

Wilson Area School District Planned Course Guide

Title of planned course: Honors Geometry

Subject Area: Mathematics

Grade Level: 10

Course Description: Honors Geometry is primarily concerned with developing geometric thinking through visualization, analysis, informal deduction and formal deduction. This course represents an accelerated, rigorous approach to the topics of traditional geometry and is consistent with current Common Core state standards. Enrichment is gained through student projects and presentations, the study of logic, the study of probability and statistics, and the use of technology. By the end of the course, students will be able to:

- Experiment with transformations in the plane
- Prove geometric theorems
- Make geometric constructions
- Use coordinates to prove simple geometric theorems, algebraically
- Apply geometric concepts in modeling situations
- Understand and apply theorems about circles
- Find arc lengths and areas of sectors of circles
- Visualize relationships between two-dimensional and three-dimensional objects
- Use probability to evaluate outcomes of decisions

Time/Credit for this Course: One Full Academic Year / 1.0 Credit

Curriculum Writing Committee: Christal Vitko

Curriculum Map

- August:** Chapter 1: Tools of Geometry
- September:** Chapter 1: Tools of Geometry (continued)
Chapter 2: Reasoning and Proof
- October:** Chapter 2: Reasoning and Proof (continued)
Chapter 3: Parallel and Perpendicular Lines
- November:** Chapter 3: Parallel and Perpendicular Lines (continued)
Chapter 4: Congruent Triangles
- December:** Chapter 4: Congruent Triangles (continued)
Chapter 5: Relationships within Triangles
- January:** Chapter 6: Polygons and Quadrilaterals
Chapter 7: Similarity
- February:** Chapter 7: Similarity (Continued)
Chapter 8: Right Triangles and Trigonometry
- March:** Chapter 8: Right Triangles and Trigonometry (Continued)
Chapter 10: Area
- April:** Chapter 10: Area (Continued)
Chapter 11: Surface Area and Volume
- May:** Chapter 11: Surface Area and Volume (Continued)
Chapter 12: Circles
- June:** Chapter 12: Circles (Continued)

Wilson Area School District Planned Course Materials

Course Title: Honors Geometry

Textbook: Pearson's Prentice Hall
Geometry Common Core ©2012

Teacher Resources:

- Textbook
- Multimedia
- Calculators
- Practice Worksheets
- Geogebra

Curriculum Scope & Sequence

Planned Course: Honors Geometry

Unit: Tools of Geometry (Chapter 1)

Time frame: 7 - 9 Days

Common Core Standards: 2.2.HS.C.1, 2.3.HS.A.3, 11; 2.3.8.A.3

Keystone Assessment Anchors: G.2.1.2.1, G.2.1.2.3, G.2.2.2.1, G.2.2.2.2

Essential content/objectives: At end of the unit, students will be able to:

- Define basic terms and postulates of geometry
- Measure and compare lengths of segments
- Measure and compare measures of angles
- Identify special angle pairs and use their relationship to find angle measures
- Find the midpoint of a segment
- Find the distance between two points in the coordinate plane
- Find the perimeter or circumference of basic shapes
- Find the area of basic shapes

Core Activities: Students will complete/participate in the following:

- Classroom lectures and discussion
- Guided and Independent practice
- Vocabulary activity with midpoint, bisector, and angle measures
- Small group work

Extensions:

- Explaining problems on the board during guided practice
- Enrichment worksheet with more challenging problems
- Concept Bytes in textbook

Remediation:

- Reteaching worksheets with worked out examples
- Teacher/Peer Tutoring

Instructional Methods:

- Explicit Instruction with discussion
- Notes projected with interactive screen
- Independent and small group practice
- Technology practice with Geogebra

Materials & Resources:

- Textbook
- Calculators
- Outlined Notes
- Worksheets
- Compass and straight edge
- Geogebra

Assessments:

- Homework Assignments
- Quizzes and Tests
- Lab Assignments
- Geometric Constructions

Curriculum Scope & Sequence

Planned Course: Honors Geometry

Unit: Reasoning and Proof (Chapter 2)

