicular bisectors, angle bisectors, medians, altitudes, and midsegments.
Essential Questions: What are the special segments in triangles? How does one find the incenter, centroid, and circumcenter of a triangle? What special characteristics do medians and altitudes have? How is the midsegment theorem apply to triangles in the coordinate plane? How can students use indirect proofs?	**Learning Targets:** Students will be introduced the different segments within a triangle and be able to apply theorems about those segments to solving problems. They will also be able to find the circumcenter, centroid, and the incenter of a triangle. They will also apply previous knowledge to the indirect proof method both in one triangle and between two triangles.
Topic 1: **Special Segments in Triangles**	Length: **4 days**
Standards: HSG-CO.C.9, HSG-MG.A.1, HSG-CO.D.12, HSG-C.A.3, HSG-MG.A.3, HSG-CO.C.10	**Academic Vocabulary:** equidistant, concurrent, point of concurrency, circumcenter, incenter, median, centroid, altitude, orthocenter
Lesson Frame:	We will explore the circumcenter and incenter of triangles.
	I will be able to apply my knowledge of perpendicular bisectors to find the circumcenter of a triangle and apply my knowledge of angle bisectors to find the incenter of a triangle.
Lesson Frame:	We will find the angle bisectors and perpendicular bisectors of a triangle.
	I will use my geometric tools to find the angle bisectors and perpendicular bisectors of a triangle.
Lesson Frame:	We willexplore the medians and altitudes of triangles.
	I will use my geometric tools to find the medians and altitudes of triangles..
Lesson Frame:	We will discuss the characteristics of the incenter and the centroid of triangles.
	I will use my geometric tools to find the incenter and centroid of triangles.
Performance Tasks: Students will use geometric software and other tools to find the medians, perpendicular bisectors, and altitudes of triangles. They will also use the locations of those segments to find the incenter, orthocenter, centroid, and circumcenter of the triangles.	Notes:

Topic 2: **Triangle Midsegment Theorem**	Length: **2 days**
Standard(s): HSG-Co.C.10, HSG-MG.A.1	**Academic Vocabulary:** midsegment of a triangle
Lesson Frame:	We will use the midsegments of a triangle in the coordinate plane.
	I will use algebraic skills to solve problems involving the midsegments of triangles.
Lesson Frame:	We will use the midsegment theorem to find distances.
	I will use algebraic skills and the midsegment theorem to solve practical problems.
Performance Tasks: Students will be able to use algebra and geometry software to solve problems involving midsegments of triangles. They will also apply their skills to practical problems.	Notes:

Topic 3: **Indirect Proofs**	Length: **2 days**
Standard(s): HSG-CO.C.10	**Academic Vocabulary:** indirect proof
Lesson Frame:	We will use indirect proofs to find lengths of sides in a triangle.
	I will apply knowledge of the Triangle Inequality Theorem to find possible lengths in a triangle.
Lesson Frame:	We will solve practical problems using the Hinge Theorem.
	I will apply my knowledge of the Hinge Theorem and indirect proofs to solve practical problems.
Performance Tasks: Students will be able to apply the methods used in indirect proofs to find the lengths of sides in triangles. They may use geometry software and geometric tools to support their proofs.	Notes:

Unit Name: **Quadrilaterals and Other Polygons**	Length: **9 days**
Standards: HSG-CO..C.11, HSG-SRT.B.5, HSG-MG.A.1, HSG-MG.A.3	**Outcomes:** In this unit, students will be introduced to quadrilaterals and other polygons. They will also be introduced to the qualities of the basic quadrilaterals.
Essential Questions: What makes a quadrilateral a parallelogram? What are the qualities of a special parallelogram? What differences are there between the different types of quadrilaterals? In what ways can one prove that a quadrilateral is a parallelogram? What are the properties of kites and trapezoids?	**Learning Targets:** Students will be able to find and use the interior and exterior angle measures of polygons. Students will be able to use properties of parallelograms and special parallelograms. Students will also be able to prove a quadrilateral is a parallelogram. They will also identify and use the properties of trapezoids and kites.
Topic 1: **Angles of Polygons**	Length: **1 day**
Standard(s): HSG-CO.C.11	**Academic Vocabulary:** diagonal, equilateral polygon, equiangular polygon, regular polygon
Lesson Frame:	We will use the interior and exterior angles of polygons.
	I will be able to find the interior and exterior angles of polygons using the polygon interior and exterior angles theorems.
Performance Tasks: Students will use their prior knowledge and their use of the Theorems to find exterior/interior angles as well as the sides of polygons.	Notes:
Topic 2: **Parallelograms**	Length: **4 days**
Standard(s): HSG-CO.C.11, HSG-SRT.B.5, HSG-MG.A.1	**Academic Vocabulary:** parallelogram
Lesson Frame:	We will explore the properties of parallelograms.
	I will determine if a quadrilateral is a parallelogram and find the side lengths of a parallelogram.
Lesson Frame:	We will explore parallelograms in the coordinate plane.
	I will use slopes and other properties to find the coordinates of a parallelogram.
Lesson Frame:	We will use properties of parallelograms to prove a quadrilateral is a parallelogram.
	I will be able to prove that a quadrilateral is a parallelogram.

