Abington Heights School District
Geometry Honors Curriculum

In Geometry Honors, students develop their numeracy skills through the following areas of study:

1. Congruence, Similarity, and Proofs
2. Coordinate Geometry and Right Triangles
3. Properties of Polygons and Polyhedra
4. Properties of Circles, Spheres, and Cylinders
5. Measurements of Two-Dimensional Shapes and Figures
6. Measurements of Three-Dimensional Shapes and Figures

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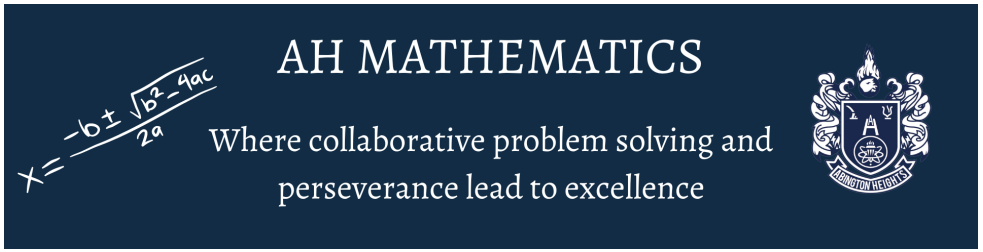

Abington Heights Math Framework

Stakeholders	Actions
Students	★ Engage in mathematical discussions, share their ideas openly, be inquisitive, seek to understand and learn more about mathematical concepts, and try their best daily. ★ Exhibit creativity and curiosity in problem solving individually and collaboratively. ★ Persevere in engaging and challenging daily mathematical practice. ★ Come prepared to learn every day.
Teachers	★ Create a safe and collaborative classroom environment where students feel vested in a shared vision for mathematical excellence. ★ Develop high quality instruction that meets the needs of all learners through differentiation. ★ Use a variety of 21st century methodologies to advance learning. ★ Partner with parents and guardians to support student success. ★ Establish a collaborative community within the building and amongst grade levels to ensure a cohesive level of instruction.
Building Leaders	★ Deeply understand the needs of teachers, students, the instructional materials being used, programs being implemented, and the expectations for state-level assessment scores ○ Knowledgeable about program and grade level standards ○ Ensure consistent and equal access to high-quality instructional materials and resources, building. ★ Be partners with teachers, students and families: ○ Provide guidance and support to the mathematical community. ○ Understand needs of teachers, students and families. ★ Trust the educators to make professional decisions based on program, student, and district needs.
Central Admin	★ Effectively communicate to the school board and community specific areas of need and how to support teachers and building leaders in a quest for mathematical excellence ★ Deeply understand the needs of teachers, students, the instructional materials being used, programs being implemented, and the expectations for state-level assessment scores ○ Have a common metric for mathematical excellence. ○ Ensure consistent and equal access to high-quality instructional materials and resources, district. ○ Re-examine best practices/curriculum routinely (6 years). ★ Support a culture of collaboration between the other stakeholder groups to maintain the standard of excellence of the Abington Heights ★ Trust the educators to make professional decisions based on program, student, and district needs.
Parents/ Community	★ Be a strong support system and contribute by building a positive math community for students. ★ Encourage a positive math mindset. ★ Have conversations with their children about school and ask what they are learning about in school. ★ Be open, receptive to the district's ideas about student learning and reach out to teachers/school to learn more about how they can support. ★ Trust the educators to make professional decisions based on program, student, and district needs.
School Board	★ Provide the fiscal resources to support: ○ Highly qualified professionals for mathematics ○ High-quality instructional materials ○ Effective and efficient math interventions for remediation ○ Professional development for math content and instructional practices ★ Trust the educators to make professional decisions based on program, student, and district needs.