Time frame: 5 - 6 Days

Common Core Standards: 2.3.HS.A.3, 6

Keystone Assessment Anchors: G.1.3.2.1

Essential content/objectives: At end of the unit, students will be able to:

- Use inductive reasoning to make conjectures
- Identify conditional statements and their parts
- Write converse, inverse, and contrapositive of a conditional
- Write biconditionals and identify good definitions
- Connect reasoning in algebra and geometry
- Prove and apply theorems about angles

Core Activities: Students will complete/participate in the following:

- Classroom lectures and discussion
- Guided and Independent practice
- Compare/Contrast varying proofs
- Small group work
- Analyze problems and give a mathematical explanation

Extensions:

- Explaining problems on the board during guided practice
- Enrichment worksheet with more challenging problems
- Concept Bytes in textbook

Remediation:

- Reteaching worksheets with worked out examples
- Teacher/Peer Tutoring

Instructional Methods:

- Explicit Instruction with discussion
- Notes projected on interactive board with outlined notes
- Independent and small group practice

Materials & Resources:

- Textbook
- Calculators
- Outlined Notes
- Worksheets

Assessments:

- Homework Assignments
- Quizzes and Tests

Curriculum Scope & Sequence

Planned Course: Honors Geometry

Unit: Parallel and Perpendicular Lines (Chapter 3)

Time frame: 6 - 8 Days

Common Core Standards: 2.3.8.A.2, 3; 2.3.HS.A.3, 11

Keystone Assessment Anchors: G.2.1.2.2, G.2.1.2.3, G.2.2.1.1, G.2.2.1.2

Essential content/objectives: At end of the unit, students will be able to:

- Identify relationships between figures in space
- Identify angles formed by two lines and a transversal
- Prove theorems about parallel lines
- Use properties of parallel lines to find angle measures
- Determine whether two lines are parallel
- Relate parallel and perpendicular lines
- Use parallel lines to prove a theorem about triangles
- Prove angles are congruent/supplementary
- Find measures of angles of triangles
- Construct parallel and perpendicular lines
- Graph and write linear equations
- Relate slope to parallel and perpendicular lines

Core Activities: Students will complete/participate in the following:

- Classroom lectures and discussion
- Guided and Independent practice
- Small group work
- Discuss properties of parallel and perpendicular lines
- Construct parallel and perpendicular lines in GeoGebra
- Analyze problems and find the mistake

Extensions:

- Explaining problems on the board during guided practice
- Enrichment worksheet with more challenging problems
- Concept Bytes in textbook

Remediation:

- Reteaching worksheets with worked out examples
- Teacher/Peer Tutoring

Instructional Methods:

- Explicit Instruction with discussion
- Notes on interactive board with outlined notes
- Independent and small group practice
- Technology practice with Geogebra

Materials & Resources:

- Textbook
- Calculators
- Outlined Notes
- Worksheets
- Compass and straight edge
- Geogebra

Assessments:

- Homework Assignments
- Quizzes and Tests
- Lab Assignments
- Geometric Constructions

Curriculum Scope & Sequence

Planned Course: Honors Geometry

Unit: Congruent Triangles (Chapter 4)

Time frame: 8 - 10 Days

Common Core Standards: 2.2.HS.C.9, 2.3.8.A.2, 2.3.HS.A.1, 2, 3, 5, 6, 8, 13

Keystone Assessment Anchors: G.1.2.1.1, G.1.2.1.3, G.1.3.1.1, G.1.3.2.1

Essential content/objectives: At end of the unit, students will be able to:

- Recognize congruent figures and their corresponding parts
- Prove two triangles are congruent using the SSS and SAS Postulates
- Prove two triangles are congruent using the ASA Postulate and the AAS Theorem
- Use triangle congruence and corresponding parts of congruent triangles to prove that parts of two triangles are congruent
- Use and apply properties of isosceles and equilateral triangles
- Prove right triangles congruent using the Hypotenuse-Leg Theorem
- Identify congruent overlapping triangles
- Prove two triangles congruent using other congruent triangles