Performance Tasks: Students will be able to apply the laws of logic introduced earlier and prove quadrilaterals are parallelograms. Students will use geometry software to graph parallelograms in the coordinate plane.	Notes:
Topic 3: **Special Parallelograms and Quadrilaterals**	Length: **4 days**
Standard(s): HSG-CO.C.11, HSG-SRT.B.5, HSG-MG.A.1, HSG-MG.A.3	**Academic Vocabulary:** rhombus, rectangle, square, trapezoid, kite, bases, base angles, legs, isosceles trapezoid, midsegment of a trapezoid
Lesson Frame:	We will use properties of special quadrilaterals.
	I will determine which special quadrilateral is presented based on the properties of each.
Lesson Frame:	We will apply the properties of diagonals of special quadrilaterals.
	I will be able to use diagonals to determine what quadrilateral is presented.
Lesson Frame:	We will explore the properties of kites and trapezoids.
	I will be able to determine whether a quadrilateral is a trapezoid or a kite.
Performance Tasks: Students will use geometric software to draw and explore the properties of quadrilaterals. They will be able to discern the similarities and differences between quadrilaterals and apply logical processes to prove which quadrilateral is presented.	Notes:

Unit Name: **Similarity**	Length: **7 days**
Standards: HSG-SRT.A.2, HSG-MG.A.3, HSG-SRT.A.3, HSG-SRT.B.4, HSG-SRT.B.5, HSG-GEP.B.5, HSG-MG.A.1, HSG-GPE.B.6	**Outcomes:** This unit explores similarity in polygons and especially triangles. There is also applications of the properties of triangle proportionality.
Essential Questions: How are similar polygons related? How can triangles be proven similar? How can polygons be proven similar? How can the proportionality theorem be used to prove lines parallel? What proportionality theorems exist in a triangle intersected by an angle bisector or by a line parallel to one side of the triangle?	**Learning Targets:** Students will be able to apply the AA, SSS, and SAS Similarity Theorems to prove that triangles are similar. They will also be able to determine if two polygons are similar. They will also use similarity criteria to solve problems involving lengths, perimeter, and area.
Topic 1: **Similar Polygons**	Length: **2 days**
Standard(s): HSG-SRT.A.2, HSG-MG.A.3	**Academic Vocabulary:** similar figures, similarity transformation, corresponding parts
Lesson Frame:	We will explore similar figures.
	I will be able to find the corresponding parts of similar polygons including side lengths, perimeters, and areas.
Lesson Frame:	We will explore similar figures.
	I will be able to write effective similarity statements.
Performance Tasks: Students will use geometric software to draw similar polygons.	Notes:
Topic 2: **Proving Triangles Similar**	Length: **3 days**
Standard(s): HSG-SRT.A.3, HSG-SRT.B.5, HSG-SRT.B4, HSG-GPE.B.5, HSG-MG.A.1	**Academic Vocabulary:**
Lesson Frame:	We will use the Angle Angle Similarity Theorem.
	I will be able to prove two triangles similar using the A-A Theorem.
Lesson Frame:	We will use SSS and SAS Similarity Theorem.
	I will be able to prove two triangles similar using either the SSS or SAS Theorem.
Lesson Frame:	We will apply similarity theorems to practical problems.

