



GEOMETRY HONORS

Counselors are available to assist parents and students with course selections and career planning. Parents may arrange to meet with the counselor by calling the school's guidance department.

COURSE DESCRIPTION

Geometry Honors is a mathematics course for students who exhibit high mathematical ability and achievement. The course is designed to prepare students for Scientific, Technology, Engineering, and Mathematics (STEM) fields. The course focuses on the development of problem-solving skills and the acquisition of mathematical vocabulary and symbols. The active engagement of students along with the use of manipulatives and technology, such as computer programs and calculators, will allow students to develop an understanding of the geometric principles they are learning. Topics include reasoning and proof, lines and their relationships, triangles and their relationships, polygons and quadrilaterals, similarity, right triangles, properties of circles, properties of transformations, and area and volume. Students will gain an appreciation of the structure of geometry and develop powers of spatial visualization. **Students cannot receive credit for both Geometry Honors and Geometry Parts 1 and 2 (MA 3221 and MA 3223).**

PREREQUISITE

Algebra I Honors or Algebra I Parts 1 and 2

OPTIONS FOR NEXT COURSE

Algebra II, Algebra II/Trigonometry, or Algebra, Functions, and Data Analysis

REQUIRED STUDENT TEXTBOOK

Glencoe Geometry (Virginia Edition). John A. Carter, Ph.D., Gilbert J. Cuevas, Ph.D., Roger Day, Ph.D., and Carol Malloy, Ph.D. Glencoe McGraw-Hill, 2012

RECOMMENDED CALCULATOR

TI-83 Plus, TI-84 Plus, TI-84 Plus C, or TI-84 Plus CE

Students should purchase a compass, ruler, and protractor.

Virginia Beach Instructional Objectives
Geometry Honors – MA 3225

VBO #	Objective
Unit 1: Reasoning and Proof	
GH.RL.1.1	The student will diagram arguments involving quantifiers using Venn Diagrams, identify the hypothesis and conclusion of a conditional statement (including statements involving quantifiers such as all, no, none and some) and write it and its converse in <i>if-then</i> form. (SOL G.1 a, c)
GH.RL.1.2	The student will construct and judge the validity of a logical argument consisting of a set of premises and a conclusion, including: being able to define and state the converse, inverse, contrapositive, and biconditional of an if-then statement; translating short verbal arguments into symbolic form; using truth tables to assess the validity of compound statements; and use valid forms of inductive and deductive reasoning to include applications in Science, Technology, Engineering and Mathematics (STEM). (SOL G.1 a, b, d)
GH.RL.1.3	The student will justify statements using properties of equality and problem solving techniques in algebraic proofs. (SOL G.1 d)
Unit 2: Foundations of Geometry	
GH.RL.2.1	The student will identify a point, line, ray, angle, line segment, and plane when given an appropriate diagram and use standard notation for each.
GH.RL.2.2	The student will use the definitions, theorems, postulates, and pictorial representations to draw conclusions about line segments and angles, including: linear measure, using the distance and midpoint formulas; using the segment addition postulate and angle addition postulate. (SOL G.3 a)
GH.RL.2.3	The student will apply the definitions and theorems for complementary, supplementary, right, straight, vertical, and adjacent angles to problems including Science, Technology, Engineering and Mathematics (STEM).
GH.RL.2.4	The student will apply the definitions and relationships of perpendicular lines in Science, Technology, Engineering and Mathematics (STEM).
GH.RL.2.5	The student will solve problems including Science, Technology, Engineering and Mathematics (STEM) by drawing conclusions about points, lines, planes, and angles and justify statements using definitions, theorems, and postulates in geometric proofs. (SOL G.1 d)
GH.RL.2.6	The student will construct a line segment congruent to a given line segment, the perpendicular bisector of a line segment, an angle congruent to a given angle, and the bisector of an angle. (SOL G.4 a, b, e, f)
Unit 3: Lines and Their Relationships	
GH.RL.3.1	The student will draw conclusions that lines and/or planes are parallel using definitions of parallel, perpendicular, and skew lines; justify parallel lines and/or planes using algebraic and coordinate methods, including slope and equations, and deductive proofs, including flow, paragraph or two-column proof. (SOL G.2 a, b, c, G.3 a, b)
GH.RL.3.2	The student will verify relationships between pairs of angles in situations involving Science, Technology, Engineering and Mathematics (STEM), using the definition of transversal and the types of angles formed justifying lines are parallel based on angle relationships. (SOL G.2 a, b, c,)
GH.RL.3.3	The student will construct the perpendicular segment to a given line from a point not on the line, the perpendicular segment to a given line from a point on the line, and a line parallel to a given line through a point not on the given line. (SOL G.4 c, d, g)

