2022 - 2023, HS, Geometry

The following Practice Standards and Literacy Skills will be used throughout the course:

Standards for Mathematical Practice	***Literacy Skills for Mathematical Proficiency***
1. Make sense of problems and persevere in solving them.	*1. Use multiple reading strategies.*
2. Reason abstractly and quantitatively.	*2. Understand and use correct mathematical vocabulary.*
3.Construct viable arguments and critique the reasoning of others.	*3. Discuss and articulate mathematical ideas.*
4. Model with mathematics. ★	*4. Write mathematical arguments.*
5. Use appropriate tools strategically.	
6. Attend to precision.	
7. Look for and make use of structure.	
8. Look for and express regularity in repeated reasoning.	

Quarter 1

Topics Covered This Quarter by Domain and Cluster

Congruence (G.CO)

- **Cluster A. Experiment with transformation in the plane.**
- **Cluster B. Understand congruence in terms of rigid motions.**
- **Cluster C. Prove Geometric Theorems.**
- **Cluster D. Make geometric constructions.**

Expressing Geometric Properties with Equations (G.GPE)

- **Cluster B: Use coordinates to prove simple geometric theorems algebraically.**

Similarity, Right Triangles, and Trigonometry (G.SRT)

- **Cluster B. Prove theorems involving similarity.**

Constructions: Scattered throughout the book; teachers use their discretion in covering as they fit in a lesson in the book, or all at once (if completed by end of quarter).

Standards	Evidence of Learning Statements from Instructional Focus Document
G.CO.A.1 Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc. (Distance around a circular arc will be taught in Quarter 3 with Circles.)	Generate a precise definition of an angle, circle, perpendicular line, parallel line, and line segment based on the undefined notions of points, lines, planes, and the distance along a line and around an arc.
G.GPE.B.2 Use coordinates to prove simple geometric theorems algebraically. *Scope and Clarifications:* *For example, prove or disprove that a figure defined by four given points in*	Identify what measures will be needed to prove a geometric theorem. Justify properties of geometric figures algebraically using coordinates. Recognize when a geometric theorem is applicable to a given figure and use it

Standards	Evidence of Learning Statements from Instructional Focus Document
the coordinate plane is a rectangle; prove or disprove that the point (1, √3) lies on the circle centered at the origin and containing the point (0, 2).	appropriately in a proof. Prove geometric theorems algebraically using notation or expressions that represent coordinates or measures on a coordinate plane.
G.CO.A.2 Represent transformations in the plane in multiple ways, including technology. Describe transformations as functions that take points in the plane (pre-image) as inputs and give other points (image) as outputs. Compare transformations that preserve distance and angle measure to those that do not (e.g., translation versus horizontal stretch).	Represent transformations in the plane in multiple ways, including technology. Describe transformations as functions that take points in the plane (preimage) as inputs and give other points (image) as outputs. Compare transformations that preserve distance and angle measure to those that do not (e.g., translation versus horizontal stretch).
G.CO.C.9 Prove theorems about lines and angles. *Scope and Clarifications:* *Proving includes, but is not limited to, completing partial proofs; constructing two-column or paragraph proofs; using transformations to prove theorems; analyzing proofs; and critiquing completed proofs. Theorems include but are not limited to: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angles are congruent; points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints.*	Make conjectures about the relationships between lines and/or angles. Prove those conjectures are true using precise mathematical language and a logical order of statements. Use rigid motions to prove the relationship between the figures in the conjectures. Construct a two-column proof or paragraph proof. Compare their proof with other students' proofs or teacher created proof examples.
G.CO.A.3 Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry the shape onto itself.	Determine a line of symmetry and/or the degree of rotational symmetry that exist in a rectangle, parallelogram, trapezoid, or regular polygon. Describe the rotations and/or reflections that carry a rectangle, parallelogram, trapezoid, or regular polygon onto itself. Determine the attributes of a figure based on its symmetries.
G.CO.A.4 Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.	Develop and give a student generated definition of a rotation in terms of distances, angles, and arcs. Develop and give a student generated definition of a reflection in terms of distance, and parallel and perpendicular lines.