	I will be able to apply similarity to real-world problems.
Performance Tasks: Students will use prior knowledge of logic rules to prove triangles similar, will also recognize similar triangles in practical situations.	Notes:
Topic 3 : **Proportionality Theorems**	Length: **2 days**
Standard(s): HSG-SRT.B.4, HSG-SRT.B.5, HSG-GPE.B.6	**Academic Vocabulary:** triangle proportionality theorems
Lesson Frame:	We will explore triangle proportionality theorems.
	I will be able to find the proportion of the sides of a triangle that has a line parallel to one side.
Lesson Frame:	We will explore the triangle angle bisector theorem.
	I will be able to find the side lengths based on the triangle angle bisector theorem.
Lesson Frame:	We will:
	I will:
Performance Tasks: Students will use software programs to draw angle bisectors and lines parallel in a triangle in order to explore the proportionality theorems.	Notes:

Unit Name: **Right Triangles and Trigonometry**	Length: **12 days**
Standards: HSG-SRT.B.4, HSG-SRT.C.8, HSG-MG.A.1, HSG-SRT.B.5, HSG-SRT.C.6, HSG-SRT.C.8, HSG-MG.A.3, HSG-SRT.D.9, HSG-SRT.D.10, HSG-SRT.D.11	**Outcomes:** In this unit, students will be able to solve problems using right triangle trigonometry, special right triangles, inverse relationships, and the Pythagorean Theorem.
Essential Questions: What is the Pythagorean Theorem? What are the relationships of the side lengths of special right triangles? What is the geometric mean of a right triangle? What are the basic trigonometric ratios and how are they related to one another? How can you use the trigonometric ratios to solve right triangles? How can the laws of sines and cosines be used to solve right triangles?	**Learning Targets:** Students will use their knowledge of triangles and the Pythagorean Theorem to solve problems. They will also be able to apply right triangle trigonometry and the laws of sines and cosines to solve right triangles.
Topic 1: **Pythagorean Theorem and its Converse**	Length: **2 days**
Standard(s): HSG-SRT.B.4, HSG-SRT.C.8	**Academic Vocabulary:** Pythagorean Theorem, Pythagorean Triple
Lesson Frame:	We will explore the Pythagorean Theorem and its converse.
	I will show that a triangle is a right triangle based on the Pythagorean Theorem and its converse.
Lesson Frame:	We will use Pythagorean triples.
	I will find missing parts of triangles using Pythagorean triples.
Performance Tasks: Students will be able to find the lengths of the sides of right triangles. Students will also be able to classify triangles based on the side lengths.	Notes:
Topic 2: **Special and Similar Right Triangles**	Length: **3 days**
Standard(s): HSG-SRT.C.8, HSG-MG.A.1, HSG-SRT.B.5	**Academic Vocabulary:** isosceles triangle, geometric mean
Lesson Frame:	We will explore special right triangles.
	I will be able to find side lengths of right triangles based on the special right triangles' relationships.

Lesson Frame:	We will explore similar right triangles.
	I will be able to use geometric means to find missing side lengths in right triangles.
Lesson Frame:	We will explore special and similar right triangles.
	I will use special right triangles and geometric means to solve practical problems.
Performance Tasks: Students will be able to find missing side lengths of similar and special right triangles. They will use geometric software to draw triangles and solve practical problems.	Notes:
Topic 3: **Tangent, Sine, and Cosine Ratios**	Length: **3 days**
Standard(s): HSG-SRt-C.6, HSG-SRT-C.8, HSG-SRT.C.7	**Academic Vocabulary:** trigonometric ratio, tangent, angle of elevation, sine, cosine, angle of depression
Lesson Frame:	We will explore the trigonometric ratios
	I will be able to solve problems using the tangent ratio.
Lesson Frame:	We will explore the trigonometric ratios.
	I will be able to solve problems using the sine and cosine ratio.
Lesson Frame:	We will apply knowledge to real-life problems.
	I will be able to solve real-life problems using the sine, cosine, and tangent ratios.
Performance Tasks: Students will be able to solve problems using knowledge of sine, cosine, and tangent ratios,	Notes:
Topic 4: **Solving Right Triangles**	Length: **2 days**
Standard(s): HSG-SRT.C.8, HSG-MG.A.1, HSG-MG.A.3	**Academic Vocabulary:** inverse tangent, inverse sine, inverse cosine, solve a right triangle
Lesson Frame:	We will explore solving right triangles.
	I will find all the missing parts of right triangles given limited information.
Performance Tasks: Students, given limited information, will be able to solve right triangles. They will also be able to use.	Notes:
Topic 5: **Law of Sines and Cosines**	Length: **2 days**

