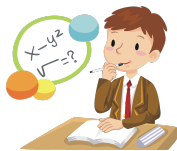


Glen Ridge Public Schools –Mathematics Curriculum



Course Title: Honors Geometry

Subject: Mathematics

Grade Level: HS

Duration: Full Year

Prerequisite: Advanced Algebra 1 with a completion of “B” or better, teacher recommendation, and completion of the summer assignment.

Elective or Required: Elective

Mathematics Mission Statement

Mathematics is an integral part of our lives. Students must be actively involved in their mathematics education through the use of modeling and demonstrating the ability to persevere through problem solving. The mathematics curricula will emphasize critical thinking skills through a balance of logic and reasoning, attention to precision by utilizing patterns and structure, and bridging these ideas to cross-curricular learning. Students will be engaged and challenged in a student-centered learning environment that is developmentally appropriate and will communicate mathematical ideas, both in a verbal and written form. Through effectively applying hands-on manipulatives, basic computation skills and the use of technical writing to justify their processes, students will critique the work of themselves and others.

Course Description:

Honors Geometry is an accelerated math course that continues the study of mathematical concepts. Students entering this course are expected to have mastered the concepts taught in Advanced Algebra 1. The emphasis of this course is paced on the traditional Euclidean Geometry. Extensive study is done on parallel and perpendicular lines, triangles, quadrilaterals, and isometrics. Proportions are applied to similar figures for finding perimeter, area, and volume. An introduction to right angle trigonometry is done with basic applications. Circles are defined and extensively studied with regards to arcs, chords, tangents, inscribed angles, segments, and equations of circles. The course concludes with exploring solids by finding surface area and volume of polyhedron.

Author: Kaitlyn Mackay

Date Submitted: Summer 2017

Text: Holt McDougal Geometry, 2012 by Burger, Chard, Kennedy, Leinward, Renfro, Roby, and Waits

Course Name: Honors Geometry
Topic/Unit: Foundations for Geometry

Approximate # Of Weeks: 2.5

Essential Questions:

- What tools and methods can you use to copy a segment, bisect a segment, copy an angle, bisect an angle, and construct a circle?
- How do you use the distance formula and midpoint formula to find distances and lengths in the coordinate plane?
- How do you identify transformations that are rigid motions?

Upon completion of this unit students will be able to:

- Identify, name, and draw points, lines, segments, rays, and planes
- Apply basic facts about points, lines, and planes
- Use length and midpoint of a segment
- Construct midpoints and congruent segments
- Name and classify angles
- Measure and construct angles and angle bisectors
- Identify adjacent, vertical, complementary, and supplementary angles
- Find measures of pairs of angles
- Apply formulas for perimeter, area, and circumference
- Develop and apply the formula or midpoint
- Use the distance formula and Pythagorean Theorem to find the distance between two points
- Identify, reflections, rotations, and translations
- Graph transformations in the coordinate plane
- Draw, identify, and describe transformations in the coordinate plane
- Use properties of rigid motions to determine whether figures are congruent and to prove figures congruent
- Identify and draw reflections, translations, and rotations
- Apply theorems about isometries
- Identify and draw compositions of transformations, such as glide reflections
- Identify and describe symmetry in geometric figures

NJCCS:

CC.9-12.A.SSE.1, CC.9-12.A.CED.4, CC.9-12.G.CO.1, CC.9-12.G.CO.2,
CC.9-12.G.CO.4, CC.9-12.G.CO.5, CC.9-12.G.CO.12

Interdisciplinary Standards (njcccs.org)

- Standard 5.1 – Science Practices
- Standard 6.3 – Active Citizenship in the 21st Century
- Standard 8.2 – Technology Education
- Standard 9.1 – 21st - Century Life & Career Skills

Activities – include 21st Century Technologies:

- SmartBoard powerpoint presentations
- Lecture and class discussion
- Geogebra (online tool)
- Google Classroom tools (Questions and assessments)
- Construction – Congruent Segment, Segment Bisector, Congruent Angle, Angle Bisector
- Connecting Geometry to Algebra – Unit Conversions (use conversion factors to convert measurements)
- Connecting Geometry to Algebra – Transformations of Functions (reflect and translate functions in the coordinate plane and write a rule for the transformation)
- Online quizzes from textbook website
- Online videos from textbook website
- Khan academy
- Kahoot (online quizzes)
- Quizlet (online quizzes)

Enrichment Activities:

- Practice C Worksheets (Holt McDougal)
- Challenge Worksheets (Holt McDougal)
- Problem Solving Worksheets (Holt McDougal)
- Extension – Solids of Revolution (understand how solids can be produced by rotating a two-dimensional figure through space)

Methods of Assessments/Evaluation:

- Exit Tickets
- Assessment Chart (Scales)
- Quizzes
- Test
- Google Classroom
- Lesson Checks
- Projects
- Verbal Assessment
- Open ended questions

- Classwork
- Homework
- Check it out problems (during lectures)
- Think-pair-share
- Turn and Talk
- Whiteboards
- Observation (Teacher/small/whole group)
- Error Analysis

Resources/Including Online Resources

- Online Textbook Information: my.hrw.com
- Teacher Webpage
- Google Classroom
- Geometry Textbook
- Geogebra
- Khan Academy

Learning Goals Scale:

- 4** Student will be able to construct, draw the elements of the foundations of geometry and apply them to real-world situations.
- 3** Student will be able to understand and use properties of the basic elements of the foundations of geometry.
- 2** Student will be able to apply facts about the basic elements of the foundations of geometry. (Points, lines, planes, segments, etc.)
- 1** Student will be able to identify all of the basic elements of the foundations of geometry. (Points, lines, planes, segments, etc.)

Course Name: Honors Geometry
Topic/Unit: Geometric Reasoning

Approximate # Of Weeks: 3

Essential Questions:

- How does inductive reasoning and conjecturing help you arrive at valid conclusions?
- How do if-then statements help you understand the validity of conclusions?
- How can you use proofs to solve problems in algebra?
- How do you construct a convincing argument?
- How can deductive reasoning be used to validate conjectures?

