Wyoming Department of Education Required Virtual Education Course Syllabus

BIG HORN COUNTY SCHOOL DISTRICT

Program Name	WYCA	Content Area	Mathematics
Course ID	CAMA79371	Grade Level	9, 10, 11, 12
Course Name	Geometry B	# of Credits	0.5
SCED Code	02072G0.5022	Curriculum Type	Connections Academy

COURSE DESCRIPTION

This is the second of two courses that comprise Geometry. Throughout the course, the student will use virtual manipulatives and tools to explore area, surface area, and volume, and study the concept of similarity as it relates to various figures. The student will use Trigonometry and right triangle concepts, such as 30-60-90, 45-45-90, and the Pythagorean Theorem to solve problems. The student will also be introduced to vectors and learn to solve problems involving magnitude and direction. In addition, the student will study transformation concepts, such as translations, reflections, rotations, and dilations as well as concepts associated with symmetry. The student will learn to use formulas to find the areas of a variety of two-dimensional shapes. This course concludes with an exploration of concepts related to circles, such as arcs, angles, and intersecting lines such as chords, secants, and tangents. Throughout the course, the student will learn concepts through a variety of instructional strategies, solve real-world applications, and complete an assortment of activities.

WYOMING CONTENT AND PERFORMANCE STANDARDS

STANDARD#	BENCHMARK
N.Q.1	Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.
N.Q.2	Define appropriate quantities for the purpose of descriptive modeling.
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.4	Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.
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.8	Explain how the criteria for triangle congruence (ASA, SAS, and SSS) follow from the definition of congruence in terms of rigid motions.
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; 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.CO.13	Construct an equilateral triangle, a square, and a regular hexagon inscribed in a circle.
G.SRT.1	Verify experimentally the properties of dilations given by a center and a scale factor:
G.SRT.1b	The dilation of a line segment is longer or shorter in the ratio given by the scale factor.
G.SRT.3	Use the properties of similarity transformations to establish the AA criterion for two triangles to be similar.
G.SRT.5	Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.
G.SRT.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.
G.SRT.8	Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.
G.SRT.10	Prove the Laws of Sines and Cosines and use them to solve problems.
G.C.1	Prove that all circles are similar.
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.C.5	Derive using similarity the fact that the length of the arc intercepted by an angle is proportional to the radius, and define the radian measure of the angle as the constant of proportionality; derive the formula for the area of a sector.
G.GPE.B.4	Use coordinates to prove simple geometric theorems algebraically.
G.GPE.6	Find the point on a directed line segment between two given points that partitions the segment in a given ratio.
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, and informal limit arguments.

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.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.
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).

SCOPE AND SEQUENCE

UNIT OUTLINE	STANDARD#	OUTCOMES
Unit 1: Review of Geometry A In this unit, you will review the major concepts from Geometry A that are applicable to Geometry B. These include the basic tools of geometry, reasoning and proof, properties of parallel and perpendicular lines, and working with congruent triangles.		• Review the basic terms of geometry • Review conditional and biconditional statements • Review properties of parallel and perpendicular lines • Review finding triangles congruent
Unit 2: Polygons and Quadrilaterals In this unit, you will examine properties of quadrilaterals and use the properties to prove and classify special types of quadrilaterals such as parallelograms, rectangles, rhombuses, squares, trapezoids, and kites. You will use properties of parallel and perpendicular lines and diagonals to classify quadrilaterals. You will also use theorems to find angle measures of polygons, both interior and exterior angles. You will explore geometry in the coordinate plane through classifying polygons in the coordinate plane with formulas such as slope, midpoint, and distance as well as naming coordinates using variables for a general polygon and proving theorems using coordinate proofs. You will complete various activities throughout the unit to apply	G.CO.10, G.CO.11, G.SRT.5, G.GPE.B.4	• Find the sum of the measures of the interior angles of a polygon • Find the sum of the measures of the exterior angles of a polygon
Unit 3: Similarity In this unit on similarity, you will learn to use ratios to compare quantities, write proportions, and solve problems. You will also use ratios and proportions to determine whether two polygons are similar, to find unknown side lengths of similar figures, and to solve problems relating to scale factor. You will explore similar triangles and related postulates and theorems. Finally, you will use similarity to find indirect measurements in right triangles, as well as the relationship between segments and between lengths.	G.SRT.2, G.SRT.3, G.SRT.4, G.SRT.5	• Write ratios and proportions and use them to solve problems • Identify similar polygons and the corresponding parts • Prove triangles similar using AA~, SAS~, and SSS~ • Use proportions to find measurements in similar polygons
Unit 4: Right Triangles and Trigonometry In this unit, you will explore concepts related to right triangles. You will use the Pythagorean Theorem and explore the concept of a Pythagorean triple, as well as properties of special right triangles. You will use trigonometric ratios to find side lengths and angle measures of right triangles. To solve real-world scenarios, you will use angles of elevation and depression. Your activities include a class discussion.	N.Q.3, A.SSE.3, G.SRT.6, G.SRT.7, G.SRT.8, G.SRT.10, G.SRT.11	• Find missing length and angle measures in right triangles using the Pythagorean Theorem • Identify properties of 30°–60°–90° and 45°–45°–90° triangles and the trigonometric functions sine, cosine, and tangent • Use theorems to classify triangles as right, obtuse, or acute • Identify and use angles of elevation and depression to solve problems

