



GREAT NECK PUBLIC SCHOOLS

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Curriculum Profile: Geometry Honors

<u>Department</u>	Mathematics	
<u>Course Name</u>	Geometry Honors	
<u>Course Length</u>	1 Year	
<u>High School Credits</u>	1	
<u>Description</u>	Geometry Honors is designed for students whose performance in Algebra 1 has been consistently above average and who possess keen mathematical insight. It is the second year in the NYS "Story of Functions" curriculum. The focus of this course is deepening explanations of geometric relationships, moving towards formal mathematical arguments. Transformations are emphasized early in this course and are utilized to reinforce the ideas of congruence and similarity. The content from the NYS Geometry curriculum will be covered in depth and with enrichment. Regents exam required.	
<u>Target/eligible students</u>	Completion of Algebra 1 with a minimum course grade of 90; minimum grade of 90 on the Algebra 1 regents; teacher and/or Department Head recommendation	
<u>State Learning Standards Link(s)</u>	New York State Next Generation Mathematics Learning Standards - Mathematical Practices 1. Make sense of problems and persevere in solving them. 2. Reason abstractly and quantitatively. 3. Construct viable arguments and critique the reasoning of others. 4. Model with mathematics. 5. Use appropriate tools strategically. 6. Attend to precision. 7. Look for and make use of structure. 8. Look for and express regularity in repeated reasoning. - Conceptual Categories - Congruence - Similarity, Right Triangles, and Trigonometry - Circles - Expressing Geometric Properties with Equations - Geometric Measurement and Dimension - Modeling with Geometry	p. 7 p. 126 p. 131 p. 134 p. 135 p. 137 p. 138
<u>Primary texts and materials</u>	https://www.engageny.org/resource/high-school-geometry	
<u>Scope/Sequence</u>	• Overview /Standards	Students will: Experiment with transformations in the plane, understand congruence in terms of rigid motions, prove geometric theorems, make geometric constructions; understand similarity in terms of similarity transformations, prove theorems involving similarity, define trigonometric ratios and solve problems involving right triangles, apply trigonometry to general triangles; understand and apply theorems about circles, find arc lengths and areas of sectors of circles; translate between the geometric description and the equation for a conic section, use coordinates to prove simple geometric theorems algebraically; explain volume formulas and use them to solve problems, visualize relationships between two-dimensional and three-dimensional objects; apply geometric concepts in modeling situations.
<u>Unit 1: Constructions</u>	• G.CO.1, 12 & 13	Make, justify, and apply formal geometric constructions with a variety of tools and methods (compass and straightedge, dynamic geometric software, etc.). Examples include: <i>Copying a segment; copying an angle; bisecting a segment; bisecting an</i>

		<i>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.</i>
<u>Unit 2: The Points of Concurrency</u>	• G.CO.12 • G.GPE.5	Define, construct, and algebraically find the points of concurrency (orthocenter, centroid, incenter, and circumcenter). Apply properties of parallel and perpendicular lines and their equations to solve geometric problems.
<u>Unit 3: Angle and Triangle Theorems</u>	• G.CO.9 & 10	Prove and apply theorems about lines, angles, and triangles. Include multi-step proofs and algebraic problems built upon these concepts. Examples of theorems include but are not limited to: • The sum of the interior angles of a triangle is 180 degrees. • The measure of an exterior angle of a triangle is equal to the sum of the two non-adjacent interior angles of the triangle. • If two parallel lines are cut by a transversal, then the alternate interior angles are congruent.
<u>Unit 4: Transformations</u>	• G.CO.2, 3, 4, 5, 6, 7 & 8	Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments. Represent transformations as geometric functions. Use geometric descriptions of rigid motions to transform figures and to predict the effect of a given rigid motion on a given figure. Specify and construct a sequence of transformations that will carry a given figure onto another.
<u>Unit 5: Quadrilaterals</u>	• G.CO.11	Classify quadrilaterals and define parallelograms, rhombuses, rectangles, squares, kites and trapezoids using properties of their sides, angles, and diagonals. Prove and apply theorems about parallelograms. Include multi-step proofs and algebraic problems built upon these concepts.
<u>Unit 6: Coordinate Plane Geometry</u>	• G.CO.12 & 13 • G.GPE.4, 5, 6 & 7	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. Find the point on a directed line segment between two given points that partitions the segment in a given ratio. Use coordinates to compute perimeters and areas of polygons.
<u>Unit 7: Similarity and Dilations</u>	• G.SRT.1, 2 & 3	Similarity transformations define similarity as a sequence of dilations and/or rigid motions that maps one figure onto another. Students formalize the similarity ideas of "same shape" and "scale factor" developed in the middle grades by establishing that similar triangles have all pairs of corresponding angles congruent and all corresponding pairs of sides proportional. These transformations lead to the criteria AA, SSS similarity, and SAS similarity for similar triangles.
<u>Unit 8: Similar Triangles</u>	• G.SRT.4 & 5	Prove and apply similarity theorems about triangles. For example: If a line parallel to one side of a triangle intersects the other two sides of the triangle, then the line divides these two sides proportionally. Use congruence and similarity criteria for triangles to: • Solve problems algebraically and geometrically. • Prove relationships in geometric figures.
<u>Unit 9: Trigonometry</u>	• G.SRT.6, 7, 8, 9, 10 & 11	Define trigonometric ratios and solve problems involving right triangles. Apply trigonometry to general triangles. Prove and apply the Law of Sines and Cosines, as well as the area formula for the area of a triangle to find unknown measurements in right and non-right triangles.
<u>Unit 10: Circles</u>	• G.CA.1, 2, 3, 4 & 5	Understand and apply theorems about circles in both degrees and radians to find arc length and area of sectors. Identify and describe relationships among inscribed angles, radii, and chords, as well as chords, tangents and secants, and the angles which they form.
<u>Unit 11: Solids</u>	• G.GMDA.1, 2, 3 & 4 • G.MG.1, 2 & 3	Explain lateral area, surface area, and volume formulas and use them to solve problems, including using Cavalieri's Principle to derive the formula for the volume of a sphere. Visualize relationships between two-dimensional and three-dimensional objects (cross-sections). Apply geometric concepts in modeling situations in real-life including applications of cost, density, and design.
<u>Additional Notes</u>	Sequencing of topics may vary.	