

# Wyoming Department of Education Required Virtual Education Course Syllabus

## BIG HORN COUNTY SCHOOL DISTRICT #1

Program Name	WYCA	Content Area	Mathematics
Course ID	CAMA79346	Grade Level	9, 10, 11, 12
Course Name	Geometry A	# of Credits	0.5
SCED Code	02072G0.5012	Curriculum Type	Connections Academy

### COURSE DESCRIPTION

*This is the first of two courses that comprise Geometry. Throughout the course, the student will use virtual manipulatives and tools to explore the principles of logic, proofs, and constructions. The student will use the midpoint and distance formulas to solve a variety of problems involving the coordinate plane. The student will also study parallel and perpendicular lines, including special angle pairs. The student will use triangle concepts to find angle measures, prove triangles congruent, and discover relationships within one and two triangles. This course will conclude with the study of polygons and quadrilaterals, during which the student will learn the properties and formulas to find angle measures and classify parallelograms. 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
<p><b>Unit 1: Focus on Success in Geometry</b>                      In this unit, you will focus on ways to think about and approach geometry. You will learn how to set personal goals, establish study strategies that reduce anxiety, and review ways to be an active learner. The goal of this unit is to help you establish a positive mindset at the start of the course. This includes understanding how effort impacts goal attainment, appreciating the importance of taking initiative with learning, and embracing the many resources available to help you throughout the course, such as your fellow students, your teacher, online tools, and your Learning Coach.</p>		<ul style="list-style-type: none"> <li>• Use strategies such as self-assessment and reflection in order to improve mathematical performance</li> <li>• Distinguish between effort-based and ability-based models of learning</li> <li>• Assess personal readiness for study and learning</li> <li>• Use resources to assist with goal-setting and attainment</li> </ul>
<p><b>Unit 2: Tools of Geometry</b>                      This unit introduces various topics in geometry. The beginning of the unit involves representing three-dimensional solid figures using nets, isometric drawings, and orthographic drawings. Special drawing techniques are introduced, such as slanted lines to represent three-dimensional perspective and dashed lines to represent hidden lines. An introduction to basic geometry terms such as points, lines, and planes is included. These are introduced as the building blocks of geometry on which all other geometry terms are defined. Postulates and axioms are introduced as well as naming techniques.</p>	G.CO.1, G.CO.9, G.CO.12, G.GPE.6, G.GPE.7	<ul style="list-style-type: none"> <li>• Make nets and drawings of three-dimensional figures</li> <li>• Understand basic terms and postulates of geometry</li> <li>• Find and compare lengths of segments and measures of angles</li> <li>• Identify special angle pairs and use their relationships to find angle measures; Make basic constructions using a straightedge and a compass</li> <li>• Find the perimeter, circumference, and area of basic shapes</li> </ul>
<p><b>Unit 3: Reasoning and Proof</b>                      This unit focuses on reasoning and writing formal proofs. You will explore conditional and biconditional statements. The conclusion of the unit introduces two types of formal proofs, two-column proofs and paragraph proofs. Finally, you will participate in a discussion on biconditionals and definitions.</p>	G.CO.9	<ul style="list-style-type: none"> <li>• Write high-quality definitions using biconditionals</li> <li>• Connect reasoning in algebra and geometry</li> <li>• Prove and apply theorems about angles</li> </ul>
<p><b>Unit 4: Parallel and Perpendicular Lines</b>                      In this unit, you will explore concepts associated with parallel and perpendicular lines. The unit begins with identifying parallel, perpendicular, and skew lines. Parallel and perpendicular planes will also be introduced, as well as the special types of angles formed by two lines and a transversal. You will participate in a discovery activity that explores special properties of angles formed by two parallel lines and a transversal. The theorems and postulate for the special angle pairs will be proven and used to find angle measures. Then the converse of these theorems and postulate are introduced and used to prove lines parallel. Different forms of proofs such as two-column, paragraph, and flow-proofs involving parallel and perpendicular lines will be</p>	G.CO.9, G.CO.10, G.CO.13, G.MG.3	<ul style="list-style-type: none"> <li>• Identify relationships between figures in space and angles formed by two lines and a transversal</li> <li>• Prove theorems about parallel lines and use parallel lines to prove a theorem about triangles</li> <li>• Use properties of parallel lines to find angle measures</li> <li>• Determine whether two lines are parallel or perpendicular</li> <li>• Construct parallel and perpendicular lines</li> </ul>
<p><b>Unit 5: Transformations</b>                      Concepts related to transformations are explored in this unit. Students will explore translations, reflections (including glide reflection and compositions of reflections), rotations, and dilations. Students will identify, find, and compose transformations both on and off the coordinate plane. Students will identify isometries as well as the type of symmetry in figures and three-dimensional objects. Students will also use reflection to minimize distance, find angles of rotation, and scale factor for dilation.</p>	G.CO.2, G.CO.3, G.CO.4, G.CO.5, G.SRT.1, G.SRT.1a, G.SRT.1b	<ul style="list-style-type: none"> <li>• Identify and classify isometries</li> <li>• Describe, find, and compose figure translations</li> <li>• Identify, find, and compose figure reflections, and use reflection to minimize a distance</li> <li>• Identify, find, and compose compositions of reflections, including glide reflection</li> <li>• Identify, find, and compose figure rotations and find angle rotation</li> </ul>