Upon completion of this unit students will be able to:

- Use inductive reasoning to identify patterns and make conjectures
- Find counterexamples to disprove conjectures
- Identify, write, and analyze the truth value of conditional statements
- Write the inverse, converse, and contrapositive of a conditional statement
- Write and analyze biconditional statements
- Review properties of equality and use them to write algebraic proofs
- Identify properties of equality and congruence
- Write two-column proofs
- Prove geometric theorems by using deductive reasoning
- Prove geometric theorems by using deductive reasoning

NJCCS:

CC.9-12.A.REI.1, CC.9-12.G.CO.9

Interdisciplinary Standards (njcccs.org)

- Standard 5.1 – Science Practices
- Standard 6.3 – Active Citizenship in the 21st Century
- Standard 8.2 – Technology Education
- Standard 9.1 – 21st - Century Life & Career Skills

Activities – include 21st Century Technologies:

- SmartBoard powerpoint presentations
- Lecture and class discussion
- Connecting Geometry to Number Theory – Venn Diagrams (applying reasoning skills to drawing Venn diagrams of number sets)
- Geometry Lab – Solve Logic Puzzles (use tables and networks to solve logic puzzles)
- Geometry Lab – Design Plans for Proofs (learn strategies for planning the logical steps of a proof)
- Real-World Connection – The Myrtle Beach Marathon/Would Carolina's Waterfalls (choose appropriate problem-solving strategies and use them to solve real-world problems)
- Online quizzes from textbook website
- Online videos from textbook website
- Geogebra (online tool)
- Google Classroom tools (Questions and assessments)
- Khan academy
- Kahoot (online quizzes)
- Quizlet (online quizzes)

Enrichment Activities:

- Practice C Worksheets (Holt McDougal)
- Challenge Worksheets (Holt McDougal)
- Problem Solving Worksheets (Holt McDougal)

- Extension – Introduction to Symbolic Logic (analyze the truth value of conjunctions and disjunctions/construct truth tables to determine the truth value of logical statements)
- Logic Puzzles

Methods of Assessments/Evaluation:

- Exit Tickets
- Assessment Chart (Scales)
- Quizzes
- Test
- Google Classroom
- Lesson Checks
- Projects
- Verbal Assessment
- Open ended questions
- Classwork
- Homework
- Check it out problems (during lectures)
- Think-pair-share
- Turn and Talk
- Whiteboards
- Observation (Teacher/small/whole group)
- Error Analysis
- Textbook Activity – Mathematical Proof (assess students' ability to apply concepts and skills in a real-world format)

Resources/Including Online Resources

- Online Textbook Information: my.hrw.com
- Teacher Webpage
- Google Classroom
- Geometry Textbook
- Geogebra
- Khan Academy

Learning Goals Scale:

- 4 Student will be able to write and complete two-column proofs.
- 3 Student will be able to prove geometric theorems by using deductive reasoning.
- 2 Student will be able to analyze conditional statements including its inverse, converse, and contrapositive.
- 1 Student will be able to identify patterns and make conjectures.

Course Name: Honors Geometry
Topic/Unit: Parallel and Perpendicular Lines

Approximate # Of Weeks: 2.5

Essential Questions:

- How do you prove theorems about parallel and perpendicular lines?
- What is the connection between slope and parallel lines?
- What is the connection between slope and perpendicular lines?
- What are the types of angles created by parallel lines?
- How is visualization of lines and angles essential to the study of the physical world?

Upon completion of this unit students will be able to:

- Identify parallel, perpendicular, and skew lines
- Identify the angles formed by two lines and a transversal
- Prove and use theorems about the angles formed by parallel lines and a transversal
- Use the angles formed by a transversal to prove two lines are parallel
- Prove and apply theorems about perpendicular lines
- Find the slope of a line
- Use slopes to identify parallel and perpendicular lines
- Graph lines, and write their equations in slope-intercept and point-slope form
- Classify lines as parallel, intersecting, or coinciding

NJCCS:

CC.9-12.G.CO.1, CC.9-12.G.CO.9, CC.9-12.G.CO.1, CC.9-12.G.GPE.5

Interdisciplinary Standards (njcccs.org)

- Standard 5.1 – Science Practices
- Standard 6.3 – Active Citizenship in the 21st Century
- Standard 8.2 – Technology Education
- Standard 9.1 – 21st - Century Life & Career Skills

Activities – include 21st Century Technologies:

- SmartBoard powerpoint presentations
- Lecture and class discussion
- Connecting Geometry to Algebra – Systems of Equations (find angle measures by solving systems of equations)
- Technology Lab – Explore Parallel Lines and Transversals (use geometry software to explore angles formed by parallel lines and transversals)
- Technology Lab – Explore Parallel and Perpendicular Lines (use a graphing calculator to graph parallel and perpendicular lines)

- Geometry Lab - Construct Parallel Lines (use various methods to construct parallel lines)
- Geometry Lab – Construct Perpendicular Lines (construct a line perpendicular to a given line through a given point)
- Connecting Geometry to Data Analysis – Scatter Plots and Lines of Best Fit (apply linear equation skills to graphing and writing equations for lines associated with data sets)
- Online quizzes from textbook website
- Online videos from textbook website
- Geogebra (online tool)
- Google Classroom tools (Questions and assessments)
- Khan academy
- Kahoot (online quizzes)
- Quizlet (online quizzes)

Enrichment Activities:

- Practice C Worksheets (Holt McDougal)
- Challenge Worksheets (Holt McDougal)
- Problem Solving Worksheets (Holt McDougal)
- Parallel/ Perpendicular Lines Investigation Activity

Methods of Assessments/Evaluation:

- Exit Tickets
- Assessment Chart (Scales)
- Quizzes
- Test
- Google Classroom
- Lesson Checks
- Projects
- Verbal Assessment
- Open ended questions
- Classwork
- Homework
- Check it out problems (during lectures)
- Think-pair-share
- Turn and Talk
- Whiteboards
- Observation (Teacher/small/whole group)
- Error Analysis
- Textbook Activity – Parallel and Perpendicular Lines and Transversals (assess students' ability to apply concepts and skills in a real-world format)
- Textbook Activity – Coordinate Geometry (assess students' ability to apply concepts and skills in a real-world format)

Resources/Including Online Resources

- Online Textbook Information: my.hrw.com
- Teacher Webpage
- Google Classroom
- Geometry Textbook
- Geogebra
- Khan Academy

Learning Goals Scale:

- 4 Student will be able to graph lines and write their equations in slope-intercept form and point-slope form.
- 3 Student will be able to apply and prove theorems about perpendicular lines and angles formed by parallel lines and a transversal.
- 2 Student will be able to classify the different types of lines and angles.
- 1 Student will be able to identify parallel, perpendicular and skew lines.