Geometry Honors Scope and Sequence

Month	Unit	Estimated Number of Weeks
September	Tools of Geometry	4
October	Reasoning and Proof	3
	Parallel and Perpendicular Lines	1
November	Parallel and Perpendicular Lines	1
	Congruent Triangles	3
December	Relationships in Triangles	3
January	Constructions	1
	Quadrilaterals	2
February	Quadrilaterals	2
	Proportions and Similarity	2
March	Proportions and Similarity	1
	Right Angles and Trigonometry	3
April	Right Angles and Trigonometry	3
	Circles	1
May	Circles	1
	Perimeter & Area	1
	Surface Area & Volume	1
June	Final Exam Review	1

Unit	Essential Questions	Content	Skills	PA Core Standards	Activities	Assessment/ Evidence of Learning
Tools of Geometry	How do I identify, define, and accurately relay geometric terms? How do I apply algebraic strategies to solve geometric problems involving points, lines, and angles? What are some of the relationships between pairs of angles?	Points, lines, and planes Linear Measure Distance and Midpoint Angle Measure Angle Relationships	Identify and model points, lines, and planes Identify intersecting lines and planes Calculate linear measurement Find union and intersection Find the distance between two points Find the midpoint of a segment Measure and classify angles Identify and use congruent angles and the bisector of an angle Convert angle measures between decimal degrees and degrees, minutes, seconds	CC.2.3.HS.A.3 CC.2.3.HS.A.11	Flipcharts Chapter 1 packets Desmos: Distance and midpoint Delta math	Homework **Quiz 1**: Points, lines, and planes + Linear Measure + Distance and Midpoint **Quiz 2**: Angle Measure + Angle Relationships **Test**: Tools of Geometry

Unit	Essential Questions	Content	Skills	PA Core Standards	Activities	Assessment/ Evidence of Learning
Tools of Geometry (continued)			Add and subtract angles using degrees, minutes, seconds Identify and use special pairs of angles Identify perpendicular lines			
Reasoning and Proof	How do I make conjectures and find counterexamples for statements? How do I use deductive reasoning to reach valid conclusions?	Inductive reasoning and conjecture Logic Conditional statements Deductive reasoning	Make conjectures based on inductive reasoning Find counterexamples Determine truth values of negations, conjunctions, and disjunctions	CC.2.3.HS.A.3	Flipcharts Chapter 2 packets Delta math List of Theorems, Definitions, and Postulates for Chapter 2	Homework **Quiz 1**: Inductive reasoning and conjecture + Logic + Conditional statements + Deductive reasoning **Quiz 2**: Proofs

Unit	Essential Questions	Content	Skills	PA Core Standards	Activities	Assessment/ Evidence of Learning
Reasoning and Proof (continued)	How do I write proofs involving segment and angle theorems?	Postulates and paragraph proofs Proving segment and angle relationships	Interpret Venn diagrams Analyze statements in if-then form Write converses, inverses, and contrapositives Use the law of detachment and law of syllogism Identify and use basic postulates about points, lines, and planes Write paragraph proofs Write 2-column proofs involving segment/angle addition and subtraction, complementary and supplementary angles, transitive, vertical angles, and perpendicular lines			**Test**: Reasoning and Proof

Unit	Essential Questions	Content	Skills	PA Core Standards	Activities	Assessment/ Evidence of Learning
Parallel and Perpendicular Lines	How do I identify and prove angle relationships that occur with parallel lines and a transversal?	Parallel lines and transversals Angles and parallel lines Slopes and equations of lines Proving lines parallel	Identify the relationships between two lines or two planes Name angle pairs formed by parallel lines and transversals Solve crook problems Use theorems to determine the relationships between specific pairs of angles Use algebra to find angle measurements Recognize angle pairs that occur with parallel lines Prove that two lines are parallel	CC.2.3.HS.A.3 CC.2.3.HS.A.11	Flipcharts Chapter 3 packet List of Theorems, Definitions, and Postulates for Chapter 3 Geogebra activity and question sheet Desmos: Parallel lines cut by a transversal Non-Euclidean geometry video and question sheet	Homework **Quiz**: Parallel lines and transversals + Angles and parallel lines + Crook problems

Unit	Essential Questions	Content	Skills	PA Core Standards	Activities	Assessment/ Evidence of Learning
Congruent Triangles	What are the special relationships about the interior and exterior angles of triangles? How do I identify corresponding parts of congruent triangles and prove triangles congruent? What are the special properties of isosceles and equilateral triangles?	Classifying triangles Angles of triangles Congruent triangles Proving triangles congruent Isosceles and equilateral triangles	Identify and classify triangles by angle measures Identify and classify triangles by side measures Apply the triangle angle-sum theorem Apply the exterior angle theorem Name and use corresponding parts of congruent polygons Prove triangles congruent using the definition of congruence Use the SSS, SAS, ASA, AAS Postulates to test for triangle congruence Use the properties of isosceles and equilateral triangles	CC.2.3.HS.A.1 CC.2.3.HS.A.2 CC.2.3.HS.A.3	Flipcharts Chapter 4 packet Delta math	Homework **Quiz 1**: Classifying triangles by sides and/or angles + Sum of the Angles in a Triangle + Exterior Angle Theorem + Congruent Triangles + Distance formula **Quiz 2**: Prove triangles congruent using SSS, SAS, ASA, AAS **Test**: Congruent Triangles