Standards	Evidence of Learning Statements from Instructional Focus Document
	Develop and give a student generated definition of a translation in terms of distance and parallel lines. Generate precise definitions of rotations, reflections, and translations such that they are unique to the given transformation.
G.CO.A.5 Given a geometric figure and a rigid motion, draw the image of the figure in multiple ways, including technology. Specify a sequence of rigid motions that will carry a given figure onto another. *Scope and Clarifications:* *Rigid motions include rotations, reflections, and translations.*	Draw the image in multiple ways, including by hand, on or off a coordinate plane, or by using technology such as dynamic geometry software, given a geometric figure and a rigid motion (rotation, reflection, or translation). Draw the image in multiple ways, given a geometric figure and a sequence of rigid motions. Describe a sequence of rigid motions that will carry a given figure onto another. Recognize and explain that there can be more than one correct sequence that will map a given preimage onto an image.
G.CO.B.6 Use geometric descriptions of rigid motions to transform figures and to predict the effect of a given rigid motion on a given figure; given two figures, use the definition of congruence in terms of rigid motions to determine informally if they are congruent.	Use definitions of rigid motions to perform a given transformation. Predict the effect of a given rigid motion on a figure. Determine what rigid motion(s) will map one figure onto another. Verify that two figures are congruent by measuring lengths and angle measures to ensure they are equal, given the pre-image and its image after a rigid motion. Make the connection that two figures are congruent because one is the resulting image of a rigid motion on the other
G.CO.B.7 Use the definition of congruence in terms of rigid motions to show that two triangles are congruent if and only if corresponding pairs of sides and corresponding pairs of angles are congruent.	Identify and name corresponding parts of triangles. Make the connection that two triangles are congruent because one is the resulting image of a rigid motion on the other.

Standards	Evidence of Learning Statements from Instructional Focus Document
	Verify that corresponding sides have equal lengths and corresponding angles have equal measures, given congruent triangles. Explain why the triangles are congruent using the definition of congruence in terms of rigid motion, given that the corresponding sides and angles of two triangles are congruent. Read and use correct notation that shows corresponding parts are congruent and triangles are congruent. Write a triangle congruence statement using correct notation.
G.CO.C.9 Prove theorems about lines and angles.	Make conjectures about the relationships between lines and/or angles. Prove those conjectures are true using precise mathematical language and a logical order of statements. Use rigid motions to prove the relationship between the figures in the conjectures. Construct a two-column proof or paragraph proof. Compare their proof with other students' proofs or teacher created proof examples.
G.CO.D.12 Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.). *Scope and Clarifications:* *Constructions include but are not limited to: copying a segment; copying an angle; bisecting a segment; bisecting an angle; constructing perpendicular lines, including the perpendicular bisector of a line segment; constructing a line parallel to a given line through a point not on the line, and constructing the following objects inscribed in a circle: an equilateral triangle, square, and a regular hexagon.*	Develop methods using a variety of appropriate tools (compass, straightedge, string, reflective device, paper folding, etc.) to precisely construct geometric objects such as a perpendicular bisector and parallel lines. Use the virtual compass and line tool in dynamic geometry software to construct various geometric objects. Construct an equilateral triangle, square, and regular hexagon in a circle using appropriate tools such as a compass, straightedge, paper folding, graph paper, etc. Explain informally why and how these construction methods work.

Standards	Evidence of Learning Statements from Instructional Focus Document
	Understand the importance of precision in these constructions. Attend to precision when performing geometric constructions.
G.GPE.B.3 Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems. *Scope and Clarifications:* *For example, find the equation of a line parallel or perpendicular to a given line that passes through a given point.*	Explain how the slopes of parallel lines are equivalent. Use the translation of the slope triangle (the right triangle formed by horizontal and vertical distances to form a triangle with the line as the hypotenuse) to justify slopes of parallel lines. Explain how the slopes of perpendicular lines are opposite reciprocals. Use the rotation of the slope triangle to justify slopes of perpendicular lines. Prove lines are parallel or perpendicular using slope criteria. Apply the properties of parallel lines and perpendicular lines to solve geometric problems. Write equations of parallel lines or perpendicular lines given a point and a slope. Write equations of parallel lines or perpendicular lines by identifying a point and a slope from a drawing. Use precise mathematical language and symbolic notation to describe parallel and perpendicular lines.
G.CO.B.7 Use the definition of congruence in terms of rigid motions to show that two triangles are congruent if and only if corresponding pairs of sides and corresponding pairs of angles are congruent.	Identify and name corresponding parts of triangles. Make the connection that two triangles are congruent because one is the resulting image of a rigid motion on the other. Verify that corresponding sides have equal lengths and corresponding angles have equal measures, given congruent triangles.