Unit 5: Area In this unit, you will explore and find the area of polygons and circles. You will use formulas to find areas of regular polygons, parallelograms, triangles, trapezoids, rhombuses, kites, and circles, including parts of circles such as sectors and segments. You will use trigonometry to find the areas of regular polygons and triangles, as well as the area formula for a triangle given SAS. In addition, you will use 30°-60°-90° and 45°-45°-90° special triangles to find area. You will also learn and apply concepts related to regular polygons, including perimeter and area ratios of similar figures, as well as circle concepts like naming arcs, finding arc measure and length, and finding the circumference of a circle. You will use these concepts to find the area of composite figures and missing dimensions of figures, in addition to using them to solve real-world applications. Finally, you will complete a portfolio project relating the circumference of a circle to the total distance a car's tires can travel.	N.Q.1, N.Q.2, N.Q.3, A.SSE.3, G.CO.1, G.SRT.9, G.C.1, G.C.5, G.GMD.1, G.MG.1	• Use formulas to find the area of parallelograms, triangles, trapezoids, rhombuses, kites, regular polygons, and circles • Use ratios to find the perimeter and area of similar polygons • Use trigonometry to find the areas of regular polygons and triangles • Find the measures of central angles, arc measure, arc length, and circumference of circles • Use arc measure and arc length to find the areas of sectors and segments of circles
Unit 6: Surface Area and Volume This unit covers area and volume of three-dimensional solids. The unit begins with defining the polyhedron space figure, the parts of a polyhedron, and examining cross sections. Euler's Formula is introduced and used to find the number of faces, vertices, or edges of a polyhedron. Students will explore and use formulas to find lateral areas, surface areas, and volume of three-dimensional solids, such as prisms, cylinders, pyramids, cones, and composite figures. Sphere terminology such as center, radius, diameter, great circle, hemispheres, and circumference are explored and defined. Students will use formulas to find the area and volume of spheres. The unit ends with exploring the areas and volumes of similar solids, including identifying similar solids, finding scale	G.GMD.1, G.GMD.2, G.GMD.3, G.GMD.4, G.MG.1, G.MG.2, G.MG.3	• Recognize a polyhedron and its parts and cross sections • Use Euler's Formula to determine the number of faces, vertices, or edges of a polyhedron • Find lateral area and surface area of a prism, cylinder, pyramid, cone, and sphere • Find the volume of a prism, cylinder, pyramid, cone, and sphere • Determine if two solids are similar
Unit 7: Circles This unit explores concepts related to circles, such as central angles, inscribed angles, and angles formed by intersecting lines–including chords, tangents, and secants. Students will examine the relationships between angles both inside and outside of a circle and the measure of the intercepted arcs. These relationships, as well as properties of tangents, will be used to solve problems involving angle measure, arc measure, and segment lengths. Students will also explore circles in the coordinate plane, including writing an equation of a circle in standard form. Using radius, circle center, or a point on the circle, students will graph circles in the coordinate plane and be able to identify circle center and radius in an equation of a circle in standard form. A variety of instructional strategies and activities are used to	G.C.2, G.C.4, G.GPE.1	• Use properties of a tangent to a circle • Use congruent chords, arcs, and central angles • Use perpendicular bisects to chords • Find the measure of an inscribed angle • Find the measure of an angle formed by a tangent and a chord
Unit 8: Geometry B Semester Exam This unit reviews concepts from Semester B of the Geometry course. The unit begins with a review assignment which intends to help the student recall topics from Units 1 through 6. A vocabulary activity explores special terms and properties from the course. Two Quarter Tests are also given for students to practice the concepts from this semester in a more formal format. The assessment is included at the conclusion of the unit in the form of the Semester Exam.		•Students demonstrate their knowledge of the concepts covered in this course