Course Name: Honors Geometry
Topic/Unit: Triangle Congruence

Approximate # Of Weeks: 3.5

Essential Questions:

- What does it mean for two figures to be congruent?
- What can you conclude about two triangles that are congruent?
- How do the SSS, SAS, and ASA Congruence Criteria follow from the rigid-motion definition of congruence?
- How do you use congruence criteria in proofs and to solve problems?
- What can you say about the sum of the angle measures in a triangle?
- What can you say about the base angles of an isosceles triangle?
- How do you write a coordinate proof?

Upon completion of this unit students will be able to:

- Classify angles by their angle measures and side lengths
- Use triangle classification to find angle measures and side lengths
- Find the measures of interior and exterior angles of triangles
- Apply theorems about the interior and exterior angles of triangles
- Use properties of congruent triangles
- Prove triangles congruent by using the definition of congruence
- Apply SSS and SAS to construct triangles and solve problems
- Prove triangles are congruent by using SSS and SAS
- Apply ASA, AAS, and HL to construct triangles and solve problems

- Prove triangles congruent by using ASA, AAS, and HL
- Use CPCTC to prove parts of triangles are congruent
- Position figures in the coordinate plane for use in coordinate proofs
- Prove geometric concepts by using coordinate proofs
- Prove theorems about isosceles and equilateral triangles
- Apply properties of isosceles and equilateral triangles

NJCCS:

CC.9-12.G.CO.6, CC.9-12.G.CO.7, CC.9-12.G.CO.8, CC.9-12.G.CO.10

CC.9-12.G.SRT.5, CC.9-12.G.MG.3, CC.9-12.G.GPE.4

Interdisciplinary Standards (njcccs.org)

- Standard 5.1 – Science Practices
- Standard 6.3 – Active Citizenship in the 21st Century
- Standard 8.2 – Technology Education
- Standard 9.1 – 21st - Century Life & Career Skills

Activities – include 21st Century Technologies:

- SmartBoard powerpoint presentations
- Lecture and class discussion
- Geometry Lab – Develop the Triangle Sum Theorem (use patty paper to discover the relationship between the measures of the interior angles of a triangle)
- Geometry Lab – Explore SSS and SAS Triangle Congruence (discover shortcuts for proving triangles are congruent)
- Technology Lab – Predict Other Triangle Congruence Relationships (use geometry software to explore triangle congruence relationships)
- Connecting Geometry to Algebra – Quadratic Equations (solve quadratic equations to find the length of a side of a triangle)
- Real-World Connections – The Queen’s Cup/The Air Zoo (choose appropriate problem-solving strategies and use them to solve real-world problems)
- Online quizzes from textbook website
- Online videos from textbook website
- Geogebra (online tool)
- Google Classroom tools (Questions and assessments)
- Khan academy
- Kahoot (online quizzes)
- Quizlet (online quizzes)

Enrichment Activities:

- Practice C Worksheets (Holt McDougal)
- Challenge Worksheets (Holt McDougal)
- Problem Solving Worksheets (Holt McDougal)

- Extension – Lines and Slopes (prove the slope criteria for parallel and perpendicular lines)
- Extension – Proving Constructions Valid (use congruent triangles to prove constructions valid)

Methods of Assessments/Evaluation:

- Exit Tickets
- Assessment Chart (Scales)
- Quizzes
- Test
- Google Classroom
- Lesson Checks
- Projects
- Verbal Assessment
- Open ended questions
- Classwork
- Homework
- Check it out problems (during lectures)
- Think-pair-share
- Turn and Talk
- Whiteboards
- Observation (Teacher/small/whole group)
- Error Analysis
- Textbook Activity – Triangles and Congruence (assess students' ability to apply concepts and skills in a real-world format)
- Textbook Activity – Proving Triangles Congruent (assess students' ability to apply concepts and skills in a real-world format)

Resources/Including Online Resources

- Online Textbook Information: my.hrw.com
- Teacher Webpage
- Google Classroom
- Geometry Textbook
- Geogebra
- Khan Academy

Learning Goals Scale:

- 4 Student will be able to prove geometric concepts by using coordinate proofs.
- 3 Student will be able to prove triangles congruent using all theorems: SSS, SAS, ASA, AAS, HL, and CPCTC.
- 2 Student will be able to use properties of congruent triangles.
- 1 Student will be able to classify angles by their measure and triangles by their angles and sides.

Course Name: Honors Geometry
Topic/Unit: Properties and Attributes of Triangles

Approximate # Of Weeks: 3

Essential Questions:

- What must be true about the segment that connects the midpoints of two sides of a triangle?
- What can you conclude about the medians of a triangle?
- What are the key theorems about angle bisectors?
- What are the key theorems about perpendicular bisectors?
- How is indirect reasoning used in real life?
- What is the Pythagorean Theorem?
- Why is problem solving easier when the special right triangles are being used?