Standard(s): HSG-SRT.D.9, HSG-SRT.D.10, HSG-SRT.D.11, HSG-MA.A.3	**Academic Vocabulary:** law of sines, law of cosines
Lesson Frame:	We will apply the law of sines and law of cosines.
	I will be able to solve many different types of problems using the law of sines and law of cosines.
Lesson Frame:	We will use constructions to draw conclusions about the law of sines and cosines.
	I will be able to see the patterns related to the law of sines and law of cosines.
Performance Tasks: Students will be able to problem solve using the law of sines and the law of cosines including real life application problems.	Notes:

Unit Name: **Circles**	Length: **11 days**
Standards: HSG-CO.A.1, HSG-C.A.2, HSG-C.A.4, HSG-C.A.1, HSG-MG.A.3, HSG-CO.D.13, HSG-C.A.3, HSG-MG.A.1, HSG-GPE.A.1, HSG-GPE.B.4	**Outcomes:** This unit is all about circles. Students will spend some time working on vocabulary and the symbols used in communicating about circles. Students will investigate the relationships between the angles and segments in circles. They will also be investigating the equations of circles in the coordinate plane.
Essential Questions: What are the definitions of the lines and segments that intersect a circle? How are central angles measured? What are two ways to determine if a chord is a diameter of a circle? How are inscribed angles related to the intercepted arcs? What are the relationships between the angles formed in a circle and the intercepted arcs? What are the relationships are formed by the segments on intersecting chords in a circle? What is the equation of a circle in the coordinate plane?	**Learning Targets:** Students will be able to use the correct mathematical vocabulary to describe the parts of circles. They will also be able to find the measures of arcs and the angles they subtend based on the central angles. Students will also be able to find the missing parts of segments formed by chords, secants, and tangents. They will also be able to accurately use the equation of a circle in the coordinate plane.
Topic 1: **Lines and Segments that Intersect Circles**	Length: **2 days**
Standard(s): HSG-CO.A.1, HSG-C.A.2, HSG-C.A.4	**Academic Vocabulary:** circle, center, radius, chord, diameter, secant, tangent, point of tangency, tangent circles, concentric circles, common tangent
Lesson Frame:	We will identify the segments in a circle.
	I will be able to identify the special segments in a circle.
Lesson Frame:	We will explore the properties of tangents of circles.
	I will be able to find missing parts using the properties of tangents.
Performance Tasks: Using geometry software, students will be able to draw circles, tangents, secants, and parts of the circles.	Notes:
Topic 2: **Finding Arc Measures**	Length: **1 day**
Standard(s): HSG-C.A.1, HSG-C.A.2	**Academic Vocabulary:** central angle, minor arc, major arc, semicircle, measure of a minor arc, measure of a major arc, adjacent arcs, congruent circles, congruent arcs, similar arcs
Lesson Frame:	We will explore arc measures in circles.

	I will be able to find the measures of arcs in a circle as well as identifying the type of arc formed.
Performance Tasks: Students will use graphing software to draw circles and arcs. They will also be able to successfully find the measures of different parts of the arcs and the angles formed.	Notes:
Topic 3: **Using Chords**	Length: **2 days**
Standard(s): HSG-C.A.2, HSG-MG.A.3	**Academic Vocabulary:** chord, arc, diameter
Lesson Frame:	We will explore the theorems about chords in a circle.
	I will apply the theorems about chords in a circle to find the missing parts of the chords or circles.
Performance Tasks: When examining circles, students will be able to find the missing parts of chords, arcs, and circles applying the theorems about chords in a circle.	Notes:
Topic 4: **Inscribed Angles, Polygons, and Angle Relationships in Circles**	Length: **3 days**
Standard(s): HSG-CO.D.13, HSG-C.A.2, HSG-C.A.3	**Academic Vocabulary:** inscribed angle, intercepted arc, subtend, inscribed polygon, circumscribed circle, circumscribed angle
Lesson Frame:	We will explore inscribed angles.
	I will be able to find the measures of inscribed angles.
Lesson Frame:	We will explore inscribed polygons.
	I will be able to find the missing angles of inscribed polygons.
Lesson Frame:	We will find angles and arc measures of circumscribed angles.
	I will be able to find the measures of circumscribed angles.