Core Activities: Students will complete/participate in the following:

- Classroom lectures and discussion
- Guided and Independent practice
- Build congruent triangles with Geogebra
- Small group work
- Analyze problems and give a reason to explain the next step

Extensions:

- Explaining problems on the board during guided practice
- Enrichment worksheet with more challenging problems
- Concept Bytes in textbook

Remediation:

- Reteaching worksheets with worked out examples
- Teacher/Peer Tutoring

Instructional Methods:

- Explicit Instruction with discussion
- Notes on interactive board with outlined notes
- Independent and small group practice
- Technology practice with Geogebra

Materials & Resources:

- Textbook
- Calculators
- Outlined Notes
- Worksheet
- Geogebra

Assessments:

- Homework Assignments
- Quizzes and Tests
- Lab Assignments

Curriculum Scope & Sequence

Planned Course: Honors Geometry

Unit: Relationships Within Triangles (Chapter 5)

Time frame: 9 - 11 Days

Common Core Standards: 2.3.8.A.2, 2.2.HS.C.9, 2.3.HS.A.3, 6, 8, 13

Keystone Assessment Anchors: G.1.2.1.1, G.1.3.2.1

Essential content/objectives: At end of the unit, students will be able to:

- Use properties of midsegments to solve problems
- Use properties of perpendicular bisectors and angle bisectors
- Identify properties of perpendicular bisectors and angle bisectors of a triangle
- Identify properties of medians and altitudes of a triangle
- Use Indirect reasoning to write proofs
- Use inequalities involving angles and sides of triangles
- Apply inequalities in two triangles

Core Activities: Students will complete/participate in the following:

- Classroom lectures and discussion
- Guided and Independent practice
- Construct angle bisectors and perpendicular bisectors with Geogebra
- Small group work
- Analyze problems and determine the next step

Extensions:

- Explaining problems on the board during guided practice
- Enrichment worksheet with more challenging problems
- Concept Bytes in textbook

Remediation:

- Reteaching worksheets with worked out examples
- Teacher/Peer Tutoring

Instructional Methods:

- Explicit Instruction with discussion
- Notes on interactive board with outlined notes
- Independent and small group practice
- Technology practice with Geogebra

Materials & Resources:

- Textbook
- Calculators
- Outlined Notes
- Worksheets
- GeoGebra

Assessments:

- Homework Assignments
- Quizzes and Tests
- Lab Assignments

Curriculum Scope & Sequence

Planned Course: Honors Geometry

Unit: Polygons and Quadrilaterals (Chapter 6)

Time frame: 7 - 10 Days

Common Core Standards: 2.2.HS.C.9, 2.3.8.A.2, 2.3.HS.A.3, 6, 8, 13

Keystone Assessment Anchors: G.1.2.1.2, G.1.2.1.4, G.1.3.2.1

Essential content/objectives: At end of the unit, students will be able to:

- Find the sum of the measures of the interior angles of a polygon
- Find the sum of the measures of the exterior angles of a polygon
- Use the relationships among sides and angles of parallelograms
- Use the relationships among diagonals of parallelograms
- Determine whether a quadrilateral is a parallelogram
- Define and classify special types of parallelograms
- Use properties of diagonals of rhombuses and rectangles
- Determine whether a parallelogram is a rhombus or rectangle
- Verify and use properties of trapezoids and kites
- Classify polygons in the coordinate plane
- Name coordinates of special figures by using their properties
- Prove theorems using figures in the coordinate plane

Core Activities: Students will complete/participate in the following:

- Classroom lectures and discussion
- Guided and Independent practice
- Vocabulary activity on different polygons and properties
- Compare and contrast different parallelograms
- Construct each polygon fulfilling respective properties with GeoGebra
- Small group work

Extensions:

- Explaining problems on the board during guided practice
- Enrichment worksheet with more challenging problems
- Concept Bytes in textbook

Remediation:

- Reteaching worksheets with worked out examples
- Teacher/Peer Tutoring

Instructional Methods:

- Explicit Instruction with discussion
- Notes on interactive board with outlined notes
- Independent and small group practice
- Technology practice with GeoGebra