Unit 4: Triangles and Their Relationships	
GH.TR.4.1	The student will apply properties of triangles in situations involving Science, Technology, Engineering and Mathematics (STEM), including: classifying triangles based on sides and angles; applying the triangle sum theorem; and applying the exterior-angle theorem.
GH.TR.4.2	The students will show that triangles are congruent by SSS, SAS, ASA, AAS or HL using algebraic and coordinate methods as well as deductive proofs, including flow, paragraph or two-column proof. (SOL G.6)
GH.TR.4.3	The student will draw conclusions about segments or angles using the corresponding parts of congruent triangles theorem, including the use of altitude and median of a triangle, and overlapping triangles. (SOL G.6)
GH.TR.4.4	The students will apply the inequality relationships for angles or sides of one or two triangles in situations involving Science, Technology, Engineering and Mathematics (STEM), including ordering the sides and angles of a triangle. (SOL G.5 a, b, c, d)
Unit 5: Similarity	
GH.TR.5.1	The student will use the properties of similar polygons, including: identifying corresponding parts of similar polygons; writing equivalent proportions; and applying proportions to solve problems involving Science, Technology, Engineering and Mathematics (STEM). (SOL G.14 a, b, c, d)
GH.TR.5.2	The student will show that triangles are similar by AA, SAS, or SSS using algebraic and coordinate methods as well as deductive proofs, including: investigating and identifying similarity between triangles; and computing lengths of segments of similar triangles. (SOL G.7)
Unit 6: Right Triangles	
GH.TR.6.1	The student will use the Pythagorean Theorem and its converse to solve problems involving Science, Technology, Engineering and Mathematics (STEM), and recognize Pythagorean triples. (SOL G.8)
GH.TR.6.2	The student will apply properties of special right triangles to problems involving Science, Technology, Engineering and Mathematics (STEM) and find decimal approximations for the solutions. (SOL G.8)
GH.TR.6.3	The student will solve problems involving Science, Technology, Engineering and Mathematics (STEM), using sine, cosine, and tangent functions of acute angles in right triangles. (SOL G.8)
Unit 7: Polygons and Quadrilaterals	
GH.PC.7.1	The student will use measurements of interior and exterior angles of convex and regular polygons to solve problems involving Science, Technology, Engineering and Mathematics (STEM). (SOL G.10)
GH.PC.7.2	The student will classify a given quadrilateral as a parallelogram, rectangle, rhombus, square, trapezoid, or kite according to its properties and justify the conclusion. (SOL G.9)
GH.PC.7.3	The student will investigate and identify properties of quadrilaterals and use them to solve problems involving Science, Technology, Engineering and Mathematics (STEM), and prove properties of quadrilaterals using algebraic and coordinate methods as well as deductive proofs, including flow, paragraph or two-column proof. (SOL G.9)
Unit 8: Circles	
GH.PC.8.1	The student will investigate and use the properties of angles, arcs, chords, tangents and secants including: defining, identifying and using standard notation for chord, secant, tangent, major and minor arc, intercepted arc, and central and inscribed angle; defining congruent arcs, congruent circles, concentric circles and common tangent. Construct an equilateral triangle, a square and a regular hexagon inscribed in a circle. Construct the inscribed and circumscribed circles of a triangle. (SOL G.4, G.9, G.11 a, b, c)

GH.PC.8.2	The student will apply properties of circles to problems involving Science, Technology, Engineering and Mathematics (STEM), including: solving problems using angles formed by radii, chords, secants, tangents; and solving problems using the lengths of arcs, chords, secant segments and tangent segments. (SOL G.4, G.11a)
GH.PC.8.3	The student will calculate circumference and arc length and relate measures of central angles to fractions of a circle. (SOL G.11 c)
GH.PC.8.4	The student, given the coordinates of the center of a circle and a point on the circle, will write the equation of the circle. (SOL G.12)
Unit 9: Area and Volume	
GH.PC.9.1	The student will calculate the area of a triangle, rectangle, rhombus, square, trapezoid, kite, parallelogram, and apply this knowledge to find the area of other polygons, including regular polygons.
GH.PC.9.2	The student will calculate area of a circle and area of a sector of a circle given the measure of its central angle involving Science, Technology, Engineering, and Mathematics (STEM). (SOL G.11 b, c)
GH.3D.9.3	The student will calculate the lateral area, surface area, and volume of three dimensional objects. (SOL G.13)
GH.3D.9.4	The student will calculate the ratio of the areas or the volumes of similar figures in terms of the ratio of the sides or perimeters and investigate relationships between linear, square, and cubic measures of similar geometric objects and describe how changes in one measure affect the others, involving Science, Technology, Engineering and Mathematics (STEM). (SOL G.14 a, b, c, d)
Unit 10: Transformations	
GH.RL.10.1	The student will determine the image of a figure under a dilation, reflection, rotation, or translation, including defining image, preimage, mapping, and isometry. Identification of transformations in the coordinate plane will be included. (SOL G.3 c, d)
GH.RL.10.2	The student will determine if a figure has point, line, or rotational symmetry and identify how many lines of symmetry exist and the magnitude and order of rotational symmetry. (SOL G.3 c)
Unit 11: Advanced Algebra Concepts	
GH.TR.11.1	The student will solve problems involving Science, Technology, Engineering and Mathematics (STEM), using the Laws of Sines and Cosines.

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For further information, please call (757) 263-1070.

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To seek resolution of grievances resulting from alleged discrimination or to report violations of these policies, please contact the Title IX Coordinator/Director of Student Leadership at (757) 263-2020, 1413 Laskin Road, Virginia Beach, Virginia 23451 (for student complaints) or the Section 504/ADA Coordinator/Chief Human Resources Officer at (757) 263-1133, 2512 George Mason Drive, Municipal Center, Building 6, Virginia Beach, Virginia 23456 (for employees or other citizens). Concerns about the application of Section 504 of the Rehabilitation Act should be addressed to the Section 504 Coordinator/Director of Guidance Services and Student Records at (757) 263-1980, 2512 George Mason Drive, Virginia Beach, Virginia 23456 or the Section 504 Coordinator at the student's school.

Alternative formats of this publication which may include taped, Braille, or large print materials are available upon request for individuals with disabilities. Call or write the Department of Teaching and Learning, Virginia Beach City Public Schools, 2512 George Mason Drive, P.O. Box 6038, Virginia Beach, VA 23456-0038. Telephone (757) 263-1070 (voice); fax (757) 263-1424; 263-1240 (TDD) or email Emmanuel Cenizal at Emmanuel.Cenizal@vbschools.com.

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VIRGINIA BEACH CITY PUBLIC SCHOOLS
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