Performance Tasks: Given a circle and either an inscribed angle, polygon, or and circumscribed angle, students will find the missing parts. They will have to apply their previous knowledge of basic parts of circles, and also the theorems related to angles and arcs.	Notes:
Topic 5: **Segment Relationships in Circles**	Length: **1 day**
Standard(s): HSG-C.A.2, HSG-MG.A.1	**Academic Vocabulary:** segments of a chord, tangent segment, secant segment, external segment
Lesson Frame:	We will explore the relationships between the lengths of segments.
	I will find the missing measurements by applying the relationships between the secant and tangent segments of a circle.
Performance Tasks: Students will use geometric software to examine the different lengths that are possible when looking at secant and tangent segments.	Notes:
Topic 6: **Circles in the Coordinate Plane**	Length: **2 days**
Standard(s): HSG-GPE.A.1, HSG-GPE.A.4	**Academic Vocabulary:** standard equation of a circle
Lesson Frame:	We will explore the standard equation of a circle.
	I will be able to find the equation of a circle given limited information.
Lesson Frame:	We will solve problems involving circles.
	I will be able to solve real world problems involving the equations of circles.
Performance Tasks: Students will use geometric software to draw circles in the coordinate plane and be able to discern what the center and radius of the circles are.	Notes:

Unit Name: **Circumference, Area, and Volume**	Length: **11 days**
Standards: HSG-GMD.A.1, HSG-C.B.5, HSG-CO.A.1, HSG-MG.A.2, HSG-GMD.A.3, HSG-GMS.B.4, HSG-GMD.A.2, HSG-MG.A.3	**Outcomes:** In this unit, students will work on geometric solids and their measurements.
Essential Questions: How does one find the arc length and area of a sector of a circle? How is the area of a regular polygon found? How can the cross section of a solid be found and described? What is a strategy for finding a solid of revolution? What are the formulas for finding the volumes and surface areas of different solids?	**Learning Targets:** Students will be able to measure angles using radians, find arc lengths and sectors of circles, find areas of regular polygons, find and use the volumes and surface areas of various three-dimensional solids.
Topic 1: **Circumference and Area of Circles**	Length: **3 days**
Standard(s): HSG-GMD.A.1, HSG-C.B.5, HSG-CO.A.1, HSG-MG.A.2	**Academic Vocabulary:** circumference, arc length, radian, sector of a circle
Lesson Frame:	We will find circumference and arc length of circles.
	I will successfully apply the circumference and arc length formulas.
Lesson Frame:	We will explore areas of circles and sectors.
	I will develop and apply the formulas for areas of sectors.
Performance Tasks: Students will find circumference, arc length, and areas of circles and sectors.	Notes:
Topic 2: **Areas of Polygons**	Length: **1 day**
Standard(s): HSG-GMD.A.3	**Academic Vocabulary:** center of a regular polygon, radius of a regular polygon, apothem of a regular polygon, central angle of a regular polygon
Lesson Frame:	We will find areas of rhombuses and kites.
	I will apply the formulas for areas of rhombuses and kites.
Lesson Frame:	We will find areas of regular polygons.
	I will solve problems involving areas of regular polygons.

Performance Tasks: Students will use geometric software to draw and find the areas of rhombuses, kites, and regular polygons.	Notes:
Topic 3: **Three-Dimensional Figures**	Length: **1 day**
Standard(s): HSG-GMD.B.4	**Academic Vocabulary:** polyhedron, face, edge, vertex, cross section, solid of revolution, axis of revolution
Lesson Frame:	We will explore different three-dimensional solids.
	I will be able to classify solids, describe cross-sections, and describe solids of revolution.
Performance Tasks: Students will be able to sketch solids and their cross sections using graph paper or geometric software.	Notes:
Topic 4: **Volumes of Prisms, Cylinders, and Pyramids**	Length: **3 days**
Standard(s): HSG-GMD.A.1, HSG-GMD.A.2, HSG-GMD.A.3, HSG-MG.A.1, HSG-MG.A.2, HSG-MG.A.3	**Academic Vocabulary:** volume, Cavalieri's Principle, density, similar solids
Lesson Frame:	We will explore the volumes of Prisms.
	I will be able to find the volumes of prisms, especially in real-life scenarios.
Lesson Frame:	We will explore the volumes of cylinders.
	I will be able to find the volumes of cylinders, especially in real-life scenarios.
Lesson Frame:	We will explore the volumes of pyramids.
	I will be able to find the volumes of pyramids, especially in real-life scenarios.
Performance Tasks: Students will find volumes of many different shapes including combinations of two or more solids.	Notes:
Topic 5: **Surface Area and Volume of Cones and Spheres**	Length: **3 days**
Standard(s): HSG-GMD.A.1, HSG-GMD.A.2, HSG-GMD.A.3, HSG-MG.A.1	**Academic Vocabulary:** lateral surface of a cone, chord of a sphere, great circle