Upon completion of this unit students will be able to:

- Prove and apply theorems about perpendicular bisectors
- Prove and apply theorems about angle bisectors
- Prove and apply properties of perpendicular bisectors of a triangle
- Prove and apply properties of angle bisectors of a triangle
- Apply properties of medians of a triangle
- Apply properties of altitudes of a triangle
- Prove and use properties of triangle midsegments
- Write indirect proofs
- Apply inequalities in one triangle
- Apply inequalities in two triangles
- Use the Pythagorean Theorem and its converse to solve problems
- Use Pythagorean inequalities to classify triangles
- Justify and apply properties of 45-45-90 degree triangles
- Justify and apply properties of 30-60-90 degree triangles

NJCCS:

CC.9-12.G.CO.9, CC.9-12.G.CO.10, CC.9-12.G.SRT.4, CC.9-12.G.SRT.8,
CC.9-12.G.C.3, CC.9-12.G.MG.3

Interdisciplinary Standards (njcccs.org)

- Standard 5.1 – Science Practices
- Standard 6.3 – Active Citizenship in the 21st Century
- Standard 8.2 – Technology Education
- Standard 9.1 – 21st - Century Life & Career Skills

Activities – include 21st Century Technologies:

- SmartBoard powerpoint presentations
- Lecture and class discussion
- Patty Paper Exercise – Perpendicular and Angle Bisectors
- Patty Paper Exercise – Circumcenter and Incenter of a Triangle
- Construction – Centroid and Orthocenter of a Triangle
- Construction – Midsegment of a Triangle
- Technology Lab – Special Points in Triangles (use geometry software and special points in triangles to explore Euler's line)
- Connecting Geometry to Algebra – Solving Compound Inequalities (apply algebra skills to solving compound inequalities)
- Connecting Geometry to Algebra – Simplest Radical Form (apply algebra skills to simplifying radical expressions)
- Geometry Lab – Explore Triangle Inequalities (explore the relationships between side lengths and angle measures in a triangle)
- Geometry Lab – Hands-on Proof of the Pythagorean Theorem (use area to justify the Pythagorean Theorem)
- Geometry Lab – Graph Irrational Numbers (graph irrational numbers on a number line)
- Online quizzes from textbook website
- Online videos from textbook website
- Geogebra (online tool)
- Google Classroom tools (Questions and assessments)
- Khan academy
- Kahoot (online quizzes)
- Quizlet (online quizzes)

Enrichment Activities:

- Practice C Worksheets (Holt McDougal)
- Challenge Worksheets (Holt McDougal)
- Problem Solving Worksheets (Holt McDougal)
- Construction of all points of intersection of various lines within a triangle.

Methods of Assessments/Evaluation:

- Exit Tickets
- Assessment Chart (Scales)
- Quizzes
- Test
- Google Classroom
- Lesson Checks
- Projects
- Verbal Assessment
- Open ended questions
- Classwork

- Homework
- Check it out problems (during lectures)
- Think-pair-share
- Turn and Talk
- Whiteboards
- Observation (Teacher/small/whole group)
- Error Analysis
- Textbook Activity – Segments in Triangles (assess students' ability to apply concepts and skills in a real-world format)
- Textbook Activity – Relationships in Triangles (assess students' ability to apply concepts and skills in a real-world format)

Resources/Including Online Resources

- Online Textbook Information: my.hrw.com
- Teacher Webpage
- Google Classroom
- Geometry Textbook
- Geogebra
- Khan Academy

Learning Goals Scale:

- 4 Student will be able to understand and use the properties of the special right triangles to solve problems.
- 3 Student will be able to use the pythagorean theorem and apply it to real world situations.
- 2 Student will be able to apply properties of the different points of intersection within triangles.
- 1 Student will be able to identify the different points of intersection within triangles.

Course Name: Honors Geometry
Topic/Unit: Polygons and Quadrilaterals

Approximate # Of Weeks: 2.5

Essential Questions:

- What can you conclude about the sides and angles of a parallelogram?
- What can you conclude about the diagonals of a parallelogram?
- What criteria can you use to prove that a quadrilateral is a parallelogram?
- What are the properties of rectangles and rhombuses?

Upon completion of this unit students will be able to:

- Classify polygons based on their sides and angles

- Find and use the measures of interior and exterior angles of polygons
- Prove and apply properties of parallelograms
- Use properties of parallelograms to solve problems
- Prove that a given quadrilateral is a parallelogram
- Prove and apply properties of rectangles, rhombuses, and squares
- Use proportions of rectangles, rhombuses, and squares to solve problems
- Prove that a given quadrilateral is a rectangle, rhombus, or square
- Use properties of kites to solve problems
- Use properties of trapezoids to solve problems

NJCCS:

CC.9-12.G.CO.11, CC.9-12.G.CO.13, CC.9-12.G.GPE.5, CC.9-12.G.MG.3

Interdisciplinary Standards (njcccs.org)

- Standard 5.1 – Science Practices
- Standard 6.3 – Active Citizenship in the 21st Century
- Standard 8.2 – Technology Education
- Standard 9.1 – 21st - Century Life & Career Skills

Activities – include 21st Century Technologies:

- SmartBoard powerpoint presentations
- Lecture and class discussion
- Geometry Lab – Construct Regular Polygons (use a compass and straightedge to construct regular polygons)
- Geometry Lab – Explore Properties of Parallelograms (explore properties of parallelograms)
- Connecting Geometry to Algebra – Relations and Functions (apply the polygon formulas to identify relations, functions, domain, and range)
- Construction – Rhombus and Kite (using compass and straightedge)
- Technology Lab – Predict conditions for Special Parallelograms (use geometry software to predict the conditions for rectangles, rhombuses, and squares)
- Technology Lab – Explore Isosceles Trapezoids (use geometry software to investigate the properties and conditions of an isosceles trapezoid)
- Real-World Connections – Handmade Tiles/The Millennium Force Roller Coaster (choose appropriate problem-solving strategies and use them to solve real-world problems)
- Online quizzes from textbook website
- Online videos from textbook website
- Geogebra (online tool)
- Google Classroom tools (Questions and assessments)
- Khan academy
- Kahoot (online quizzes)
- Quizlet (online quizzes)

Enrichment Activities:

- Practice C Worksheets (Holt McDougal)
- Challenge Worksheets (Holt McDougal)
- Problem Solving Worksheets (Holt McDougal)

Methods of Assessments/Evaluation:

- Exit Tickets
- Assessment Chart (Scales)
- Quizzes
- Test
- Google Classroom
- Lesson Checks
- Projects
- Verbal Assessment
- Open ended questions
- Classwork
- Homework
- Check it out problems (during lectures)
- Think-pair-share
- Turn and Talk
- Whiteboards
- Observation (Teacher/small/whole group)
- Error Analysis
- Textbook Activity – Polygons and Parallelograms (assess students' ability to apply concepts and skills in a real-world format)
- Textbook Activity – Other Special Quadrilaterals (assess students' ability to apply concepts and skills in a real-world format)

Resources/Including Online Resources

- Online Textbook Information: my.hrw.com
- Teacher Webpage
- Google Classroom
- Geometry Textbook
- Geogebra
- Khan Academy

Learning Goals Scale:

- 4 Student will be able to prove that a given quadrilateral is a rectangle, rhombus or square.
- 3 Student will be able to prove and apply properties of special polygons and quadrilaterals.
- 2 Student will be able to use properties of special polygons and quadrilaterals to solve problems.
- 1 Student will be able to classify polygons based on their sides and angles.