Standards	Evidence of Learning Statements from Instructional Focus Document
	Explain why the triangles are congruent using the definition of congruence in terms of rigid motion, given that the corresponding sides and angles of two triangles are congruent. Read and use correct notation that shows corresponding parts are congruent and triangles are congruent. Write a triangle congruence statement using correct notation.
G.CO.B.8 Explain how the criteria for triangle congruence (ASA, SAS, AAS, and SSS) follow from the definition of congruence in terms of rigid motions.	Determine which combinations of congruent corresponding parts must be known to verify that two triangles are congruent. Explain how knowing SSS, SAS, ASA, or AAS is enough to say that two triangles are congruent using the definition of congruence in terms of rigid motions. Read and use correct notation that shows corresponding parts are congruent and triangles are congruent. Provide instructions to another student giving only three measurements of triangle sides and/or angles so that they can accurately draw a triangle congruent to their own drawing.
G.CO.D.12 Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.). *Scope and Clarifications:* *Constructions include but are not limited to: copying a segment; copying an angle; bisecting a segment; bisecting an angle; constructing perpendicular lines, including the perpendicular bisector of a line segment; constructing a line parallel to a given line through a point not on the line, and constructing the following objects inscribed in a circle: an equilateral triangle, square, and a regular hexagon.*	Develop methods using a variety of appropriate tools (compass, straightedge, string, reflective device, paper folding, etc.) to precisely construct geometric objects such as a perpendicular bisector and parallel lines. Use the virtual compass and line tool in dynamic geometry software to construct various geometric objects. Construct an equilateral triangle, square, and regular hexagon in a circle using appropriate tools such as a compass, straightedge, paper folding, graph paper, etc. Explain informally why and how these construction methods work. Understand the importance of precision in these constructions.

Standards	Evidence of Learning Statements from Instructional Focus Document
	Attend to precision when performing geometric constructions.
G.SRT.B.5 Use congruence and similarity criteria for triangles to solve problems and to justify relationships in geometric figures.	Use transformations to determine relationships among simple geometric figures and to solve problems.
Honors Addendum: G.WCE.1 Understand and apply the rules of logic as they relate to proving geometric theorems.	Write and analyze biconditional statements. Write the inverse, converse, and contrapositive of a conditional statement.
G.WCE.2 Investigate forms of non-Euclidean geometry.	Research and explain the other types of geometry besides Euclidean such as spherical, hyperbolic, and elliptical.
G.WCE.3 Construct truth tables to determine the truth value of logical statements.	Identify, write, and analyze the truth value of conditional statements. Apply the Law of Detachment and Law of Syllogism in logical reasoning. Follow logical steps to write a simple indirect proof. Construct truth tables to determine the truth value of logical statements.

Quarter 2

Topics Covered this Quarter by Domain and Cluster

Congruence (G.CO)
- **Cluster C. Prove geometric theorems.**

Expressing Geometric Properties with Equations (G.GPE)
- **Cluster B: Use coordinates to prove simple geometric theorems algebraically.**

Similarity, Right Triangles, and Trigonometry (G.SRT)
- **Cluster A: Understand Similarity in terms of similarity transformations.**
- **Cluster B: Prove theorems involving similarity.**

Standards	Evidence of Learning Statements from Instructional Focus Document
G.CO.C.10 Prove theorems about triangles. *Scope and Clarifications:* *Proving includes, but is not limited to, completing partial proofs; constructing two-column or paragraph proofs; using transformations to prove theorems; analyzing proofs; and critiquing completed proofs. Theorems include but are not limited to: measures of interior angles of a triangle sum to 180°; base angles of isosceles triangles are congruent; the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length; the medians of a triangle meet at a point.*	Define median of a triangle, identify, or draw it in a picture. Explore the properties of triangles and make conjectures. Formally prove the conjectures using precise mathematical language. Use rigid motions to prove the conjectures. Construct a two-column proof or paragraph proof. Compare their proof with other students' proofs or teacher created proof examples.
G.SRT.B.5 Use congruence and similarity criteria for triangles to solve problems and to justify relationships in geometric figures.	Use transformations to determine relationships among simple geometric figures and to solve problems.
G.C.A.3 Construct the incenter and circumcenter of a triangle and use their properties to solve problems in context.	Use a compass and/or dynamic geometry software to construct a triangle's incenter and circumcenter. Identify equal distances formed from the incenter and circumcenter. Know and use the properties of a triangle's incenter to find unknown measures in a figure. Know and use the properties of a triangle's circumcenter to find unknown measures in a figure.