<p><b>Unit 6: Congruent Triangles</b></p> <p>This unit covers concepts associated with congruent triangles, such as identifying corresponding parts of congruent triangles, identifying isosceles and equilateral triangles, proving triangles congruent, and proving parts of triangles congruent. Lessons build on your understanding and skills related to angles and triangles. Visualization skills will be used for overlapping triangles. Theorems and postulates such as SSS, SAS, ASA, AAS, and HL will be introduced throughout the unit. Corresponding parts of congruent triangles are congruent (CPCTC) are used to prove parts of triangles congruent. You will use and apply properties of isosceles and equilateral triangles. You will also prove two triangles congruent using other congruent triangles.</p> <p>A variety of methods will be used throughout the unit for <del>instruction, practice, and review of concepts. You will complete</del></p>	<p>G.CO.6, G.CO.7, G.CO.8, G.CO.10, G.CO.12, G.SRT.5</p>	<ul style="list-style-type: none"> <li>• Identify congruent figures and corresponding parts of congruent figures</li> <li>• Prove that two triangles are congruent using various methods such as SSS, SAS, ASA, AAS, and HL</li> <li>• Prove that parts of two triangles are congruent</li> <li>• Identify and use properties of isosceles and equilateral triangles</li> </ul>
<p><b>Unit 7: Triangles</b></p> <p>In this unit, you will discover and explore concepts involving relationships within triangles. You will expand on the skills learned in previous units, such as using the midpoint formula to find the midsegments of triangles and the distance formula to examine relationships in triangles. You will learn new theorems, such as the Triangle Midsegment Theorem, Perpendicular Bisector Theorem, and Angle Bisector Theorem, as well as theorems related to concurrency in triangles and triangle inequality. You will also explore relationships within a triangle using the Corollary to the Triangle Exterior Angle Theorem as well as those theorems related to triangle inequality. Finally, you will identify and use properties of midsegments, perpendicular</p>	<p>G.CO.9, G.CO.10, G.SRT.5, G.C.3</p>	<ul style="list-style-type: none"> <li>• Identify and use properties of triangles, such as midsegments, perpendicular bisectors, angle bisectors, medians, and altitudes</li> <li>• Use indirect reasoning to write proofs</li> <li>• Use and apply inequalities in one triangle involving angles and sides</li> </ul>
<p><b>Unit 8: Geometry A Semester Exam</b></p> <p>In this unit, you will have the opportunity to prepare for and take the semester exam. Since this is a comprehensive exam, it may be helpful to organize your notes in the order of the course outline before you begin to review. Using the test-taking strategies that you have previously learned can help you with both the objective questions and essays.</p>		<ul style="list-style-type: none"> <li>• Decide which strategies you will use to prepare for your exam</li> <li>• Organize your time and study materials</li> <li>• Review your notes, key words and vocabulary terms, and all important concepts that may be covered in this exam</li> </ul>