YEAR AT A GLANCE: *Geometry and Geometry R* *(updated Dec 2022)*

	UNIT 1	**UNIT 2**	**UNIT 3**	**UNIT 4**	**UNIT 5**
Title	Geometry Basics	Transformations	Triangle Congruence and Properties	Quadrilaterals	Similar Triangles & Trigonometry
Unit Length *(weeks taught)*	4 weeks	4 weeks	5 weeks	3 weeks	5 weeks
Performance Task *(e.g., Persuasive Essay, DBQ, Nutritional Analysis, etc.)*	Tests, Quizzes, Daily Homework, Warm ups, Exit Tickets & Take-home Assignments Constructions Project	Tests, Quizzes, Daily Homework, Warm ups, Exit Tickets & Take-home Assignments Transformational proofs** Transformation constructions	Tests, Quizzes, Daily Homework, Warm ups, Exit Tickets & Take-home Assignments Rigorous proofs are necessary including two column, flow, and paragraph proofs ** Proofs Packet**	Tests, Quizzes, Daily Homework, Warm ups, Exit Tickets & Take-home Assignments Congruency proofs are necessary including two column, flow, and paragraph proofs ** Quadrilateral Family Project	Tests, Quizzes, Daily Homework, Warm ups, Exit Tickets & Take-home Assignments Similarity proofs are included including two column, flow, and paragraph proofs ** Trigonometry Project
Enduring Understanding (The big ideas, the “why” we include these ideas	1. There is a distinct and definite bridge between the worlds of algebra and algebraic thinking and the field of geometry. 2. Simple figures and shapes are a part of the larger understanding of complex geometric	1. Transformations (translations, reflections, rotations, and dilations) are all around us. 2. Transformations provide the framework for artistic representation in many cultures. 3. Transformations are imbedded in the design	1.Congruent figures have special characteristics that can help us solve problems. 2.Triangles have limitations that give them special properties.	1.The properties of transformations that are isometric can be used to identify and prove congruence of figures in a plane. 2. Constructing a viable argument using precise vocabulary of transformations and congruence to prove geometric theorems in a	1. Sequence of similarity transformation of two objects that maps one exactly onto the other is defined. 2.Similarity of two objects using their given ratio by a scale factor is proved; such as: using the dilation of a line segment in ratio

	ideas.	of many different everyday items. 4. Mathematical properties of rotations, reflection, and symmetry are found in many designs in everyday life.		variety of formats.	given by the scale factor. 3.Similar triangles have corresponding pairs of angles and proportional pairs of sides (AA, SAS, SSS). -Prove Theorems about triangles; such as “a line parallel to one side of a triangle divides the other two proportionately and conversely.” Triangle similarity is used to prove the Pythagorean Theorem. 4.Congruence and similarity criteria for triangles are used to solve problems and prove relationships of geometric figures.
Essential Questions (What do we want students to think about)	1. What algebra tools and concepts will I use in Geometry? 2. How are diagrams marked? 3. How are angles measured? 4. How can constructions reinforce the meaning of geometric definitions? 5. How can spatial relationships, including shape	1. How are logos and crests linked to the sense of identity? 2. How would life be different if there were no transformations? 3. What information must be given in order to define a translation? 4. What does a pattern look like that has been created using translations? 5. What is the result when a shape is translated twice? 6. What information	1. Why is it necessary to prove two shapes are congruent? 2.What are the minimal conditions needed to prove two triangles are congruent? 3. When can a triangle exist?	1.What characteristics provided about a quadrilateral can be utilized to identity that type of quadrilateral with the most specific and accurate classification? 2.How do the different classifications of quadrilaterals relate to each other? 3.How do geometric constructions relate to geometric reasoning and proof? 4.How can the properties of rigid	1.What is the difference between similarity and congruence? 2. How can you show that it is not possible to prove similarity by showing three angles in proportion to one another? 3. How do you construct a viable argument for congruency and/or similarity of two triangles? 4. How do you construct a viable