Standards	Evidence of Learning Statements from Instructional Focus Document
	Solve real-world problems involving a triangle's incenter and circumcenter.
G.CO.C.10 Prove theorems about triangles. *Scope and Clarifications:* *Proving includes, but is not limited to, completing partial proofs; constructing two-column or paragraph proofs; using transformations to prove theorems; analyzing proofs; and critiquing completed proofs. Theorems include but are not limited to: measures of interior angles of a triangle sum to 180°; base angles of isosceles triangles are congruent; the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length; the medians of a triangle meet at a point.*	Define median of a triangle, identify, or draw it in a picture. Explore the properties of triangles and make conjectures. Formally prove the conjectures using precise mathematical language. Use rigid motions to prove the conjectures. Construct a two-column proof or paragraph proof. Compare their proof with other students' proofs or teacher created proof examples.
G.CO.D.12 Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.). *Scope and Clarifications:* *Constructions include but are not limited to: copying a segment; copying an angle; bisecting a segment; bisecting an angle; constructing perpendicular lines, including the perpendicular bisector of a line segment; constructing a line parallel to a given line through a point not on the line, and constructing the following objects inscribed in a circle: an equilateral triangle, square, and a regular hexagon.*	Develop methods using a variety of appropriate tools (compass, straightedge, string, reflective device, paper folding, etc.) to precisely construct geometric objects such as a perpendicular bisector and parallel lines. Use the virtual compass and line tool in dynamic geometry software to construct various geometric objects. Construct an equilateral triangle, square, and regular hexagon in a circle using appropriate tools such as a compass, straightedge, paper folding, graph paper, etc. Explain informally why and how these construction methods work. Understand the importance of precision in these constructions. Attend to precision when performing geometric constructions.
G.GPE.B.2 Use coordinates to prove simple geometric theorems algebraically. *Scope and Clarifications:* *For example, prove or disprove that a figure defined by four given points in the coordinate plane is a rectangle; prove or disprove that the point (1, √3)*	Identify what measures will be needed to prove a geometric theorem. Justify properties of geometric figures algebraically using coordinates. Recognize when a geometric theorem is applicable to a given figure and use it appropriately in a proof.

Standards	Evidence of Learning Statements from Instructional Focus Document
lies on the circle centered at the origin and containing the point (0, 2).	Prove geometric theorems algebraically using notation or expressions that represent coordinates or measures on a coordinate plane.
G.GPE.B.3 Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems. *Scope and Clarifications:* *For example, find the equation of a line parallel or perpendicular to a given line that passes through a given point.*	Explain how the slopes of parallel lines are equivalent. Use the translation of the slope triangle (the right triangle formed by horizontal and vertical distances to form a triangle with the line as the hypotenuse) to justify slopes of parallel lines. Explain how the slopes of perpendicular lines are opposite reciprocals. Use the rotation of the slope triangle to justify slopes of perpendicular lines. Prove lines are parallel or perpendicular using slope criteria. Apply the properties of parallel lines and perpendicular lines to solve geometric problems. Write equations of parallel lines or perpendicular lines given a point and a slope. Write equations of parallel lines or perpendicular lines by identifying a point and a slope from a drawing. Use precise mathematical language and symbolic notation to describe parallel and perpendicular lines.
G.CO.C.11 Prove theorems about parallelograms. *Scope and Clarifications:* *Proving includes, but is not limited to, completing partial proofs; constructing two-column or paragraph proofs; using transformations to prove theorems; analyzing proofs; and critiquing completed proofs. Theorems include but are not limited to opposite sides are congruent, opposite angles are congruent, the diagonals of a parallelogram bisect each other, and conversely, rectangles are parallelograms with congruent diagonals.*	Explore the relationships that exist between the sides, angles, and diagonals of parallelograms, including rectangles, rhombuses, and squares. Make conjectures about the properties of parallelograms, rectangles, rhombuses, and squares. Formally prove the properties of parallelograms using precise mathematical language. Use rigid motions to prove the conjectures.