Lesson Frame:	We will explore the surface areas of cones and spheres.
	I will successfully apply the formulas for surface areas of cones and spheres.
Lesson Frame:	We will explore the volumes of cones and spheres.
	I will successfully apply the formulas for volumes of cones and spheres.
Performance Tasks: Students will explore different cones and spheres and the formulas to find surface area and volumes.	Notes:

Unit Name: **Probability**	Length: **11 days**
Standards: HSS-CP.A.1, HSS-CP.A.2, HSS-CP.A.3, HSS-CP.A.4, HSS-CP.A.5, HSS-CP.B.6, HSS-CP.B.7, HSS-CP.B.8, HSS-CP.B.9	**Outcomes:** In this unit, students will be exploring probability, sample spaces, dependent and independent events, permutations and combinations, and binomial distributions. They will finish the unit with a clear understanding of the basics of probability and its application to real-world events.
Essential Questions: How can one find the sample space of an experiment? What is one way to determine whether two events are dependent or independent? How can you construct and interpret a two-way table? How can you find the probabilities of disjoint and overlapping events? How can a tree diagram help you visualize permutations? How can you determine the frequency of each outcome of an event?	**Learning Targets:** Students will be able to find the sample space for an experiment and use it to determine probability. They will also find probabilities related to independent, dependent, overlapping, and disjoint events. Students will use permutations and combinations and clearly be able to discern the difference between them. Students will use binomial distributions to determine the frequency of events.
Topic 1: **Sample Space and Probability**	Length: **2 days**
Standard(s): HSS-CP.A.1	**Academic Vocabulary:** probability experiment, outcome, event. sample space, probability of an event, theoretical probability, geometric probability, experimental probability
Lesson Frame:	We will explore sample space.
	I will find the sample spaces of events.
Lesson Frame:	We will relate sample spaces to probabilities.
	I will find probabilities of events based on sample spaces.
Performance Tasks: Students will use different tools to create and explore different sample spaces for probability.	Notes:
Topic 2: **Independent, Dependent Events, and Two-Way Tables**	Length: **3 days**
Standard(s): HSS-CP.A.1, HSS-CP.A.2, HSS-CP.A.3, HSS-CP.A.5, HSS-CP.B.6, HSS-CP.B.8, HSS-CP.A.4	**Academic Vocabulary:** independent events, dependent events, conditional probability, two-way table, joint frequency, marginal frequency, joint relative frequency, marginal relative frequency, conditional relative frequency
Lesson Frame:	We will explore dependent and independent events.

	I will be able to find the probabilities of dependent and independent events.
Lesson Frame:	We will explore conditional probabilities.
	I will be able to find the conditional probabilities of events.
Lesson Frame:	We will construct two-way tables.
	I will use two-way tables to find relative and conditional relative frequencies and use them to find probabilities.
Performance Tasks: Students will be able to construct frequency tables and interpret the results.	Notes:
Topic 3: **Probability of Disjoint and Overlapping Events**	Length: **2 days**
Standard(s): HSS-CP.A.1, HSS-CP.B.7	**Academic Vocabulary:** compound event, overlapping events, disjoint or mutually exclusive events
Lesson Frame:	We will explore compound events.
	I will find the probabilities of compound events.
Lesson Frame:	We will explore compound events and their probabilities.
	I will use multiple strategies to find probabilities of compound events.
Performance Tasks: Students will use software to model probabilities.	Notes:
Topic 4: **Permutations and Combinations**	Length: **2 days**
Standard(s): HSS-CP.B.9	**Academic Vocabulary:** permutation, n factorial, combination
Lesson Frame:	We will explore combinations and permutations.
	I will use formulas to find the combinations and permutations.
Lesson Frame:	We will explore combinations and permutations.
	I will find real-world applications of permutations and combinations.
Performance Tasks: Students will be able to use creative ways to visually represent combinations and permutations.	Notes:

Topic 5: **Binomial Distributions**	Length: **2 days**
Standard(s): HSS-CP.B.9	**Academic Vocabulary:** random variable, probability distribution, binomial distribution, binomial experiment
Lesson Frame:	We will explore probability and binomial distributions.
	I will build probability and binomial distributions.
Lesson Frame:	We will explore probability and binomial distributions.
	I will interpret probability and binomial distributions.
Performance Tasks: Students will use various methods to build and interpret binomial and probability distributions.	Notes: