Wyoming Department of Education Required Virtual Education Course Syllabus

Platte 1County School District # 1

Program Name	Edgenuity	Content Area	MA
Course ID	O200005	Grade Level	Grades 9-12
Course Name	Geometry	# of Credits	1.0
SCED Code	02072G1.0011	Curriculum Ty	Edgenuity Online Course

COURSE DESCRIPTION

This full-year course addresses the critical areas of: congruence, proof, and constructions; similarity and trigonometry; circles; three-dimensional figures; and probability of compound events. Transformations and deductive reasoning are common threads throughout the course. Students build on their conceptual understanding of rigid transformations established in middle school as they formally define each and then, use them to prove theorems about lines, angles, and triangle congruency. Rigid transformations are also used to establish relationships between two-dimensional and three-dimensional figures. Students use their knowledge of proportional reasoning and dilations to develop a formal definition for similarity of figures. They apply their understanding of similarity to defining trigonometric ratios and radian measure. Students also make algebraic connections as they use coordinate algebra to verify properties of figures in the coordinate plane and write equations of parabolas and circles. Throughout the course, students investigate properties of figures, make conjectures, and prove theorems. Students demonstrate their reasoning by completing proofs in a variety of formats. The standards of mathematical practice are embedded throughout the course as students apply geometric concepts in modeling situations, make sense of problem situations, solve novel problems, reason abstractly, and think critically.

WYOMING CONTENT AND PERFORMANCE STANDARDS

STANDARD#	BENCHMARK_(Standard/Indicator) Use the Standards and Benchmarks as Spreadsheets
G-CO.1.	Experiment with transformations in the plane. Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line,
G-CO.2	Experiment with transformations in the plane. 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	Experiment with transformations in the plane. Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry it onto itself.
G-CO.4	Experiment with transformations in the plane. Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.
G-CO.5	Experiment with transformations in the plane. 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	Understand congruence in terms of rigid motions. 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	Understand congruence in terms of rigid motions. 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 geometric theorems. 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 geometric theorems. Prove theorems about triangles. Theorems include: measures of interior angles of a triangle sum to 180 degrees; 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.12.	Make geometric constructions. 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; 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.
G-SRT.1	Understand similarity in terms of similarity transformations. Verify experimentally the properties of dilations given by a center and a scale factor:
G-SRT.2.	Understand similarity in terms of similarity transformations. 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.	Understand similarity in terms of similarity transformations. Use the properties of similarity transformations to establish the AA criterion for two triangles to be similar.
G-SRT.4.	Prove theorems involving similarity. 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.	Prove theorems involving similarity. Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.
G-SRT.8.	Define trigonometric ratios and solve problems involving right triangles. Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.
G-SRT.6.	Define trigonometric ratios and solve problems involving right triangles. 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.
G-GPE.4	Use coordinates to prove simple geometric theorems algebraically.
G-GPE.5.	Use coordinates to prove simple geometric theorems algebraically. Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems
G-GPE.6.	Use coordinates to prove simple geometric theorems algebraically. 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 prove simple geometric theorems algebraically. Use coordinates to compute perimeters of polygons and areas of triangles and rectangles
A-REI.1.	Understand solving equations as a process of reasoning and explain the reasoning. Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.
F-LE.2.	Construct and compare linear, quadratic, and exponential models and solve problems. Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).
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).*
G-MG.2.	Apply concepts of density based on area and volume in modeling situations
G-MG.3.	Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios).*
G-C.2.	Understand and apply theorems about circles. Identify and describe relationships among inscribed angles, radii, and chords. 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.
G-C.3.	Understand and apply theorems about circles. Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle.
G-C.4.	Understand and apply theorems about circles. Construct a tangent line from a point outside a given circle to the circle.
G-GMD.1.	Give an informal argument for the formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone. Use dissection arguments, Cavalieri's principle,
G-GMD.2.	(+)Give an informal argument using Cavalieri's principle for the formulas for the volume of a sphere and other solid figures.
G-GMD.3.	Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.*
G-GMD.4.	Identify the shapes of two-dimensional cross-sections of three-dimensional objects, and identify three-dimensional objects generated by rotations of two-dimensional objects.
A-CED.2.	Create equations to represent relationships between quantities; graph equations on coordinating axes with labels and scales

SCOPE AND SEQUENCE		
UNIT OUTLINE	STANDARD#	OUTCOMES
		OBJECTIVES/STUDENT CENTERED GOALS

Geometric Transformations	G-CO.1. G-CO.9. G-CO.12.	Use transformations to understand and explain triangle congruence and similarity.
Angles and lines	G-CO.1 G-CO.9 G-CO.12. G-GPE.4 G-GPE.5 A-CED.2	Understand parallel and perpendicular lines, lines cut by transversal, perform geometric constructions and justify them, understand slopes of parallel and perpendicular lines, writing linear equations, proving lines parallel
Triangles and Triangle Congruence	G-SRT.2. GSRT.3. G-SRT.3 G-SRT.4 G-SRT.6 G-SRT.8 G-CO.1. G-CO.4. G-CO.10. G-CO.2 G-CO.6.	Show understanding of triangle angle theorems, triangles and their side lengths, triangle inequalities, proving the isosceles triangle theorem and its converse, understanding congruent figures, using triangle congurence theorems
Similarity Transformations	G-CO.1 G-CO.2 G-CO.3 G-CO.4 G-CO.5 G-CO.6 G-CO.7 G-SRT.1 F-LE.2.	Calculate and interpret the scale factor for dilations of figures, determine if two polygons are similar using dilations, completing steps to prove triangles and similar, apply the Pythagorean theorem to find side lengths of a triangle

| Circles | G-CO.1.
G-GPE.1.
G-C.2.
G-C.3.
G-C.4.
A-REI.1. | Introduction to Circles Calculate the degree measure of an arc using the arc addition postulate. Complete the steps to prove that all circles are similar. Identify and describe terms related to circles. Central Angles Determine the measures of central angles, chords, and arcs using the angles-chords-arcs congruency theorems. Identify congruent central angles, chords, and arcs. Solve problems using the radius tangent theorem and its converse. Inscribed Angles Apply theorems about inscribed angles and angles formed by a tangent and a chord. Complete the steps to prove theorems involving inscribed angles and their intercepted arcs. Secants, Tangents, and Angles Solve problems about angles formed by a secant and a tangent that intersect outside a circle. Solve problems about angles formed by two intersecting chords. Solve problems about angles formed by two intersecting tangents. Solve problems about angles formed by two secants that intersect outside a circle. Solve problems involving segments formed by a secant and a tangent that intersect outside a circle. Solve problems involving segments formed by two intersecting chords. Solve problems involving segments formed by two intersecting tangents. Solve problems involving segments formed by two secants that intersect outside a circle. Determine the radian measure of a central angle. Solve problems involving arc length with central angles measured in degrees. Solve problems involving arc length with central angles measured in radians. Solve problems involving circumference of a circle. Solve problems involving area of a circle. Solve problems involving area of a sector with central angles measured in degrees. Solve problems involving area of a sector with central angles measured in radians. Determine segment lengths, angle measures, and arc measures using definitions and theorems relating to circles. Performance Task: Circle Constructions Equation of a Circle Determine if a given point lies on a circle. Determine the equation of a circle. Identify the center and radius from the equation of a circle, including equations given in general form. Describe key features of a parabola. Determine the equation of a parabola given the focus and directrix. |

Geometric Modeling in Two Dimensions	G-CO.1. G-GPE.6. G-GPE.7. G-MG.1. G-SRT.6. G-SRT.8.	Geometric Modeling in Two Dimensions Area of Triangles and Parallelograms Solve problems involving areas of triangles and parallelograms. Perimeter and Area of Rhombi, Trapezoids, and Kites Calculate the perimeter of a rhombus, trapezoid, or kite given the coordinates of the vertices. Solve problems involving the area of a rhombus, trapezoid, and kite given the coordinates of the vertices. Solve problems involving the area of a rhombus, trapezoid, and kite. Angle Measures of Polygons Apply the polygon exterior angle sum theorem to solve problems. Apply the polygon interior angle sum theorem to solve problems. Identify and describe polygons. Area of Regular Polygons Calculate the area of a regular polygon. Calculate the length of the apothem of a regular polygon. Solve real-world problems involving the area of regular polygons. Area of Composite Figures Calculate the area of composite 2-D figures, including real-world applications. Decompose composite 2-D figures. Write an expression that represents the area of a composite 2-D figure. Density and Design Problems Solve problems involving density of an area. Use geometric concepts to solve design problems.
Geometric Modeling in Three Dimensions	G-CO.1. G-MG.1. G-MG.2. G-MG.3. G-GMD.1. G-GMD.2. G-GMD.3. G-GMD.4.	Determine the 3-D figure generated by a rotation of a 2-D figure. Determine the horizontal and vertical cross-sections of 3-D figures. Calculate the olume of Prisms. Calculate the volume or an unknown measure of an oblique prism based on a mathematical or real-world model. Write expressions to represent the volumes or unknown measures of right and oblique prisms. Volume of Pyramids Calculate the volume or an unknown measure of a right pyramid based on a mathematical or real-world model. Calculate the volume or an unknown measure of an oblique pyramid based on a mathematical or real-world model. Write expressions to represent the volumes or unknown measures of right and oblique pyramids. Calculate the volume of Cylinders, Cones, and Spheres.