Standards	Evidence of Learning Statements from Instructional Focus Document
	Construct a two-column proof or paragraph proof. Compare their proof with other students' proofs or teacher created proof examples. Explain the relationships between parallelograms, rectangles, rhombuses, and squares.
G.SRT.B.5 Use congruence and similarity criteria for triangles to solve problems and to justify relationships in geometric figures.	Use transformations to determine relationships among simple geometric figures and to solve problems.
G.GPE.B.2 Use coordinates to prove simple geometric theorems algebraically. *Scope and Clarifications:* *For example, prove or disprove that a figure defined by four given points in the coordinate plane is a rectangle; prove or disprove that the point (1, √3) lies on the circle centered at the origin and containing the point (0, 2).*	Identify what measures will be needed to prove a geometric theorem. Justify properties of geometric figures algebraically using coordinates. Recognize when a geometric theorem is applicable to a given figure and use it appropriately in a proof. Prove geometric theorems algebraically using notation or expressions that represent coordinates or measures on a coordinate plane.
G.GPE.B.3 Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems.	Explain how the slopes of parallel lines are equivalent. Use the translation of the slope triangle (the right triangle formed by horizontal and vertical distances to form a triangle with the line as the hypotenuse) to justify slopes of parallel lines. Explain how the slopes of perpendicular lines are opposite reciprocals. Use the rotation of the slope triangle to justify slopes of perpendicular lines. Prove lines are parallel or perpendicular using slope criteria. Apply the properties of parallel lines and perpendicular lines to solve geometric problems. Write equations of parallel lines or perpendicular lines given a point and a slope.

Standards	Evidence of Learning Statements from Instructional Focus Document
	Write equations of parallel lines or perpendicular lines by identifying a point and a slope from a drawing. Use precise mathematical language and symbolic notation to describe parallel and perpendicular lines.
G.CO.C.11 Prove theorems about parallelograms. *Scope and Clarifications:* *Proving includes, but is not limited to, completing partial proofs; constructing two-column or paragraph proofs; using transformations to prove theorems; analyzing proofs; and critiquing completed proofs. Theorems include but are not limited to: opposite sides are congruent, opposite angles are congruent, the diagonals of a parallelogram bisect each other, and conversely, rectangles are parallelograms with congruent diagonals.*	Explore the relationships that exist between the sides, angles, and diagonals of parallelograms, including rectangles, rhombuses, and squares. Make conjectures about the properties of parallelograms, rectangles, rhombuses, and squares. Formally prove the properties of parallelograms using precise mathematical language. Use rigid motions to prove the conjectures. Construct a two-column proof or paragraph proof. Compare their proof with other students' proofs or teacher created proof examples. Explain the relationships between parallelograms, rectangles, rhombuses, and squares.
G.GPE.B.5 ★Know and use coordinates to compute perimeters of polygons and areas of triangles and rectangles. *Scope and Clarifications:* *For example, use the distance formula.*	Calculate the perimeter of polygons on a coordinate plane. Calculate the area of a triangle or a rectangle on a coordinate plane. Explain the relationship between distances or measures on a figure in terms of variables in a formula. Attend to precision in calculating measures. Justify the solution pathway for calculating area and perimeter. Operate with irrational numbers in radical form and write the result in simplest radical form.

Standards	Evidence of Learning Statements from Instructional Focus Document
	Recognize extraneous or unnecessary information. Model real-world problems by sketching them on a coordinate plane and interpret the results in context of the problem.
G.SRT.A.1 Verify informally the properties of dilations given by a center and a scale factor. *Scope and Clarifications:* *Properties include but are not limited to: a dilation takes a line not passing through the center of the dilation to a parallel line, and leaves a line passing through the center of the dilation unchanged; the dilation of a line segment is longer or shorter in the ratio given by the scale factor.*	Determine the properties of a dilation given by a center and a scale factor. Perform a dilation in the coordinate plane given a scale factor and a center.
G.CO.A.2 Represent transformations in the plane in multiple ways, including technology. Describe transformations as functions that take points in the plane (pre-image) as inputs and give other points (image) as outputs. Compare transformations that preserve distance and angle measure to those that do not (e.g., translation versus horizontal stretch).	Represent transformations in the plane in multiple ways, including technology. Describe transformations as functions that take points in the plane (preimage) as inputs and give other points (image) as outputs. Compare transformations that preserve distance and angle measure to those that do not (e.g., translation versus horizontal stretch).
G.SRT.A.2 Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar; explain using similarity transformations the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides.	Determine the properties of a dilation given by a center and a scale factor. Perform a dilation in the coordinate plane given a scale factor and a center. Determine if two figures are similar using the definition of similarity in terms of similarity transformations. Identify which transformations preserve similarity for two triangles. Use similarity transformations to verify that all corresponding pairs of angles are congruent and verify the proportionality or all corresponding pairs of sides to show that the triangles are similar when given two triangles. Determine the sequence of transformations that have occurred in order to determine when two figures are similar.