Unit	Essential Questions	Content	Skills	PA Core Standards	Activities	Assessment/ Evidence of Learning
Transformations (self-paced unit)	How do I name and draw figures that have been reflected, translated, rotated, or dilated in a plane? How do I identify symmetry?	Reflections Translations Symmetry Dilations	Draw reflections Draw translations Draw rotations Draw dilations Identify lines of symmetry	CC.2.3.HS.A.2 CC.2.3.HS.A.3 CC.2.3.HS.A.5		Delta Math Transformations Unit Project **Quiz**: Transformations
Relationships in Triangles	What are the special segments and points related to triangles? What are the relationships between the sides and angles of triangles? How do I write an indirect proof?	Bisectors of triangles Medians and altitudes Inequalities in a triangle Indirect Proof The triangle inequality Inequalities in two triangles	Identify and use perpendicular bisectors in triangles Identify and use angle bisectors in triangles Identify and use medians in triangles Identify and use altitude in triangles Recognize and apply properties of inequalities to the measures of the angles of a triangle	CC.2.3.HS.A.3	Flipcharts Relationships in triangles packet Geogebra activity: perpendicular bisectors Geometer's sketchpad: medians and altitude Geogebra: Triangle Inequality Theorem	Homework **Quiz 1:** Medians + Angle bisector + altitudes Exterior angle inequality theorem **Quiz 2:** Indirect Proof + Determine if given sides can form a triangle + Find range of possible values of x **Test:** Relationships in Triangles

Unit	Essential Questions	Content	Skills	PA Core Standards	Activities	Assessment/ Evidence of Learning
Relationships in Triangles (continued)			Recognize and apply properties of inequalities to the relationships between the angles and sides of a triangle Use the Triangle Inequality Theorem Apply the Hinge Theorem or its converse to make comparisons in two triangles Prove triangle relationships using the Hinge Theorem or its converse			
Constructions	How do I use a straightedge, compass and protractor to draw various lines and angles?	Straightedge, compass, protractor Midpoints Parallel lines Perpendicular lines Angle bisectors	Draw a circle Copy a segment Draw the perpendicular bisector of a segment	CC.2.3.HS.A.4	Flipcharts Mathisfun: constructions videos Hands on activities using straightedge, compass and protractor	Constructions practice worksheets **Quiz**: Constructions Constructions Extra Credit

Unit	Essential Questions	Content	Skills	PA Core Standards	Activities	Assessment/ Evidence of Learning
Constructions (continued)		Congruent angles	Draw the line perpendicular to a line through a point on the line and not on the line Draw a line parallel to a given line, through a given point Draw an angle bisector Draw congruent angles			
Quadrilaterals	How do I find and use the sum of the measures of the interior and exterior angles of a polygon? How do I recognize and apply the properties of quadrilaterals? How do quadrilaterals compare to one another?	Angles of polygons Parallelograms Test for parallelograms Rectangles Rhombi and squares Trapezoids and kites	Find and use the sum of the measures of the interior angles of a polygon Find and use the sum of the measures of the exterior angles of a polygon Recognize and apply properties of the sides and angles of parallelograms	CC.2.3.HS.A.3 CC.2.3.HS.A.11	Flipcharts Quadrilaterals packets Relay A and B Google Forms of packet pages (T/F, ASN) Problem sets A and B Kahoot	**Homework** **Quiz:** names and formulas **Quiz:** - True/False questions involving the properties of special quadrilaterals and the relationships of the special quadrilaterals to each other

Unit	Essential Questions	Content	Skills	PA Core Standards	Activities	Assessment/ Evidence of Learning
Quadrilaterals (continued)			Recognize and apply properties of the diagonals of parallelograms Recognize the conditions that ensure a quadrilateral is a parallelogram Prove that a set of points forms a parallelogram in the coordinate plane Recognize and apply the properties of rectangles, rhombi, squares, kites and isosceles trapezoids			- Always / Sometimes / Never statements involving the properties of special quadrilaterals and the relationships of the special quadrilaterals to each other - Algebraic problems involving special quadrilaterals - 2-Column Proof involving special quadrilaterals **Test:** - Always, Sometimes, Never Statements - Properties of special quadrilaterals - Properties of special quadrilaterals and methods of proving each type of special quadrilateral