	and dimension, be used to represent real life scenarios?	must be given to describe a reflection? 7. How can you describe the process of reflecting an object or shape? 8. What shapes look the same after they have been reflected? 9. What is the net result when we reflect something twice across the same mirror line? 10. How can a rotation be described?		motions be used to prove properties of specific quadrilaterals? 5.What are the various pathways to create a valid proof for theorems about lines, angles, triangles congruence and parallelograms?	argument for the similarity of geometric figures? 5. Are all congruent triangles similar and is the converse true also?
Common Core Standards	**G.CO.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.** **G.CO.12 - Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.). Copying a segment; copying an angle; bisecting a segment;**	**G.CO.2 - Represent transformations in the plane using, e.g., transparencies and geometry software; describe transformations as functions that take points in the plane as inputs and give other points as outputs. Compare transformations that preserve distance and angle to those that do not (e.g., translation versus horizontal stretch).** **G.CO.3 - Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry it onto itself.** **G.CO.4 - Develop definitions of rotations, reflections, and**	**G.CO.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 decide if they are congruent.** **G.CO.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.** **G.CO.8 - Explain how the criteria for triangle congruence (ASA, SAS, and SSS) follow from the definition of congruence in terms of**	**G.CO.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 decide if they are congruent.** **G.CO.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.** **G.CO.8 - Explain how the criteria for triangle congruence (ASA, SAS, and SSS) follow from the definition of congruence in terms of rigid**	**G.SRT.1- Verify experimentally the properties of dilations given by a center and a scale factor.** **G.SRT.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.** **G.SRT.3- Use the properties of similarity transformations to establish the AA criterion for two triangles to be similar.**

	bisecting an angle; constructing perpendicular lines, including the perpendicular bisector of a line segment; and constructing a line parallel to a given line through a point not on the line.	translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments. **G.CO.5 -** Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure using, e.g., graph paper, tracing paper, or geometry software. Specify a sequence of transformations that will carry a given figure onto another. **G.CO.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 decide if they are congruent. **G.CO.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. **G.CO.9 -** Prove theorems about lines and angles. Theorems include: vertical angles are congruent; when a transversal crosses parallel lines, alternate	rigid motions. **G.CO.9 -** Prove theorems about lines and angles. Theorems include: 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. **G.CO.10 -** Prove theorems about triangles. Theorems include: 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. **G.SRT.4-** Prove theorems about triangles. *Theorems include: a line parallel to one side of a triangle divides the other two proportionally, and conversely; the Pythagorean Theorem proved using triangle similarity* **G.SRT.5 -** Use congruence and	motions. **G.CO.9 -** Prove theorems about lines and angles. Theorems include: 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. **G.CO.10 -** Prove theorems about triangles. Theorems include: 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. **G.CO.11 -** Prove theorems about parallelograms. Theorems include: opposite sides are congruent, opposite angles are congruent, the diagonals of a parallelogram bisect each other, and conversely, rectangles are parallelograms with congruent diagonals.	**G.SRT.4-** Prove theorems about triangles. *Theorems include: a line parallel to one side of a triangle divides the other two proportionally, and conversely; the Pythagorean Theorem proved using triangle similarity* **G.SRT.5-** Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures. Apply geometric concepts in modeling situations. *Focus on situations that require relating two- and three-dimensional objects, determining and using volume, and the trigonometry of general triangles.* **G.MG.1-** Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder).

		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. **G.SRT.1- Verify experimentally the properties of dilations given by a center and a scale factor.** **a. 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 unchanged** **b. The dilation of a line segment is longer or shorter in the ratio given by the scale factor.** **G.SRT.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.** **G.SRT.3 - Use the properties of similarity transformations to**	**similarity criteria for triangles to solve problems and to prove relationships in geometric figures.**		

		establish the AA criterion for two triangles to be similar.			

** These ***rigorous*** proofs are for the Geometry R students only. The geometry students will learn about the theorems and postulates without completing the rigour of the proofs.