Course Name: Honors Geometry
Topic/Unit: Similarity

Approximate # Of Weeks: 3

Essential Questions:

- What does it mean for two figures to be similar?
- What can you conclude about similar triangles and how can you prove triangles are similar?
- How can you use similar triangles to solve problems?
- How does a line that is parallel to one side of a triangle divide the two sides that it intersects?
- What are the key properties of dilations?

Upon completion of this unit students will be able to:

- Identify similar polygons
- Apply properties of similar polygons to solve problems
- Draw and describe similarity transformations in the coordinate plane
- Use properties of similarity transformations to determine whether polygons are similar and to prove circles similar
- Prove certain triangles are similar by using AA, SSS, and SAS
- Use triangle similarity to solve problems
- Use properties of similar triangles to find segment lengths
- Apply proportionality and triangle angle bisector theorems
- Use ratios to make indirect measurements
- Use scale drawings to solve problems
- Apply similarity properties in the coordinate plane
- Use coordinate proof to prove figures similar
- Identify and draw dilations

NJCCS:

CC.9-12.G.SRT.1, CC.9-12.G.SRT.2, CC.9-12.G.SRT.3, CC.9-12.G.SRT.4,
CC.9-12.G.SRT.5, CC.9-12.G.CO.2, CC.9-12.G.MG.3

Interdisciplinary Standards (njcccs.org)

- Standard 5.1 – Science Practices
- Standard 6.3 – Active Citizenship in the 21st Century
- Standard 8.2 – Technology Education
- Standard 9.1 – 21st - Century Life & Career Skills

Activities – include 21st Century Technologies:

- SmartBoard powerpoint presentations
- Lecture and class discussion

- Technology Lab – Predict Triangle Similarity Relationships (use geometry software to find ways to determine that triangles are similar)
- Technology Lab – Investigate Angle Bisectors of a Triangle (use geometry software to explore the relationship between the two segments into which an angle bisector divides the opposite side of a triangle)
- Technology Lab – Dilations on a Graphing Calculator (use matrices to perform dilations with scale factor)
- Connecting Geometry to Algebra – Direct Variation (determine whether there is a direct variation between scale factor and perimeter)
- Construction – Triangle Proportionality Theorem
- Construction – Dilate a Figure by a Scale Factor of 2
- Online quizzes from textbook website
- Online videos from textbook website
- Geogebra (online tool)
- Google Classroom tools (Questions and assessments)
- Khan academy
- Kahoot (online quizzes)
- Quizlet (online quizzes)

Enrichment Activities:

- Practice C Worksheets (Holt McDougal)
- Challenge Worksheets (Holt McDougal)
- Problem Solving Worksheets (Holt McDougal)
- Extension – Proving the Pythagorean Theorem (prove the Pythagorean Theorem using similar triangles)
- Extension – Segment Partition (divide a directed line segment into partitions)

Methods of Assessments/Evaluation:

- Exit Tickets
- Assessment Chart (Scales)
- Quizzes
- Test
- Google Classroom
- Lesson Checks
- Projects
- Verbal Assessment
- Open ended questions
- Classwork
- Homework
- Check it out problems (during lectures)
- Think-pair-share
- Turn and Talk
- Whiteboards
- Observation (Teacher/small/whole group)

- Error Analysis
- Textbook Activity – Similarity Relationships (assess students' ability to apply concepts and skills in a real-world format)
- Textbook Activity – Applying Similarity (assess students' ability to apply concepts and skills in a real-world format)

Resources/Including Online Resources

- Online Textbook Information: my.hrw.com
- Teacher Webpage
- Google Classroom
- Geometry Textbook
- Geogebra
- Khan Academy

Learning Goals Scale:

- 4 Student will be able to use properties of similar triangles to prove them congruent using AA, SSS, and SAS.
- 3 Student will be able to use triangle similarity to solve problems.
- 2 Student will be able to identify and draw dilations.
- 1 Student will be able to identify similar polygons.

Course Name: Honors Geometry
Topic/Unit: Right Triangle and Trigonometry

Approximate # Of Weeks: 3

Essential Questions:

- How do you find the tangent ratio for an acute angle of a right triangle?
- How do you find the sine and cosine ratios for an acute angle of a right triangle?
- What can you say about the side lengths and the trigonometric ratios associated with special right triangles?
- How do you find an unknown angle measure in a right triangle?
- How are vectors useful?

Upon completion of this unit students will be able to:

- Use geometric means to find segment lengths in right triangles
- Apply similarity relationships in right triangles to solve problems
- Find the sine, cosine, and tangent of an acute angle

- Use trigonometric ratios to find side lengths in right triangles and to solve real-world problems
- Use trigonometric ratios to find angle measures in right triangles and to solve real-world problems
- Solve problems involving angles of elevation and angles of depression
- Find the magnitude and direction of a vector
- Use vectors and vector addition to solve real-world problems

NJCCS:

CC.9-12.G.SRT.6, CC.9-12.G.SRT.7, CC.9-12.G.SRT.8, CC.9-12.G.SRT.10, CC.9-12.G.SRT.11

Interdisciplinary Standards (njcccs.org)

- Standard 5.1 – Science Practices
- Standard 6.3 – Active Citizenship in the 21st Century
- Standard 8.2 – Technology Education
- Standard 9.1 – 21st - Century Life & Career Skills

Activities – include 21st Century Technologies:

