Abington Heights School District
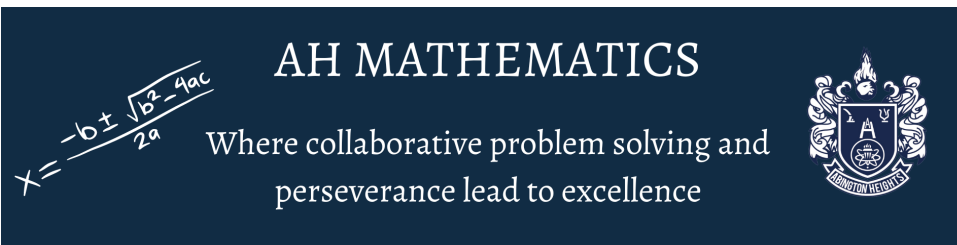# Geometry Curriculum

In Geometry, 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

Board Approval Date: June 7, 2023
Adoption: 2023 - 2024 SY
Review Date:

AH MATHEMATICS

Where collaborative problem solving and perseverance lead to excellence

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

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 Scope and Sequence

Month	Unit	Estimated Number of Weeks
September	Basics of Geometry	3
	Segments and Angles	1
October	Segments and Angles	2
	Parallel and Perpendicular Lines	2
November	Parallel and Perpendicular Lines	1
	Triangle Relationships	2
December	Triangle Relationships	1
	Right Triangles and Trigonometry	2
January	Congruent Triangles	3 1/2
February	Quadrilaterals	3
	Similarity	1
March	Similarity	1 1/2
	Polygons and Area	3
April	Surface Area and Volume	3
May	Circles	3
June	Final Exam Review	1

	Essential Questions	Content	Skills	PA Core Standards	Activities	Assessment/ Evidence of Learning
Basics of Geometry	What is a pattern? What is inductive reasoning? What are the basic building blocks of geometry? What is an intersection? What are congruent segments/congruent angles? What is a construction?	Finding and Describing Patterns Inductive Reasoning Points, Lines, and Planes Sketching Intersections Segments and their Measures Angles and their Measures Segments/Angles and their Measures Congruent segments and angles	Find patterns and use to make predictions Make conjectures using inductive reasoning Use postulates and undefined terms Sketch simple figures and their intersections Measure segments Add segment lengths Measure and classify angles Add angle measures Define congruent segments and angles	CC.2.3.HS.A.3 CC.2.3.HS.A.4	Flipcharts Sections 1.1-1.6 Chapter 1 Packet Practice Problems & Activities Sections 1.1-1.6 Constructions of congruent segments and angles	Question and answer Google Classroom Questions Homework Quiz 1.1-1.3 Quiz 1.4-1.6 Chapter 1 Test Completion of constructions packet Basic Constructions Quiz

	Essential Questions	Content	Skills	PA Core Standards	Activities	Assessment/ Evidence of Learning
Segments and Angles	What is a segment bisector? How is the midpoint of a segment calculated? What is an angle bisector? What relationships exist between angles? What is deductive reasoning? What are the properties of equality and congruence?	Naming / Using Segment Bisectors Naming / Using Angle Bisectors Complementary and Supplementary Angles Recognizing Vertical Angles & Using Their Properties If-Then Statements and Deductive Reasoning Properties of Equality and Congruence	Bisect a segment Find the coordinates of the midpoint of a segment Bisect an angle Find measures of complementary and supplementary angles Recognizing vertical angles and using their properties Write If-Then Statements Identify Hypothesis / Conclusion Use properties of equality and congruence	CC.2.3.HS.A.3 CC.2.3.HS.A.11	Flipcharts Section 2.1-2.6 Chapter 2 Packet Practice Problems and Activities 2.1-2.6 Segment & Midpoint Partner Activity	Question and answer Google Classroom Questions Homework Quiz 2.1-2.3 Quiz 2.4-2.6 Chapter 2 Test

	Essential Questions	Content	Skills	PA Core Standards	Activities	Assessment/ Evidence of Learning
Parallel and Perpendicular Lines	What are the possible relationships between lines? What theorems are related to perpendicular lines? What is a transversal? What angles are formed by a transversal? How do parallel lines affect angles formed by a transversal? How do you show lines are parallel? What is a translation?	Relationships Between Lines Theorems About Perpendicular Lines Angles Formed by Transversals Parallel Lines and Transversals Showing Lines are Parallel Using Perpendicular and Parallel Lines Translations	Identify relationships between lines Understand and use theorems about perpendicular lines Identify angles formed by transversals Find the congruent and/or supplementary angles formed when a transversal cuts parallel lines Show that two lines are parallel Construct parallel and perpendicular lines Use properties of parallel and perpendicular lines Identify and use translations	CC.2.3.HS.A.3 CC.2.3.HS.A.4	Flipcharts 3.1-3.7 Chapter 3 Packet Practice Problems and Activities Parallel Lines & Transversal Activity Perspective Drawing	Question and answer Google Classroom Questions Homework Quiz 3.1-3.3 Quiz 3.4-3.7 Chapter 3 Test