Materials & Resources:

- Textbook
- Calculators
- Outlined Notes
- Worksheets
- GeoGebra

Assessments:

- Homework Assignments
- Quizzes and Tests
- Lab Assignments

Curriculum Scope & Sequence

Planned Course: Honors Geometry

Unit: Similarity (Chapter 7)

Time frame: 8 - 10 Days

Common Core Standards: 2.2.HS.C.9, 2.3.HS.A.1, 2, 3, 5, 6, 8; 2.3.8.A.2

Keystone Assessment Anchors: G.1.2.1.1, G.1.3.1.2, G.1.3.2.1

Essential content/objectives: At end of the unit, students will be able to:

- Write ratios and solve proportions
- Identify and apply similar polygons
- Use the AA Similarity Postulate and the SAS and SSS Similarity Theorems to prove triangles are similar
- Use similarity to find indirect measurements
- Find and use relationships in similar right triangles
- Use the Side-Splitter Theorem and the Triangle-Angle-Bisector Theorem
- Write two-column proofs involving similar triangles

Core Activities: Students will complete/participate in the following:

- Classroom lectures and discussion
- Guided and Independent practice
- Discuss why similarity can be proven with AA and SSS
- Discuss how the Side-Splitter Theorem and Triangle Angle Bisector theorem function
- Group work

Extensions:

- Explaining problems on the board during guided practice
- Enrichment worksheet with more challenging problems
- Concept Bytes in textbook

Remediation:

- Reteaching worksheets with worked out examples
- Teacher/Peer Tutoring

Instructional Methods:

- Explicit Instruction with discussion
- Notes on interactive board with outlined notes
- Independent and small group practice

Materials & Resources:

- Textbook
- Calculators
- Outlined Notes
- Worksheets

Assessments:

- Homework Assignments
- Quizzes and Tests

Curriculum Scope & Sequence

Planned Course: Honors Geometry

Unit: Right Triangles and Trigonometry (Chapter 8)

Time frame: 9 - 11 Days

Common Core Standards: 2.2.HS.C.9, 2.3.HS.A.2, 3, 7, 13

Keystone Assessment Anchors: G.1.2.1.1, G.2.1.1.1, G.2.1.1.2

Essential content/objectives: At end of the unit, students will be able to:

- Use the Pythagorean Theorem and its converse
- Use the properties of a 45-45-90 and a 30-60-90 triangle
- Use the sine, cosine and tangent ratios to determine side lengths and angles measures in right triangles
- Use angles of elevation and depression to solve problems
- Apply the Law of Sines
- Apply the Law of Cosines

Core Activities: Students will complete/participate in the following:

- Classroom lectures and discussion
- Guided and Independent practice
- Use the Pythagorean theorem to discover rules for Special Right Triangles
- Build triangles with Geogebra and compare actual and calculated measurements from Law of Sines and Cosines
- Group work

Extensions:

- Explaining problems on the board during guided practice
- Enrichment worksheet with more challenging problems
- Concept Bytes in textbook

Remediation:

- Reteaching worksheets with worked out examples
- Teacher/Peer Tutoring

Instructional Methods:

- Explicit Instruction with discussion
- Notes on interactive board with outlined notes
- Independent and small group practice
- Technology practice with GeoGebra

Materials & Resources:

- Textbook
- Calculators
- Outlined Notes
- Worksheets
- GeoGebra

Assessments:

- Homework Assignments
- Quizzes and Tests
- Lab Assignments

Curriculum Scope & Sequence

Planned Course: Honors Geometry

Unit: Area (Chapter 10)

Time frame: 5 - 9 Days

Common Core Standards: 2.2.HS.C.1, 2.3.HS.A.2, 3, 8, 9, 13, 14

Keystone Assessment Anchors: G.1.1.1.1, G.1.2.1.1, G.1.2.1.2, G.1.2.1.3, G.1.2.1.4, G.2.2.2.4, G.2.2.2.5, G.2.2.3.1, G.2.2.4.1, G.2.2.2.3