- SmartBoard powerpoint presentations
- Lecture and class discussion
- Technology Lab – Explore Trigonometric Ratios (use geometry software to explore trigonometric ratios in right triangles)
- Connecting Geometry to Algebra – Inverse Functions (apply properties of inverses to trigonometric functions)
- Geometry Lab – Indirect Measurement Using Trigonometry (make a clinometer and use trigonometry to measure objects indirectly)
- Real World Connections – The John Hancock Center/Ernest Hemingway’s Birthplace (choose appropriate problem-solving strategies and use them to solve real-world problems)
- Online quizzes from textbook website
- Online videos from textbook website
- Geogebra (online tool)
- Google Classroom tools (Questions and assessments)
- Khan academy
- Kahoot (online quizzes)
- Quizlet (online quizzes)

Enrichment Activities:

- Practice C Worksheets (Holt McDougal)
- Challenge Worksheets (Holt McDougal)
- Problem Solving Worksheets (Holt McDougal)
- Extension – Trigonometric Ratios and Complementary Angles (use the relationship between the sine and cosine of complementary angles)

- Extension – Trigonometry and the Unit Circle (define trigonometric ratios for angle measures greater than or equal to 90 degrees)

Methods of Assessments/Evaluation:

- Exit Tickets
- Assessment Chart (Scales)
- Quizzes
- Test
- Google Classroom
- Lesson Checks
- Projects
- Verbal Assessment
- Open ended questions
- Classwork
- Homework
- Check it out problems (during lectures)
- Think-pair-share
- Turn and Talk
- Whiteboards
- Observation (Teacher/small/whole group)
- Error Analysis
- Textbook Activity – Trigonometric Ratios (assess students' ability to apply concepts and skills in a real-world format)
- Textbook Activity – Applying Trigonometric Ratios (assess students' ability to apply concepts and skills in a real-world format)

Resources/Including Online Resources

- Online Textbook Information: my.hrw.com
- Teacher Webpage
- Google Classroom
- Geometry Textbook
- Geogebra
- Khan Academy

Learning Goals Scale:

- 4 Student will be able to solve real world problems involving trigonometric ratios to find angles and sides.
- 3 Student will be able to solve problems involving angles of elevation and depression.
- 2 Student will be able to apply similarity relationships in right triangles to solve problems.
- 1 Student will be able to find the sine, cosine and tangent of an acute angle.

Course Name: Honors Geometry
Topic/Unit: Extending Transformational Geometry

Approximate # Of Weeks: 2

Essential Questions:

- How can you change a figure's position without changing its size and shape?
- How can you change a figure's size without changing its shape?
- How can you represent a transformation in the coordinate plane?
- How do you recognize symmetry in a figure?

Upon completion of this unit students will be able to:

- Identify and draw reflections
- Identify and draw translations
- Identify and draw rotations
- Apply theorems about isometries
- Identify and draw compositions of transformations, such as glide reflections
- Identify and describe symmetry in geometric figures
- Use transformations to draw tessellations
- Identify regular and semiregular tessellations and figures that will tessellate
- Identify and draw dilations

NJCCS:

CC.9-12.G.CO.6, CC.9-12.G.CO.5, CC.9-12.G.CO.4, CC.9-12.G.CO.2,
CC.9-12.G.CO.3, CC.9-12.G.SRT.1

Interdisciplinary Standards (njcccs.org)

- Standard 5.1 – Science Practices
- Standard 6.3 – Active Citizenship in the 21st Century
- Standard 8.2 – Technology Education
- Standard 9.1 – 21st - Century Life & Career Skills

Activities – include 21st Century Technologies:

- SmartBoard powerpoint presentations
- Lecture and class discussion
- Online quizzes from textbook website
- Online videos from textbook website
- Geogebra (online tool)
- Google Classroom tools (Questions and assessments)
- Khan academy

- Kahoot (online quizzes)
- Quizlet (online quizzes)

Enrichment Activities:

- Practice C Worksheets (Holt McDougal)
- Challenge Worksheets (Holt McDougal)
- Problem Solving Worksheets (Holt McDougal)
- Transformation Maze

Methods of Assessments/Evaluation:

- Exit Tickets
- Assessment Chart (Scales)
- Quizzes
- Test
- Google Classroom
- Lesson Checks
- Projects
- Verbal Assessment
- Open ended questions
- Classwork
- Homework
- Check it out problems (during lectures)
- Think-pair-share
- Turn and Talk
- Whiteboards
- Observation (Teacher/small/whole group)
- Error Analysis

Resources/Including Online Resources

- Online Textbook Information: my.hrw.com
- Teacher Webpage
- Google Classroom
- Geometry Textbook
- Geogebra
- Khan Academy

Learning Goals Scale:

- 4 Student will be able to draw and interpret multiple transformations.
- 3 Student will be able to draw and interpret symmetry and tessellations.
- 2 Student will be able to identify symmetry and tessellations.
- 1 Student will be able to identify the different transformations.

Course Name: Honors Geometry
Topic/Unit: Extending Perimeter, Circumference and Area

Approximate # Of Weeks: 2.5

Essential Questions:

- How do you calculate the area of various 2-D shapes?
- How are the perimeter and area of similar figures related?
- How can you use trigonometry to find area?
- How do you calculate geometric probability?

Upon completion of this unit students will be able to:

- Develop and apply the formulas for the areas of triangles and special quadrilaterals
- Solve problems involving perimeters and areas of triangles and special quadrilaterals
- Develop and apply the formulas for the area and circumference of a circle
- Develop and apply the formula for the area of a regular polygon
- Use the Area Addition Postulate to find the areas of composite figures
- Use composite figures to estimate the areas of irregular shapes
- Find the perimeters and areas of figures in a coordinate plane
- Describe the effect on perimeter and area when one or more dimensions of a figure are changed
- Apply the relationship between perimeter and area in problem solving
- Calculate geometric probabilities
- Use geometric probability to predict results in real-world situations

NJCCS:

CC.9-12.A.CED.4, CC.9-12.G.GMD.1, CC.9-12.G.SRT.9, CC.9-12.G.GPE.7

Interdisciplinary Standards (njcccs.org)

- Standard 5.1 – Science Practices
- Standard 6.3 – Active Citizenship in the 21st Century
- Standard 8.2 – Technology Education
- Standard 9.1 – 21st - Century Life & Career Skills

Activities – include 21st Century Technologies:

- SmartBoard powerpoint presentations
- Lecture and class discussion
- Connecting Geometry to Algebra – Literal Equations (apply geometry skills to solving formulas for a variable)
- Connecting Geometry to Probability – Probability (review basic probability concepts in preparations for geometric probability)