2022 - 2023, HS, Geometry

Standards	Evidence of Learning Statements from Instructional Focus Document
	Identify the ratio of proportionality for similar figures.
G.C.A.1 Recognize that all circles are similar.	Recognize any two circles are similar. Explain in terms of transformations and by the definition of similar figures why any two circles are similar. Construct similar circles using dynamic geometry software or traditional tools.
G.CO.A.5 Given a geometric figure and a rigid motion, draw the image of the figure in multiple ways, including technology. Specify a sequence of rigid motions that will carry a given figure onto another. *Scope and Clarifications:* *Rigid motions include rotations, reflections, and translations.*	Draw the image in multiple ways, including by hand, on or off a coordinate plane, or by using technology such as dynamic geometry software, given a geometric figure and a rigid motion (rotation, reflection, or translation). Draw the image in multiple ways, given a geometric figure and a sequence of rigid motions. Describe a sequence of rigid motions that will carry a given figure onto another. Recognize and explain that there can be more than one correct sequence that will map a given preimage onto an image.
G.SRT.A.3 Use the properties of similarity transformations to establish the AA criterion for two triangles to be similar.	Determine if two triangles are similar or not similar by AA criterion using properties of similarity transformations.

Standards	Evidence of Learning Statements from Instructional Focus Document
G.SRT.B.5 Use congruence and similarity criteria for triangles to solve problems and to justify relationships in geometric figures	Use transformations to determine relationships among simple geometric figures and to solve problems.
G.SRT.B.4 Prove theorems about similar triangles. *Scope and Clarifications:* *Proving includes, but is not limited to, completing partial proofs; constructing two-column or paragraph proofs; using transformations to prove theorems; analyzing proofs; and critiquing completed proofs. Theorems include but are not limited to: a line parallel to one side of a triangle divides the other two proportionally, and conversely; the Pythagorean Theorem proved using triangle similarity.*	Prove theorems about similar triangles by completing two-column and paragraph proofs. Use triangle similarity to prove the Pythagorean Theorem and its converse.
G.GPE.B.4 Find the point on a directed line segment between two given points that partitions the segment in a given ratio.	Explain the importance to following the direction of the ratio when partitioning a line segment. Explain what it means to partition a segment into a given ratio. Observe patterns when subdividing line segments and draw conclusions about the effects the ratio has on the segment and its lengths. Use the ratio of vertical change to horizontal change (slope) to find a point that partitions a line segment into a given ratio. Explain the ratio of parts of a segmented line $a:b$, as $\frac{a}{a+b}$. Partition a directed line segment using a compass
G.SRT.B.5 Use congruence and similarity criteria for triangles to solve problems and to justify relationships in geometric figures	Use transformations to determine relationships among simple geometric figures and to solve problems.
Relationships Within Triangles G.WCE.4 Construct the points of concurrency within a triangle and solve problems using the properties of the centroid, orthocenter, incenter, and circumcenter.	**Relationships Within Triangles** Distinguish among altitudes, angle bisectors, perpendicular bisectors, medians and midsegments in triangles and use their properties to solve problems. Distinguish among the centroid, orthocenter, incenter, and circumcenter in a triangle and use the properties of each to solve problems. Construct special segments in triangles using a compass and a straight edge

Standards	Evidence of Learning Statements from Instructional Focus Document
	or patty paper. Use points of concurrency to construct and make conjectures about the Euler Line.

Quarter 3

Topics Covered this Quarter by Domain and Cluster

Similarity, Right Triangles, and Trigonometry (G.SRT)

Cluster C: Define trigonometric ratios and solve problems involving triangles.

