

Course Title:	Geometry (H)
Grade(s):	9-12

Course Description

The Geometry course includes an in-depth analysis of plane, solid, and coordinate geometry as they relate to both abstract mathematical concepts and real-world problem situations. Topics include logic and proof, angle relationships, parallel and perpendicular lines, triangles, quadrilaterals and polygons, perimeter and area, volume and surface area, similarity and congruence, trigonometry, and analytic geometry. The geometry course also includes units focused on data analysis. Emphasis is placed on developing critical thinking skills as they relate to logical reasoning and argument.

Honors Level (H)

Honors-level courses are designed to challenge the advanced learner. Students should expect to reach a deeper scope of skills than the academic class: a higher reading stamina, the motivation to revise work, critical thinking skills, and the propensity to finish complex tasks in a timely manner. Students in honors-level classes are expected to have a solid foundation of skills from previous courses, an ability to connect these skills to new learning, and the ability to apply them in problem-solving. Students taking an honors-level class have demonstrated the ability to take responsibility for their own learning and work fluidly both independently and collaboratively. These students should consistently aspire to achieve higher-level quality work through self-reflection and self-advocacy. These classes are recommended to students by teachers who have evaluated a student's past practice and achievement.

Course Units:

1. Foundations of Geometry
2. Parallel and Perpendicular Lines
3. Triangle Congruence
4. Relationships in Triangles
5. Quadrilaterals and Other Polygons
6. Two- and Three-Dimensional Models - Area and Volume
7. Similarity
8. Right Triangles and Trigonometry
9. Transformations
10. Circles
11. Probability

Approved Curricular Materials/Textbook(s)

Savvas enVision Geometry

Unit Title	Unit Description (Include Unit Objectives)	Unit Pacing
Unit 1: FOUNDATIONS OF GEOMETRY	The unit introduces students to the basic building blocks and skills needed for the study of geometric concepts. Students will learn essential vocabulary, construction skills, and reasoning skills needed to write simple proofs. The unit begins by focusing on the measurements and properties of line segments and angles. Students will use geometric tools to perform basic constructions and use simple angle and segment relationships to write simple proofs. The unit focuses on the Common Core Domains: Geometric Measurement and Dimension, Congruence, and Constructing viable arguments. Unit Topics Include: • Measuring Segments and Angles - Including Points, Lines, and Planes • Basic Constructions • Midpoint and Distance Formulas • Patterns and Inductive Reasoning • Conditional Statements and Biconditionals • Deductive Reasoning • Writing Proofs • Indirect Proof	5 weeks - 6 weeks (September - Beginning of October)
Unit 2: PARALLEL & PERPENDICULAR LINES	The unit begins by focusing on the properties of parallel lines and the angle relationships formed when parallel lines are cut by a transversal. The rest of the unit examines how these angle relationships can help us prove whether or not lines are parallel, the relationships between parallel lines and triangle angles, and the relationships between the slopes of parallel and perpendicular lines. Understanding how to write equations of lines, including parallel and perpendicular lines, will be reviewed, but it is a prerequisite skill to be successful in this unit. The unit covers the Common Core Domains: Congruence, Expressing Geometric Properties with Equations, and Modeling with Geometry.	2 weeks - 3 weeks (October)

	Unit Topics Include: • Parallel Lines • Proving Lines Parallel • Parallel Lines and Triangle Angle Sums • Slopes of Parallel and Perpendicular Lines • Equations of Parallel and Perpendicular Lines	
Unit 3: TRIANGLE CONGRUENCE	Congruent figures have the same shape and size. When two figures are congruent, you can slide, flip, or rotate one of the figures so that it fits exactly on the other one. When two figures are congruent, all corresponding parts will be congruent. This unit focuses on congruence and the transformations that result in congruent figures, providing examples to help students understand and determine if figures are congruent. The unit then focuses specifically on triangle congruence, and explores and defines congruence theorems that can be used to prove triangles are congruent. The unit covers the Common Core Domains: Congruence and Modeling with Geometry. Unit Topics Include: • Congruence • Isosceles and Equilateral Triangles • Proving and Applying SAS and SSS Congruence Criteria • Proving and Applying ASA and AAS Congruence Criteria • Congruence in Right Triangles • Congruence in Overlapping Triangles	3 weeks - 4 weeks (November)
Unit 4: RELATIONSHIPS IN TRIANGLES	This unit focuses on the concurrent points found in a triangle using perpendicular bisectors, angle bisectors, medians, and altitudes. The unit examines the relationships of the angle measures and side lengths within a triangle, as well as the side lengths and angle measures of two triangles. Students will construct the circumcenter, incenter, orthocenter, and centroid, and examine and apply the properties of these points within a triangle. The unit covers the Common Core Domains: Congruence, Similarity, Right Triangles, and Trigonometry. Unit Topics Include: • Perpendicular Bisectors and Angle Bisectors	3 Weeks (December)