- Geometry Lab – Develop Pi (use construction and measurement to develop pi)
- Geometry Lab – Use Geometric Probability to Estimate Pi
- Online quizzes from textbook website
- Online videos from textbook website
- Geogebra (online tool)
- Google Classroom tools (Questions and assessments)
- Khan academy
- Kahoot (online quizzes)
- Quizlet (online quizzes)

Enrichment Activities:

- Practice C Worksheets (Holt McDougal)
- Challenge Worksheets (Holt McDougal)
- Problem Solving Worksheets (Holt McDougal)
- Connecting Geometry to Trigonometry – Triangle Area Formulas (develop and use the formula $A = \frac{1}{2}ba \sin\theta$ to find the area of a triangle)

Methods of Assessments/Evaluation:

- Exit Tickets
- Assessment Chart (Scales)
- Quizzes
- Test
- Google Classroom
- Lesson Checks
- Projects
- Verbal Assessment
- Open ended questions
- Classwork
- Homework
- Check it out problems (during lectures)
- Think-pair-share
- Turn and Talk
- Whiteboards
- Observation (Teacher/small/whole group)
- Error Analysis
- Textbook Activity – Developing Geometric Formulas (assess students' ability to apply concepts and skills in a real-world format)
- Textbook Activity – Applying Geometric Formulas (assess students' ability to apply concepts and skills in a real-world format)

Resources/Including Online Resources

- Online Textbook Information: my.hrw.com
- Teacher Webpage
- Google Classroom

- Geometry Textbook
- Geogebra
- Khan Academy

Learning Goals Scale:

- 4 Student will be able to apply the relationship between perimeter and area in problem solving.
- 3 Student will be able to describe the effect on perimeter and area when dimensions are changed.
- 2 Student will be able to develop the formulas for perimeter and area of regular shapes.
- 1 Student will be able to apply the formulas for perimeter and area of regular shapes.

Course Name: Honors Geometry
Topic/Unit: Three Dimensional Figures and Volume

Approximate # Of Weeks: 2

Essential Questions:

- How do you calculate the volume of a prism or cylinder?
- How do you calculate the volume of a pyramid?
- How do you calculate the volume of a cone?
- How do you calculate the volume of a sphere?

Upon completion of this unit students will be able to:

- Classify three-dimensional figures according to their properties
- Use nets and cross sections to analyze three-dimensional figures
- Learn and apply the formula for the volume of a prism
- Learn and apply the formula for the volume of a cylinder
- Learn and apply the formula for the volume of a pyramid
- Learn and apply the formula for the volume of a cone
- Learn and apply the formula for the volume of a sphere
- Learn and apply the formula for the surface area of a sphere

NJCCS:

CC.9-12.G.GMD.1, CC.9-12.G.GMD.3, CC.9-12.G.GMD.4, CC.9-12.G.MG.1, CC.9-12.G.MG.2, CC.9-12.G.MG.3

Interdisciplinary Standards (njcccs.org)

- Standard 5.1 – Science Practices
- Standard 6.3 – Active Citizenship in the 21st Century

- Standard 8.2 – Technology Education
- Standard 9.1 – 21st - Century Life & Career Skills

Activities – include 21st Century Technologies:

- SmartBoard powerpoint presentations
- Lecture and class discussion
- Connecting Geometry to Algebra – Cube Roots (calculate cube roots)
- Technology Lab – Compare Surface Area and Volumes (use spreadsheet software to compare surface areas and volumes)
- Real-World Connections – The Mellon Arena/The U.S. Mint (choose appropriate problem-solving strategies and use them to solve real-world problems)
- Online quizzes from textbook website
- Online videos from textbook website
- Geogebra (online tool)
- Google Classroom tools (Questions and assessments)
- Khan academy
- Kahoot (online quizzes)
- Quizlet (online quizzes)

Enrichment Activities:

- Practice C Worksheets (Holt McDougal)
- Challenge Worksheets (Holt McDougal)
- Problem Solving Worksheets (Holt McDougal)
- Investigation: Formulas for Volume of a cylinder
- Donut Project

Methods of Assessments/Evaluation:

- Exit Tickets
- Assessment Chart (Scales)
- Quizzes
- Test
- Google Classroom
- Lesson Checks
- Projects
- Verbal Assessment
- Open ended questions
- Classwork
- Homework
- Check it out problems (during lectures)
- Think-pair-share
- Turn and Talk
- Whiteboards
- Observation (Teacher/small/whole group)
- Error Analysis

- Textbook Activity – Surface Area and Volume (assess students' ability to apply concepts and skills in a real-world format)

Resources/Including Online Resources

- Online Textbook Information: my.hrw.com
- Teacher Webpage
- Google Classroom
- Geometry Textbook
- Geogebra
- Khan Academy

Learning Goals Scale:

- 4 Student will be able to apply the formulas for surface area and volume of three-dimensional figures to solve real world situations.
- 3 Student will be able to learn the formulas for surface area and volume of three-dimensional figures.
- 2 Student will be able to use nets and cross sections to analyze three-dimensional figures.
- 1 Student will be able to classify three-dimensional figures according to their properties.

Course Name: Honors Geometry
Topic/Unit: Circles

Approximate # Of Weeks: 4

Essential Questions:

- What is the relationship between central angles and inscribed angles in a circle?
- What can you conclude about the angles of a quadrilateral inscribed in a circle?
- What are the key theorems about tangent lines to a circle?
- How do you write the equation of a circle if you know the radius and the coordinate of its center?