Circles (G.C)

Cluster A: Understand and apply theorems about circles.

Cluster B: Find areas of sectors of circles.

Expressing Geometric Properties with Equations (G.GPE)

Cluster A: Translate between the geometric description and the equation for a circle.

Cluster B: Use coordinates to prove simple geometric theorems algebraically.

Standards	Evidence of Learning Statements from Instructional Focus Document
G.SRT.C.6 Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles.	Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles. Find missing sides and angles of a right triangle, given other sides and angles.
G.SRT.C.7 Explain and use the relationship between the sine and cosine of complementary angles.	Develop logical arguments about relationships between the sine and cosine values of angles. Explain the relationship of the sine and cosine values of complementary angles. Use precise language to describe a trigonometric relationship. Use the concepts of the relationship between the sine and cosine values of complementary angles to solve non-routine problems such as complex drawings, embedded figures, or disseminating information that contains extraneous values.
G.SRT.C.8 Solve triangles. ★ **a.** Know and use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.	Use the Pythagorean Theorem, trigonometric ratios, and the Law of Sines and Law of Cosines to solve mathematical and real-life problems and recognize when it is appropriate to use each.
G.SRT.C.8 Solve triangles. ★	Use the Pythagorean Theorem, trigonometric ratios, and the Law of Sines and

Standards	Evidence of Learning Statements from Instructional Focus Document
b. Know and use the Law of Sines and Law of Cosines to solve problems in real life situations. Recognize when it is appropriate to use each. *Scope and Clarifications:* *Ambiguous cases will not be included in assessment.*	Law of Cosines to solve mathematical and real-life problems and recognize when it is appropriate to use each.
G.C.A.2 Identify and describe the relationships among inscribed angles, radii, and chords. *Scope and Clarifications:* *Include the relationship between central, inscribed, and circumscribed angles; inscribed angles on a diameter are right angles; the radius of a circle is perpendicular to the tangent where the radius intersects the circle, and properties of angles for a quadrilateral inscribed in a circle.*	Identify patterns and describe the relationship between a circle's arcs and angles. Use the relationship between arcs and angles to find unknown measures in a circle. Compare and contrast inscribed angles, central angles, and circumscribed angles. Compare and contrast secant lines and tangent lines. Identify, describe, and use the relationship between a radius and tangent line. Make observations, draw conclusions, and use the properties of angles in a quadrilateral when inscribed in a circle. Formulate conjectures and generalize findings about the relationships between angles, arcs, chords, and lines in, on, and outside a circle. Justify conjectures and use precise language.
G.GMD.A.1 Give an informal argument for the formulas for the circumference of a **circle** and the volume and surface area of a cylinder, cone, prism, and pyramid. *Scope and Clarifications:* *Informal arguments may include but are not limited to using the dissection argument, applying Cavalieri's principle, and constructing informal limit arguments.*	Write an informal argument for the formulas for the circumference and area of a circle. Write an informal argument for the formulas for the volumes and surface areas of a cylinder, cone, prism, and pyramid.
G.MG.A.1 Use geometric shapes, their measures, and their properties to	Use geometric shapes, their measures, and their properties to describe

Standards	Evidence of Learning Statements from Instructional Focus Document
describe objects. *Scope and Clarifications:* *For example, modeling a tree trunk or a human torso as a cylinder*.	objects.
G.C.B.4 Know the formula and find the area of a sector of a circle in a real-world context. *Scope and Clarifications:* *For example, use proportional relationships and angles measured in degrees or radians. There are no assessment limits for this standard. The entire standard is assessed in this course.*	Represent the measure of a sector as a fraction of degrees or a fraction of radians. Explain that the formula for area of a sector is a fraction of the circle's whole area. That is, the fraction of the circle multiplied by πr^2. Recognize the need for finding the area of fractional portions of a circle in a real-world context. Identify a sector in context of a real-world problem. Know and use the formula to find the area of a sector in a real-world context.
G.GPE.A.1 Know and write the equation of a circle of given center and radius using the Pythagorean Theorem.	Write the equation of a circle centered at the origin with a given radius. Recognize from a graph when a circle has been translated from the origin. Write the equation of a circle with a given center not at the origin and radius. Write the equation of a circle from a graph of a circle drawn on a coordinate plane. Make observations about the connection between the Pythagorean Theorem and the equation of a circle. Explain how the equation of a circle can be derived from the Pythagorean Theorem.
G.GPE.B.2 Use coordinates to prove simple geometric theorems algebraically. *Scope and Clarifications:* *For example, prove or disprove that a figure defined by four given points in*	Identify what measures will be needed to prove a geometric theorem. Justify properties of geometric figures algebraically using coordinates. Recognize when a geometric theorem is applicable to a given figure and use it