Unit	Essential Questions	Content	Skills	PA Core Standards	Activities	Assessment/ Evidence of Learning
Quadrilaterals (continued)						- Algebraic Problems Polygon angle and diagonal formulas - Special Quadrilaterals - Give most descriptive name of each quadrilateral
Proportions and Similarity	How do I identify similar polygons and use proportions to solve problems? How do I use scale models and drawings to solve problems?	Ratio and proportions Similar polygons Similar triangles Parallel lines and proportional parts Parts of similar triangles	Write ratios Write and solve proportions Use proportions to identify similar polygons Solve problems using the properties of similar polygons Identify similar triangles using AA, SSS, SAS Use similar triangles to solve problems	CC.2.3.HS.A.1 CC.2.3.HS.A.3 CC.2.3.HS.A.5 CC.2.3.HS.A.6 CC.2.3.HS.A.9	Flipcharts Proportions and Similarity packet Desmos: similar triangles Kahoot: review 7.1-7.3 Chapter 7 scavenger hunt Kahoot: 7.5-7.6 Powerpoint 7.5, 7.6 Tessellations Activity packet Tessellations Creator (NCTM)	Homework **Quiz 1:** ratio of x to y + arithmetic mean/geometric means + express as ratios in lowest terms + solve proportions + find 4th proportional + dilation + similar triangles

Unit	Essential Questions	Content	Skills	PA Core Standards	Activities	Assessment/ Evidence of Learning
Proportions and Similarity (continued)			Use proportional parts within triangles Use proportional parts with parallel lines Recognize and use proportional relationships of corresponding angle bisectors, altitudes, and medians of similar triangles Use the triangle bisector theorem Identify similarity transformations Verify similarity after a transformation Interpret scale models Use scale factors to solve problems			**Quiz 2:** Similar triangles + Side-splitter theorem + Parallel lines and transversals + proportionality + Angle-bisector theorem + Triangle midsegment theorem + Scale drawings +Dilation + Tessellations + Varignon's theorem

Unit	Essential Questions	Content	Skills	PA Core Standards	Activities	Assessment/ Evidence of Learning
Right Angles and Trigonometry	How do I use the pythagorean theorem? What are the properties of special right triangles? How do I use trigonometry to find missing measures of triangles?	Geometric mean Pythagorean theorem and its converse Special right triangles Trigonometry Angles of elevation and depression	Find the geometric mean between two numbers Solve problems involving relationships between parts of a right triangle and the altitude to its hypotenuse Use the pythagorean theorem and its converse Use the properties of 45°- 45°- 90° and 30°- 60°- 90° triangles Find trigonometric ratios using right triangles Use trigonometric ratios to find angle measures in right triangles Solve problems involving angles of elevation and depression	CC.2.2.HS.C.9 CC.2.3.HS.A.3 CC.2.3.HS.A.7	Radicals and Quadratic Equations packet (review) Pythagorean Theorem packet Trigonometry packet Quizlet Live: Pythagorean Triples SAT problems: special right triangles Kahoot: Special Right Triangles	Homework Quiz: relationships between parts of a right triangle and the altitude to its hypotenuse Test: parts of a right triangle + special right triangles + angles of elevation and depression Quiz: radicals, simplifying, adding and subtracting, solving quadratic equations Quiz: Trigonometric ratios

Unit	Essential Questions	Content	Skills	PA Core Standards	Activities	Assessment/ Evidence of Learning
Right Angles and Trigonometry (continued)			Use angles of elevation and depression to find the distance between two objects			
Circles	What are the relationships between central angles, arcs, and inscribed angles in a circle? How do I define and use secants and tangents?	Circles and circumference Measuring angles and arcs Arcs and chords Inscribed angles Tangents Secants, tangents, and angle measures Special segments in a circle	Identify and use parts of circles Solve problems involving the circumference of a circle Identify central angles, major arcs, minor arcs, and semi circles, and find their measures Find arc lengths Recognize and use the relationships between arcs and chords and diameters Find measures of inscribed angles. Find measures of angles of inscribed polygons	CC.2.3.HS.A.3 CC.2.3.HS.A.8 CC.2.3.HS.A.9	Flipcharts Circles packet Kahoot: circles, arcs, and tangents	Homework Delta Math Quiz: Large circle with many angles outside walk-around Inside walk-around Common internal tangent Common external tangent Distance of a chord to center of circle Circumference of a circle Area of a circle Length of an arc