YEAR AT A GLANCE: *Geometry and Geometry R*

	UNIT 6	**UNIT 7**	**UNIT 8**	**UNIT 9**
Title	Area, Volume, Perimeter, Circumference of 2D and 3D Solids	Coordinate Geometry & Proofs	Systems of Equations	Circles
Unit Length *(weeks taught)*	4 Weeks	3 weeks	2 weeks	4 weeks
Performance Task *(e.g., Persuasive Essay, DBQ, Nutritional Analysis, etc.)*	Tests, Quizzes, Daily Homework, Warm ups, Exit Tickets & Take-home Assignments Measurement in Shapes Project	Tests, Quizzes, Daily Homework, Warm ups, Exit Tickets & Take-home Assignments Coordinate proofs	Tests, Quizzes, Daily Homework, Warm ups, Exit Tickets & Take-home Assignments	Tests, Quizzes, Daily Homework, Warm ups, Exit Tickets & Take-home Assignments
Enduring Understanding (The big ideas, the “why” we include these ideas	1. Area and perimeter/circumference are used in a variety of real-world	1. Relationships can be linear. 2. Characteristics of linear equations such slope, independent and	1. Multiple mathematical approaches and strategies can be used to reach a desired	1. Angles with their vertex at the center of the circle are equal to the intercepted minor arc; all other angles can

	applications. 2. Before finding area of a figure, one must be sure of the exact type of figure, so as to find the area correctly.	dependent variable 3. Slopes including perpendicular 4. Midpoint	outcome. 2. Algebraic models and graphical representations are tools that can help us make meaningful connections to solve real-world situations. 3. Functions and number operations play fundamental roles in helping us to make sense of various situations.	also be described as having a mathematical relationship to the minor arc. 2. The standard form equation of a circle allows you to easily graph the circle on the coordinate plane because you know the center and the radius. 3. Many real world applications use the circumference of a circle on a two dimensional plane.
Essential Questions (What do we want students to think about)	1. How can I find area and perimeter or circumference of a figure? 2. How can I use area and perimeter/circumference in real-world problems?	1. How can we prove a figure is a specific polygon? 2. What are a polygons properties? 3. How are slope, distance, and midpoint used to prove properties of polygons?	1. How can you model and explain real world situations with mathematical functions? 2. What is the correlation between the graphic representation and algebraic representation of the solutions to a system or function? 3. How does one determine which law to apply in order to best solve a problem?	1. How are angles and arcs in a circle related? 2. What information can you extract from the algebraic standard equation of a circle? 3. How do areas of sectors and lengths of arcs relate to real world Geometry?
Common Core Standards	**GMG.1- Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.** **GPE.B.7**	**G.GPE.4- Use coordinates to prove simple geometric theorems algebraically. For example, prove or disprove that a figure defined by four given**	**REI.C.5 - Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the**	**G.C.1- Prove that all circles are similar.** **G.C.2 - Identify and describe relationships among inscribed angles, radii, and chords. Include the relationship**

	Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula. **7.G.B.6** **Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.**	**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).** **G.GPE.5- Prove the slope criteria for parallel and perpendicular lines and uses them to solve geometric problems (e.g., find the equation of a line parallel or perpendicular to a given line that passes through a given point).** ***Relate work on parallel lines in G.GPE.5 to work on A.REI.5 in High School Algebra I involving systems of equations having no solution or infinitely many solutions.*** **G.GPE.6- Find the point on a directed line segment between two given points that partitions the segment in a given ratio.** **G.GPE.7- Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula.** ***G.GPE.7 provides practice with the distance formula and its connection with the Pythagorean Theorem★***	**other produces a system with the same solutions.** **REI.C.6 - Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.** **REI.C.7- Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically. For example, find the points of intersection between the line $y = -3x$ and the circle $x2 + y2 = 3$.**	**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.*** **G.C.3 - Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle.** **G.GPE.1 - Derive the equation of a circle of given center and radius using the Pythagorean Theorem; complete the square to find the center and radius of a circle given by an equation.**