Upon completion of this unit students will be able to:

- Identify tangents, secants, and chords
- Use properties of tangents to solve problems
- Apply properties of arcs
- Apply properties of chords

- Find the area of sectors
- Find arc lengths
- Find the measure of an inscribed angle
- Use inscribed angles and their properties to solve problems
- Find the measures of angles formed by lines that intersect circles
- Use angle measures to solve problems
- Find the lengths of segments formed by lines that intersect circles
- Use the lengths of segments in circles to solve problems
- Write equations and graph circles in the coordinate plane
- Use the equation and graph of a circle to solve problems

NJCCS:

CC.9-12.G.C.2, CC.9-12.G.C.3, CC.9-12.G.C.4, CC.9-12.G.C.5,
CC.9-12.G.CO.13, CC.9-12.G.GPE.1

Interdisciplinary Standards (njcccs.org)

- Standard 5.1 – Science Practices
- Standard 6.3 – Active Citizenship in the 21st Century
- Standard 8.2 – Technology Education
- Standard 9.1 – 21st - Century Life & Career Skills

Activities – include 21st Century Technologies:

- SmartBoard powerpoint presentations
- Lecture and class discussion
- Construction – Tangent to a Circle at a Point
- Construction – Circle Through Three Noncollinear Points
- Construction – Center of a Circle
- Construction – Tangent to a Circle From an Exterior Point
- Connecting Geometry to Data Analysis – Circle Graphs (identify circle graphs that represent given data)
- Technology Lab – Explore Angle Relationships in Circles (use geometry software to explore segment relationships in circles)
- Technology Lab – Explore Segment Relationships in Circles (use geometry software to explore angle relationships in circles)
- Online quizzes from textbook website
- Online videos from textbook website
- Geogebra (online tool)
- Google Classroom tools (Questions and assessments)
- Khan academy
- Kahoot (online quizzes)
- Quizlet (online quizzes)

Enrichment Activities:

- Practice C Worksheets (Holt McDougal)
- Challenge Worksheets (Holt McDougal)

- Problem Solving Worksheets (Holt McDougal)
- Extension – Measuring Angles in Radians (use proportions to convert angle measures from degrees to radians)
- Circle Puzzles

Methods of Assessments/Evaluation:

- Exit Tickets
- Assessment Chart (Scales)
- Quizzes
- Test
- Google Classroom
- Lesson Checks
- Projects
- Verbal Assessment
- Open ended questions
- Classwork
- Homework
- Check it out problems (during lectures)
- Think-pair-share
- Turn and Talk
- Whiteboards
- Observation (Teacher/small/whole group)
- Error Analysis
- Textbook Activity – Lines and Arcs in Circles (assess students' ability to apply concepts and skills in a real-world format)
- Textbook Activity – Angles and Segments in Circles (assess students' ability to apply concepts and skills in a real-world format)

Resources/Including Online Resources

- Online Textbook Information: my.hrw.com
- Teacher Webpage
- Google Classroom
- Geometry Textbook
- Geogebra
- Khan Academy

Learning Goals Scale:

- 4 Student will be able to find the measure of an angle or length of a segment with a circle using the various properties.
- 3 Student will be able to apply properties of angles and segments with circles to solve problems.
- 2 Student will be able to graph, and write the equation of a circle in the coordinate plane.
- 1 Student will be able to identify segments and angles formed with circles.

Course Name: Honors Geometry
Topic/Unit: Probability (if time permits)

Approximate # Of Weeks: 2.5

Essential Questions:

- How can you use probabilities to help you make fair decisions?
- What are permutations and how can you use them to calculate probabilities?
- What are combinations and how can you use them to calculate probabilities?
- How do you find the probability of mutually exclusive events and overlapping events?
- How do you calculate a conditional probability?

Upon completion of this unit students will be able to:

- Solve problems involving the Fundamental Counting Principle
- Solve problems involving permutations and combinations
- Find the theoretical probability of an event
- Find the experimental probability of an event
- Determine whether events are independent or dependent
- Find the probability of independent and dependent events
- Construct and interpret two-way frequency tables of data when two categories are associated with each object being classified
- Find the probability of mutually exclusive events
- Find the probability of inclusive events

NJCCCS:

CC.9-12.C.CP.1, CC.9-12.S.CP.2, CC.9-12.S.CP.3, CC.9-12.S.CP.4, CC.9-12.S.CP.5, CC.9-12.S.CP.6, CC.9-12.S.CP.7, CC.9-12.S.CP.8, CC.9-12.S.CP.9, CC.9-12.S.IC.2, CC.9-12.S.ID.1, CC.9-12.S.ID.3, CC.9-12.S.ID.5, CC.9-12.S.MD.4, CC.9-12.S.MD.5, CC.9-12.S.MD.7, CC.9-12.A.APR.6

Interdisciplinary Standards (njcccs.org)

- Standard 5.1 – Science Practices
- Standard 6.3 – Active Citizenship in the 21st Century
- Standard 8.2 – Technology Education
- Standard 9.1 – 21st - Century Life & Career Skills

Activities – include 21st Century Technologies:

- SmartBoard powerpoint presentations
- Lecture and class discussion

- Connecting Algebra to Geometry – Relative Area (find relative areas of geometric figures)
- Technology Lab – Explore Simulations (use a spreadsheet to simulate experimental probability)
- Online quizzes from textbook website
- Online videos from textbook website
- Geogebra (online tool)
- Google Classroom tools (Questions and assessments)
- Khan academy
- Kahoot (online quizzes)
- Quizlet (online quizzes)

Enrichment Activities:

- Practice C Worksheets (Holt McDougal)
- Challenge Worksheets (Holt McDougal)
- Problem Solving Worksheets (Holt McDougal)

Methods of Assessments/Evaluation:

- Exit Tickets
- Assessment Chart (Scales)
- Quizzes
- Test
- Google Classroom
- Lesson Checks
- Projects
- Verbal Assessment
- Open ended questions
- Classwork
- Homework
- Check it out problems (during lectures)
- Think-pair-share
- Turn and Talk
- Whiteboards
- Observation (Teacher/small/whole group)
- Error Analysis
- Textbook Activity – Experimental Probability (assess students' ability to apply concepts and skills in a real-world format)
- Textbook Activity – Probability (assess students' ability to apply concepts and skills in a real-world format)

Resources/Including Online Resources

- Online Textbook Information: my.hrw.com
- Teacher Webpage
- Google Classroom
- Geometry Textbook

- Geogebra
- Khan Academy

Learning Goals Scale:

- 4** Student will be able to apply all types of probability to real world situations.
- 3** Student will be able to construct and interpret two-way frequency tables.
- 2** Student will be able to find the probability of mutually exclusive events and compound events.
- 1** Student will be able to determine whether events are independent or dependent.