Unit	Essential Questions	Content	Skills	PA Core Standards	Activities	Assessment/ Evidence of Learning
Circles (continued)			Use properties of tangents Solve problems involving circumscribed polygons Find measures of angles formed by lines intersecting on,inside, or outside a circle Find measures of segments that intersect in the interior or exterior of a circle			Test: Large circle with many angles Walk-around Common internal tangent Common external tangent Distance of a chord to center of circle Special segments of a circle Quadrilateral inscribed in a circle "Packed" circle problem
Perimeter & Area (self paced + 2 days)	How do I calculate the area of polygons? How do I solve problems involving areas and sectors of circles? How do I answer basic probability questions?	Part 1: Find perimeters and areas of parallelograms. Find perimeters and areas of triangles Find areas of trapezoids Find areas of rhombi and kites	Find areas of Polygons. Solve problems involving areas and sectors of circles. Solve problems involving area probability	CC.2.3.HS.A.3 CC.2.3.HS.A.9 CC.2.3.HS.A.14	Project: Perimeter and Area: - Problems from textbook - Polyhedron Kahoot Review: chapter 11	Part 1 of project, problems from text Quiz: Perimeter and Area Delta math: probability problems

Unit	Essential Questions	Content	Skills	PA Core Standards	Activities	Assessment/ Evidence of Learning
Perimeter & Area (self paced + 2 days in class) (continued)		Find areas of circles Find areas of sectors of circles				
Surface Area & Volume (self paced + 2 days in class)	How do I calculate the surface area and volume of solid figures	Find lateral areas and surface areas of prisms, cylinders, pyramids, and cones Find volumes of prisms, cylinders, pyramids, and cones Find volume and surface area of spheres	Find lateral areas, surface areas, and volumes of various solid figures.	CC.2.3.HS.A.12 CC.2.3.HS.A.13	Project: Surface Area and Volume: - Delta math assignment - Robot/Tin Man with volume and surface area calculations	Delta math Quiz: Surface Area and Volume

Portrait of an Abington Heights Mathematician

By the end of Geometry, students will:

Congruence, Similarity, and Proofs	Coordinate Geometry and Right Triangles	Properties of Polygons and Polyhedra	Properties of Circles, Spheres, and Cylinders	Measurements of Two-Dimensional Shapes and Figures	Measurements of Three-Dimensional Shapes and Figures
☐ Identify and use properties of congruent and similar polygons or solids ☐ Identify and use proportional relationships in similar figures ☐ Write, analyze, complete, or identify formal proofs	☐ Use the Pythagorean Theorem to write and/or solve problems involving right triangles ☐ Use trigonometric ratios to write and solve problems involving right triangles ☐ Calculate the distance and midpoint between two points on a number line or on a coordinate plane ☐ Relate slope to perpendicularity and/or parallelism (limited to linear equations) ☐ Use slope, distance, and/or midpoint between two points on a coordinate plane to establish properties of a two-dimensional shape	☐ Identify and use properties of triangles, quadrilaterals, regular polygons, pyramids, and prisms	☐ Identify, determine, and use the radius, diameter, segment, and/or tangent of a circle ☐ Identify, determine, and use the arcs, semicircles, sectors, and/or angles of a circle ☐ Use chords, tangents, and secants to find arc measures or segment measures ☐ Identify and use the properties of a sphere and cylinder	☐ Use properties of angles formed by intersecting lines to find measures of angles ☐ Use properties of angles formed when two parallel lines are cut by a transversal to find measures of angles ☐ Estimate and find area, perimeter, or circumference of regular, irregular , or compound figure ☐ Find the area of a sector of a circle ☐ Determine how a change in a linear dimension of a figure affects its perimeter, circumference, and area ☐ Use area models to find probabilities	☐ Calculate the surface area of prisms, cylinders, cones, pyramids, and spheres ☐ Calculate the volume of prisms, cylinders, cones, pyramids, and spheres ☐ Determine how a change in a linear dimension of a figure affects its surface area or volume