Standards	Evidence of Learning Statements from Instructional Focus Document
the coordinate plane is a rectangle; prove or disprove that the point (1, √3) lies on the circle centered at the origin and containing the point (0, 2). There are no assessment limits for this standard. The entire standard is assessed in this course.	appropriately in a proof. Prove geometric theorems algebraically using notation or expressions that represent coordinates or measures on a coordinate plane.
Honors Addendum: G.WCE.5 Make use of the Pythagorean triples and special right triangles and use them to solve problems. G.WCE.6 Make use of the Converse of the Pythagorean theorem.	List the common Pythagorean triples. (ACT) Solve right triangles including special right triangles (such as 30-60-90 and 45-45-90) by finding the measures of all sides and angles in the triangles. Use the converse of the Pythagorean Theorem to determine if a triangle is acute, obtuse, or right.
G.WCE.7 Derive the formula *A = 1/2 ab sin(C)* for the area of a triangle by drawing an auxiliary line from a vertex perpendicular to the opposite side.	Derive the formula, $A = \frac{1}{2} absin(C)$, and use it to solve for the area of a triangle.

Quarter 4

Topics Covered this Quarter by Domain and Cluster

Geometric Measurement and Dimension (G.GMD)

Cluster A: Explain volume and surface area formulas and use them to solve problems.

Modeling with Geometry (G.MG)

Cluster A: Apply geometric concepts in modeling situations.

Standards	Evidence of Learning Statements from Instructional Focus Document
G.GMD.A.1 Give an informal argument for the formulas for the circumference of a circle and the volume and surface area of a cylinder, cone, prism, and pyramid. *Scope and Clarifications:* *Informal arguments may include but are not limited to using the dissection argument, applying Cavalieri's principle, and constructing informal limit arguments.*	Write an informal argument for the formulas for the circumference and area of a circle. Write an informal argument for the formulas for the volumes and surface areas of a cylinder, cone, prism, and pyramid.
G.GMD.A.2 Know and use volume and surface area formulas for cylinders, cones, prisms, pyramids, and spheres to solve problems.★	Apply volume and surface area formulas to solve mathematical and real-world problems.
G.GPE.B.5 Know and use coordinates to compute perimeters of polygons and areas of triangles and rectangles. *Scope and Clarifications:* *For example, use the distance formula.*	Calculate the perimeter of polygons on a coordinate plane. Calculate the area of a triangle or a rectangle on a coordinate plane. Explain the relationship between distances or measures on a figure in terms of variables in a formula. Attend to precision in calculating measures. Justify the solution pathway for calculating area and perimeter. Operate with irrational numbers in radical form and write the result in simplest radical form. Recognize extraneous or unnecessary information.

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Standards	Evidence of Learning Statements from Instructional Focus Document
	Model real-world problems by sketching them on a coordinate plane and interpret the results in context of the problem.
G.MG.A.1 Use geometric shapes, their measures, and their properties to describe objects. *Scope and Clarifications:* *For example, modeling a tree trunk or a human torso as a cylinder.*	Use geometric shapes, their measures, and their properties to describe objects.
G.MG.A.2 Apply geometric methods to solve real world problems. *Scope and Clarifications:* *Geometric methods may include but are not limited to using geometric shapes, the probability of a shaded region, density, and design problems.*	Apply geometric methods to solve real-world problems.
Honors Addendum: G.WCE.8 Discover the connection between finding trigonometric ratios using special right triangles and the unit circle. G.WCE.9 Understand radian measure of an angle as the length of the arc on the unit circle subtended by the angle. G.WCE.10 Convert degrees to radians using constant of proportionality.	Evaluate trigonometric ratios (sine, cosine, and tangent) using special right triangles and the unit circle. Define the radian measure of an angle as the ratio of arc length to its radius and calculate a radian measure when given an arc length and its radius. Convert degrees to radians using the proportions: 1 degree = $(\pi/180)$ radians and 1 radian = $(180/\pi)$ degrees.