	Essential Questions	Content	Skills	[PA Core Standards](#)	Activities	Assessment/ Evidence of Learning
Triangle Relationships	What are the ways to classify a triangle? What is the relationship between angles in a triangle? How can the Pythagorean Theorem be applied to right triangles? How can the distance between points be calculated? What is a median? What are triangle inequalities?	Classifying Triangles Angle Measures of Triangles Isosceles and equilateral Triangles The Pythagorean Theorem and the Distance Formula The Converse of the Pythagorean Theorem Medians of a Triangle Triangle Inequalities	Classify triangles by their sides and by their angles Find angle measures in triangles Use properties of isosceles and equilateral triangles Apply the Pythagorean Theorem and the Distance Formula in problem solving scenarios Use the converse of the Pythagorean Theorem Use side lengths to classify triangles Identify medians in triangles	CC.2.2.HS.C.9 CC.2.3.HS.A.3 CC.2.3.HS.A.11	Flipcharts Sections 4.1-4.6 Chapter 4 Packet Practice Problems & Activities Sections 4.1-4.6 Pythagorean Theorem Word Problems	Question and answer Google Classroom Questions Homework Quiz 4.1-4.3 Quiz 4.4-4.5 Quiz 4.5-4.7 Pythagorean Theorem Word Problem Quiz Chapter 4 Test

	Essential Questions	Content	Skills	[PA Core Standards](#)	Activities	Assessment/ Evidence of Learning
Triangle Relationships (continued)			Use triangle measurements to decide which side is longest and which angle is largest			
Right Triangles and Trigonometry	How do you simplify square roots? How do you solve 45-45-90 triangles? How do you solve 30-60-90 triangles? What are trigonometric ratios? How do you solve right triangles?	Simplifying Square Roots 45-45-90 Triangles 30-60-90 Triangles Tangent Ratio Sine and Cosine Ratios Solving Right Triangles	Simplify square roots Find the side lengths of 45-45-90 triangles Find the side lengths of 30-60-90 triangles Find the tangent of an acute angle Use the sine and cosine ratios in right triangles Solve a right triangle	CC.2.2.HS.C.9 CC.2.3.HS.A.7	Flipcharts Sections 10.1-10.6 Chapter 10 Packet Practice Problems & Activities Sections 10.1-10.6	Question and answer Google Classroom Questions Homework Quiz 10.1-10.3 Radicals Quiz Quiz 10.4-10.6 Chapter 10 Test
Congruent Triangles	How can triangles be proven congruent? What is a reflection?	Proving Triangles are Congruent by SSS and SAS Proving Triangles are Congruent by ASA and AAS	Identify congruent triangles and corresponding parts	CC.2.3.HS.A.1 CC.2.3.HS.A.2 CC.2.3.HS.A.3	Flipcharts Sections 5.1-5.7 Chapter 5 Packet Practice Problems & Activities Sections 5.1-5.7	Question and answer Google Classroom Questions Homework

	Essential Questions	Content	Skills	[PA Core Standards](#)	Activities	Assessment/ Evidence of Learning
Congruent Triangles (continued)	What is symmetry? How can congruent triangles be used? What is a perpendicular bisector? What is a reflection? What is symmetry?	Hypotenuse-Leg Congruence Theorem: HL Using Congruent Triangles Angle Bisectors and Perpendicular Bisectors Reflections and Symmetry	Show that triangles are congruent using SSS and SAS Show that triangles are congruent using ASA and AAS Use the HL Congruence Theorem Show corresponding parts of congruent triangles are congruent Use angle bisectors and perpendicular bisectors Identify and use reflections and lines of symmetry		Proofs Packet	Quiz 5.1-5.3 Quiz 5.4-5.5 Chapter 5 Test
Quadrilaterals	What is a polygon? What are the properties of parallelograms?	Polygons Properties of Parallelograms	Identify and classify polygons Find angle measures of quadrilaterals	CC.2.3.HS.A.3	Flipcharts Sections 6.1-6.6 Chapter 6 Packet Practice Problems & Activities Sections 6.1-6.6	Question and answer Google Classroom Questions Homework