	• Bisectors in a triangle • Medians and Altitudes • Inequalities in one triangle • Inequalities in two triangles	
Unit 5: QUADRILATERALS & OTHER POLYGONS	The unit begins by focusing on the interior and exterior angles of polygons. Students will explore and identify relationships that exist for these angles. The unit then focuses on quadrilaterals, examining properties of kites and trapezoids, and then the properties and conditions of parallelograms and special parallelograms - Rectangles, Rhombuses, and Squares. The unit also examines several aspects of coordinate geometry. Students analyze figures in the coordinate plane using slope, midpoint, and distance, and use coordinate geometry to prove properties of figures. The unit covers the Common Core Domains: Congruence, Similarity, Right Triangles, Trigonometry, and Expressing Geometric Properties with Equations. Unit Topics Include: • The Polygon Angle-Sum Theorems • Kites and Trapezoids • Properties of Parallelograms • Proving a Quadrilateral is a Parallelogram • Properties of Special Parallelograms - Rhombuses, Rectangles, and Squares • Conditions of Special Parallelograms • Polygons in the Coordinate Plane • Proofs Using Coordinate Geometry	4 weeks (December - January)
Unit 6: TWO- AND THREE-DIMENSIONAL MODELS - AREA & VOLUME	The unit opens by considering the relationship between the numbers of faces, vertices, and edges in polyhedra, examining cross sections, and determining the three-dimensional figure formed by rotating a two-dimensional figure. Students then consider the volume of oblique solids by comparing the cross sections of oblique solids to corresponding right solids. Throughout the unit, students apply geometric formulas for volume and surface area for prisms, cylinders, pyramids, cones, and spheres to solve problems. The unit focuses on the Common Core Domains: Circles, Expressing Geometric Properties with Equations, Geometric	3 weeks (January - February)

	Measurement and Dimension, and Modeling with Geometry. Unit Topics Include: • Area and Perimeter of Two-Dimensional Shapes • Volume and Surface Area of Prisms and Cylinders • Pyramids and Cones • Spheres	
Unit 7: SIMILARITY	The unit begins with students extending their understanding of transformations to include dilations. They develop the understanding that two figures are similar if there is a similarity transformation that maps one figure to the other: a rigid motion, a dilation, or a composition of a rigid motion and a dilation. These concepts are then applied to triangles. Students examine the criteria for proving two triangles are similar and analyze similarity in right triangles, including applications of the geometric mean. The unit incorporates a review of solving simple rational equations as students look at applications of similarity. The unit covers the Common Core Domains: Similarity, Right Triangles, Trigonometry, and Expressing Geometric Properties with Equations. Unit Topics Include: • Dilations • Similarity Transformations • Proving Triangles Similar • Similarity in Right Triangles • Proportions in Triangles • Review and Assessment	3 weeks (February - March)
Unit 8: RIGHT TRIANGLES & TRIGONOMETRY	The unit begins by applying the properties of similar right triangles to understand the Pythagorean Theorem, relationships in special right triangles, and trigonometric ratios. These triangle relationships are then applied in various contextual problems. The unit focuses on the Common Core Domains: Similarity, Right Triangles, Trigonometry, and Modeling with Geometry. Unit Topics Include: • Right Triangles and the Pythagorean Theorem	3 weeks - 4 weeks (March - April)

	• Special Triangles • Trigonometric Ratios • Problem Solving with Trigonometry	
Unit 9: TRANSFORMATIONS	A transformation of a geometric figure is a function, or mapping, that results in a change in the position, shape, or size of the figure. In a transformation, the original figure is the preimage, and the resulting figure is the image. A transformation that preserves distance and angle measures is called a rigid motion. The unit begins by focusing on transformations, moving from the definition of rigid motion to the rigid transformations: reflections, translations, and rotations. The rest of the unit examines how transformations can be combined to create new images and complete proofs. The unit covers the Common Core Domains: Congruence, Similarity, Right Triangles, and Trigonometry. Unit Topics Include: • Reflections • Translations • Rotations • Classification of Rigid Motions • Symmetry	3 weeks (April)
Unit 10: CIRCLES & CIRCLES IN THE PLANE	The study of circles begins with an examination of arc length, sector area, and segment area, and an introduction to radians as a unit of angle measure. Students then examine properties of tangents, chords, and inscribed angles. Finally, students learn about the properties of angles, arcs, and segment lengths that are formed when two lines intersect inside or outside a circle. The unit focuses on the Common Core Domains: Circles and Expressing Geometric Properties with Equations. Unit Topics Include: • Arcs and Sectors • Lines Tangent to a Circle • Chords - 2 Days • Inscribed Angles • Secant Lines and Segments	3 weeks - 4 weeks (April - May)

	• Circles in the Coordinate Plane	
Unit 11: PROBABILITY	The unit begins with building an understanding of probability, defining both Theoretical Probability and Experimental Probability. Students make and use frequency tables and probability distributions, and calculate the probability of events. They then extend their understanding of probability to include Conditional Probability. The unit focuses on the Common Core Domains: Conditional Probability and Rules of Probability, and Using Probability to Make Decisions. Unit Topics Include: • Experimental and Theoretical Probability • Probability Distributions and Frequency Tables • Probability Events • Conditional Probability • Permutations and Combinations	2 weeks - 3 weeks (May - June)