Essential content/objectives: At end of the unit, students will be able to:

- Find the area of parallelograms and triangles
- Find the area of trapezoids, rhombuses and kites
- Find the area of a regular polygon
- Find the perimeters and areas of similar polygons
- Find the measures of central angles and arcs of circles
- Find the circumference and arc length of circles
- Find the area of circles, sectors, and segments of circles
- Use segment and area models to find the probabilities of events

Core Activities: Students will complete/participate in the following:

- Classroom lectures and discussion
- Guided and Independent practice
- Compare/Contrast area formulas of polygons
- Group work

Extensions:

- Explaining problems on the board during guided practice
- Enrichment worksheet with more challenging problems
- Concept Bytes in textbook

Remediation:

- Reteaching worksheets with worked out examples
- Teacher/Peer Tutoring

Instructional Methods:

- Explicit Instruction with discussion
- Notes on interactive board with outlined notes
- Independent and small group practice

Materials & Resources:

- Textbook
- Calculators
- Outlined Notes
- Worksheets

Assessments:

- Homework Assignments
- Quizzes and Tests

Curriculum Scope & Sequence

Planned Course: Honors Geometry

Unit: Surface Area and Volume (Chapter 11)

Time frame: 5 - 6 Days

Common Core Standards: 2.3.HS.A.1, 3, 12, 13, 14

Keystone Assessment Anchors: G.1.2.1.5, G.2.3.1.1, G.2.3.1.2, G.2.3.1.3, G.2.3.2.1

Essential content/objectives: At end of the unit, students will be able to:

- Recognize polyhedra and their parts
- Visualize cross sections of space figures
- Find the surface area of a prism and a cylinder
- Find the surface area of a pyramid and a cone
- Find the volume of a prism and a cylinder
- Find the volume of a pyramid and a cone
- Find the surface area and volume of spheres
- Compare and find the areas and volumes of similar solids

Core Activities: Students will complete/participate in the following:

- Classroom lectures and discussion
- Guided and Independent practice
- Discuss similarities of area/volume formulas for each polygon
- Group work

Extensions:

- Explaining problems on the board during guided practice
- Enrichment worksheet with more challenging problems
- Concept Bytes in textbook

Remediation:

- Reteaching worksheets with worked out examples
- Teacher/Peer Tutoring

Instructional Methods:

- Explicit Instruction with discussion
- Notes on interactive board with outlined notes
- Independent and small group practice

Materials & Resources:

- Textbook
- Calculators
- Outlined Notes
- Worksheets

Assessments:

- Homework Assignments
- Quizzes and Tests

Curriculum Scope & Sequence

Planned Course: Honors Geometry

Unit: Circles (Chapter 12)

Time frame: 5 - 8 Days

Common Core Standards: 2.3.HS.A.1, 2, 5, 6, 8, 9, 13

Keystone Assessment Anchors: G.1.1.1.1-4, G.1.3.1.2, G.2.2.2.2-3

Essential content/objectives: At end of the unit, students will be able to:

- Use the properties of the tangent to a circle
- Use congruent chords, arcs, and central angles
- Use perpendicular bisectors to chords
- Find the measure of an inscribed angle
- Find the measure of angle formed by a tangent and a chord
- Find measures of angles formed by chords, secants, and tangents
- Find the lengths of segments associated with circles
- Write the equation of a circle
- Find the center and radius of a circle

Core Activities: Students will complete/participate in the following:

- Classroom lectures and discussion
- Guided and Independent practice
- Construct circles in GeoGebra and determine arc length and angle measures
- Group work

Extensions:

- Explaining problems on the board during guided practice
- Enrichment worksheet with more challenging problems
- Concept Bytes in textbook

Remediation:

- Reteaching worksheets with worked out examples
- Teacher/Peer Tutoring

Instructional Methods:

- Explicit Instruction with discussion
- Notes on interactive board with outlined notes
- Independent and small group practice

Materials & Resources:

- Textbook
- Calculators
- Outlined Notes
- Worksheets

Assessments:

- Homework Assignments
- Quizzes and Tests