	Essential Questions	Content	Skills	PA Core Standards	Activities	Assessment/ Evidence of Learning
Quadrilaterals (continued)	How do you show quadrilaterals are parallelograms rhombuses, rectangles, and squares? What is a trapezoid? How do you use reasoning about special quadrilaterals?	Showing Quadrilaterals are Parallelograms Rhombuses, Rectangles, and Squares Trapezoids Reasoning about Special Quadrilaterals	Use properties of parallelograms Show that a quadrilateral is a parallelogram Use properties of special types of parallelograms Define and use properties of trapezoids Identify special quadrilaterals based on given information			Quiz 6.1-6.4 Properties of Quadrilaterals Quiz Quiz 6.5-6.6 Chapter 6 Test
Similarity	What is a ratio? What are similar polygons? How do you show triangles are similar? How do you use proportions with similar triangles? What is a dilation?	Ratio and Proportion Similar Polygons Showing Triangles are Similar: AA Showing Triangles are Similar: SSS and SAS Proportions and Similar Triangles Dilations	Use ratios and solve proportions Identify similar polygons Use similar polygons to find missing sides/angles Show that two triangles are similar using the AA similarity postulate	CC.2.3.HS.A.1 CC.2.3.HS.A.3 CC.2.3.HS.A.6	Flipcharts Sections 7.1-7.6 Chapter 7 Packet Practice Problems & Activities Sections 7.1-7.6	Question and answer Google Classroom Questions Homework Quiz 7.1-7.2 Quiz 7.3-7.5 Chapter 7 Test

	Essential Questions	Content	Skills	PA Core Standards	Activities	Assessment/ Evidence of Learning
Similarity (continued)			Show that two triangles are similar using the SSS and SAS similarity postulates Use the Triangle Proportionality Theorem and its converse Identify and draw dilations			
Polygons and Area	How do you classify polygons? How do you calculate angles in polygons? How do you calculate the area of squares and rectangles? How do you calculate area of triangles? How do you calculate area of parallelograms?	Classifying Polygons Angles in Polygons Area of Squares and Rectangles Area of Triangles Area of Parallelograms Area of Trapezoids Circumference and Area of Circles	Describe polygons Calculate the measures of interior and exterior angles of polygons Calculate the area of squares and rectangles Calculate the area of triangles Calculate the area of parallelograms Calculate the area of trapezoids	CC.2.3.HS.A.9 CC.2.3.HS.A.14	Flipcharts Sections 8.1-8.7 Chapter 8 Packet Practice Problems & Activities Sections 8.1-8.7	Question and answer Google Classroom Questions Homework Quiz 8.1-8.2 Quiz 8.3-8.5 Quiz 8.6 Quiz 8.7 Chapter 8 Test

	Essential Questions	Content	Skills	PA Core Standards	Activities	Assessment/ Evidence of Learning
Polygons and Area (continued)	How do you calculate area of trapezoids? How do you calculate circumference and area of circles?	Probability	Calculate the circumference and area of circles			
Surface Area and Volume	What are solid figures? How do you calculate surface area of prisms and cylinders? How do you calculate surface area of pyramids and cones? How do you calculate volume of prisms and cylinders? How do you calculate volume of pyramids and cones? How do you calculate surface area and volume of spheres?	Solid Figures Surface Area of Prisms and Cylinders Surface Area of Pyramids and Cones Volume of Prisms and Cylinders Volume of Pyramids and Cones Surface Area and Volume of Spheres	Identify and name solid figures Calculate the surface area of prisms and cylinders Calculate the surface area of pyramids and cones Calculate the volume of prisms and cylinders Calculate the volume of pyramids and cones Calculate the surface area and volume of spheres and hemispheres	CC.2.3.HS.A.12 CC.2.3.HS.A.13 CC.2.3.HS.A.14	Flipcharts Sections 9.1-9.6 Chapter 9 Packet Practice Problems & Activities Sections 9.1-9.6	Question and answer Google Classroom Questions Homework Quiz 9.1-9.5 Chapter 9 Test

	Essential Questions	Content	Skills	[PA Core Standards](#)	Activities	Assessment/ Evidence of Learning
Circles	What are the parts of a circle? What is a tangent to a circle and what are its properties? What is an arc? What is a central angle? What is an inscribed angle What are the properties of a chord? How do you write the equation of a circle?	Parts of a Circle Properties of Tangents Arcs and Central Angles Arcs and Chords Inscribed Angles and Polygons Properties of Chords Equations of Circles Rotations	Identify parts of a circle Use properties of a tangent to a circle Use properties of arcs and central angles Use properties of arcs and chords Use properties of inscribed angles Write equations of circles Identify rotations and rotational symmetry	CC.2.3.HS.A.8 CC.2.3.HS.A.9	Flipcharts Sections 11.1-11.8 Chapter 11 Packet Practice Problems & Activities Sections 11.1-11.8	Question and answer Google Classroom Questions Homework Quiz 11.1-11.3 Quiz 11.4-11.6 Quiz 11.7-11.8 Chapter 11 Test

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