Grade Level:	
Class Title:	**Geometry**
Subject:	**Math**
Class Description:	This course will introduce students to the fundamentals of geometry. Geometry is a full-year class that will emphasize an abstract, formal approach to the study of geometry, typically including topics such as properties of plane and solid figures; deductive methods of reasoning and use of logic; geometry as an axiomatic system including the study of postulates, theorems, and formal proofs; concepts of congruence, similarity, parallelism, perpendicularity, and proportion; and rules of angle measurement in triangles. Passing this course is a high school graduation requirement, as is passing the end-of-course (EOC) exam that is taken at the completion of the course in May. This class will cover the common core mathematics standards for geometry. This will be a year-long , high school credit class, spanning the 2014-2015 school year. This class will work toward one or more EALRs. This will be a year-long class, spanning the 2014-2015 school year.
Learning Materials:	Parent: ***List all textbooks, workbooks, lessons, manipulatives, workshops, on-site class, etc., that will be used on a regular basis to accomplish the goals of this course.*** Textbook Workbook Manipulatives/Games Flash cards
Learning Goals/ Performance Objectives:	**Geometry Common Core Standards** Making mathematical models is a Standard for Mathematical Practice, and specific modeling standards appear throughout the high school standards indicated by a star symbol (★). **Experiment with transformations in the plane** 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. 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). 3. Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry it onto itself. 4. Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.

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.

Understand congruence in terms of rigid motions

1. 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.

2. 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.

3. Explain how the criteria for triangle congruence (ASA, SAS, and SSS) follow from the definition of congruence in terms of rigid motions.

Prove geometric theorems

1. 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.*

2. 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.*

3. 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.*

Make geometric constructions

1. Make formal geometric constructions with a variety of tools and methods (compass and straight edge, 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.*

2. Construct an equilateral triangle, a square, and a regular hexagon inscribed in a circle.

Understand similarity in terms of similarity transformations

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.

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.

3. Use the properties of similarity transformations to establish the AA criterion for two triangles to be similar.

Prove theorems involving similarity

1. 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.*

2. Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.

Define trigonometric ratios and solve problems involving right triangles

1. 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.

2. Explain and use the relationship between the sine and cosine of complementary angles.

3. Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.★

Understand and apply theorems about circles

1. Prove that all circles are similar.

2. 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.*

3. Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle.

Find arc lengths and areas of sectors of circles

1. 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.

Translate between the geometric description and the equation for a conic section

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.

2. Derive the equation of a parabola given a focus and directrix.

Use coordinates to prove simple geometric theorems algebraically

1. Use coordinates to prove simple geometric theorems algebraically. *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).*

2. Prove the slope criteria for parallel and perpendicular lines and use 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).

3. Find the point on a directed line segment between two given points that partitions the segment in a given ratio.

4. Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula.★

Explain volume formulas and use them to solve problems

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.*

2. Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.★

Visualize relationships between two-dimensional and three-dimensional objects

1. Identify the shapes of two-dimensional cross-sections of three-dimensional objects, and identify three-dimensional objects generated by rotations of two-dimensional objects.

Apply geometric concepts in modeling situations

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).★ 2. Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile, BTUs per cubic foot).★ 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).★
Learning Activities:	[Student's name] will complete _____chapters per month from the textbook (OR "student will complete one unit per month in curricula") [Student's name] will complete ____ chapter/unit tests. Student's name] will spend ____ minutes learning and memorizing basic facts each week. Student's name] will spend ___ minutes practicing skills on Study Island. Other examples of activities: Chapter review questions; chapter quizzes; section / topic homework assignments; section / topic quizzes; review / homework worksheets; chapter tests; final exam / semester exam; online assessments; individual or group tutoring; online math activities; use of math manipulatives or tools in constructing various figures; creating and organizing a math portfolio notebook Moving through the materials at this pace will ensure completion by the end of the year and accomplish the goals of the course. <Student's Name> will complete _____ each week _____each month to ensure completion by the end of the year. (The goal may be to finish part of a text, etc.)
Progress Criteria/ Methods of Evaluation:	***Consultant:*** The student will cover all topics and be assessed with a variety of materials ranging from tests, quizzes, homework assignments, discussions, and frequent formative assessments. These assessments can be made by the parents and/or online tools. The grade for the class will be assigned using the Mid-Columbia Partnership's grading scale (93-100 = A; 90-92 = A- ; 87-89 = B+ ; 83-86 = B ; 80-82 = B- ; 77-79 C+ ; 73-76 = C ; 70-72 = C- ; 67-69 = D+ ; 65-66 = D ; 64 an d below = F) [Student's name] will be expected to achieve 80% accuracy on each assignment or test before moving on to the next. Concepts not mastered at this level will be retaught until 80% mastery is achieved. Mastery may be evaluated by written tests, oral questions and answers, or parent observation. [Student's name] will keep a portfolio of weekly work samples and any written assessments to present to consultant at face-to-face meetings at the end of each month. This notebook will also be made available to the HQ teacher upon request for the awarding of high school credit. [Student's name] will complete 7-10 activities monthly with a mastery of 80% of the

	concepts studied. Student's conceptual mastery will be determined based on weekly journal entries, project worksheets and parent observation. Student will maintain a portfolio containing weekly work samples and any written assessments to present to consultant at face-to-face meetings at the end of each semester. **Every month progress will be determined by the HQ teacher of this course based on the question: "Will the student master his performance objectives by the end of the course?" The HQ teacher will take into consideration ALL factors (including student life situation, effort, attitude, etc.) when making this professional judgment. Each month, the student will be expected to master approximately 10% of the yearly goals for this class (or 20% of semester goals), with all of the goals being met by the end of the year (or semester.) The mastery of any one goal may be an on-going process and some goals may overlap or be difficult to measure. Evaluation of progress toward the mastery of the goals will be based on monthly completion (or progress toward completion) of the learning activities that are designed to provide the means to achieving the goals of the learning plan. With that said, monthly progress can still be marked satisfactory based on the professional judgment of the teacher that the student will complete the goals of the course.**
Estimated Weekly Hr:	***Consultant: The typical number of hours spent on this subject at this age in a traditional classroom is 5+ hours.***
CEDARS Code:	***Consultant: 52052***