**COURSE DESCRIPTION**

**Course Title:** Geometry Honors

**Course Number:** 00251

**Course Prerequisites:** 80% or higher in Algebra II Honors or 85% or higher in Algebra II CP with teacher recommendation.

**Course Description:** Geometry Honors is an academic course designed for the accelerated mathematics student planning on pursuing higher education; particularly those individuals whose primary interests are in mathematics. This course helps students recognize how algebra and geometry complement each other. In this course, students will learn various proof techniques and apply them to topics ranging from the basic elements of geometry to the areas and volumes of solids. Problems in this course will require higher level thinking skills and in-depth knowledge of the course content. District marking period assessments and final exam are required.

**Suggested Grade Level**: Grade 10

**Length of Course:** Two Semesters

**Units of Credit:** 1

**PDE Certification and Staffing Policies and Guidelines (CSPG) Required Teacher Certifications:**

CSPG #50 Mathematics (7-12)

To find the CSPG information, go to [CSPG](https://www.education.pa.gov/Educators/Certification/Staffing%20Guidelines/Pages/default.aspx)

**Certification verified by the WCSD Human Resources Department:** [x] Yes [ ] No

**WCSD STUDENT DATA SYSTEM INFORMATION**

**Course Level:** Honors & Dual Enrollment (1) GPA +5%

**Mark Types:** Check all that apply.

[x] F – Final Average [x] MP – Marking Period [x] EXM – Final Exam

**GPA Type**: [ ]  GPAEL-GPA Elementary [ ]  GPAML-GPA for Middle Level [x]  NHS-National Honor Society

[x]  UGPA-Non-Weighted Grade Point Average [x]  GPA-Weighted Grade Point Average

**State Course Code**: 02072

To find the State Course Code, go to [State Course Code](https://nces.ed.gov/forum/sced.asp), download the Excel file for *SCED*, click on SCED 6.0 tab, and choose the correct code that corresponds with the course.

**TEXTBOOKS AND SUPPLEMENTAL MATERIALS**

**Board Approved Textbooks, Software, and Materials:**

**Title:**  *Big Ideas Math – Geometry: A Common Core Curriculum*

**Publisher:** Big Ideas Learning, LLC.

**ISBN #:**  978-1-64208-762-8

**Copyright Date:** 2019

**WCSD Board Approval Date:** 6/29/2020

**Supplemental Materials:** *Geometry for Enjoyment and Challenge*: McDougal and Littell,
 Kuta Software, pdesas.org

**Curriculum Document**

**WCSD Board Approval:**

**Date Finalized:** 5/23/2022

**Date Approved:**  6/13/2022

**Implementation Year:** 2022-2023

**SPECIAL EDUCATION, 504, and GIFTED REQUIREMENTS**

The teacher shall make appropriate modifications to instruction and assessment based on a student’s Individual Education Plan (IEP), Chapter 15 Section 504 Plan (504), and/or Gifted Individual Education Plan (GIEP).

**SCOPE AND SEQUENCE OF CONTENT, AND CONCEPTS**

**Marking Period 1: Perimeter, Circumference, and Area, Geometric Probability, Basics of Geometry, Postulates and Proofs, Parallel and Perpendicular Lines**

* Perimeter, Circumference, and Area of Geometric Figures
* Probability of Non-Mutually Exclusive Events
* Points, Lines, and Planes
* Measurements of Segments
* Midpoint and Distance Formulas
* Perimeter and Area in the Coordinate Plane
* Measurements of Angles
* Angle Pairs
* Postulates
* Proofs of Segments and Angles
* Proofs of Geometric Relationships
* Pairs of Lines and Angles
* Parallel Lines and Transversals
* Proofs with Parallel and Perpendicular Lines
* Equations of Parallel and Perpendicular Lines
* Marking Period 1 Review and Assessment

**Marking Period 2: Transformations, Congruent Triangles, and Relationships within Triangles**

* Translations
* Reflections
* Rotations
* Congruence and Transformations
* Dilations
* Similarity and Transformations
* Angles of Triangles
* Congruent Polygons
* Proofs of Triangle Congruence: SAS, SSS, ASA, AAS, HL
* Equilateral and Isosceles Triangles
* Congruent Triangles
* Perpendicular and Angle Bisectors
* Bisectors of Triangles
* Definitions of Median and Altitude of a Triangle
* Triangle Midsegment Theorem
* Inequalities in One Triangle and Two Triangles
* Mid-Term Review and Assessment

**Marking Period 3: Quadrilaterals and Other Polygons, Similarity, and Right Triangles**

* Angles of Polygons
* Properties of Parallelograms
* Proofs: Quadrilaterals are Parallelograms
* Properties of Special Parallelograms
* Properties of Trapezoids and Kites
* Similar Polygons
* Proofs of Triangle Similarity: AA, SSS, SAS
* Proportionality Theorems
* Pythagorean Theorem
* Special Right Triangles
* Similar Right Triangles
* Marking Period 3 Review and Assessment

**Marking Period 4: Trigonometry, Circles, and Circumference, Area, and Volume**

* The Tangent, Sine and Cosine Ratios
* Inverse Trigonometric Ratios
* Right Triangle Solutions
* Lines, Segments, and Tangent Lines of Circles
* Arc Measures
* Chords
* Inscribed Angles and Polygons
* Angle and Segment Relationships in Circles
* Circles in the Coordinate Plane
* Circumference and Arc Length
* Areas of Circles and Sectors
* Areas of Polygons
* Three-Dimensional Figures
* Volume: Prisms, Cylinders, Pyramids, Cones, Spheres, Composite Figures
* Surface Area: Prisms, Cylinders, Pyramids, Cones, Spheres, Composite Figures
* Final Exam Review and Assessment

**Standards/Eligible Content and Skills**

| **Performance Indicator** | **PA Core Standard and/or Eligible Content** | **Marking Period Taught**  |
| --- | --- | --- |
| Review perimeter, circumference, and area of polygons and circles | CC.2.3.HS.A.3 | MP1 |
| Estimate perimeter, circumference, and/or area of an irregular geometric figure | G.2.2.2.1 | MP1 |
| Find the measurement of a missing length, given the perimeter circumference, or area of a geometric figure | G.2.2.2.2 | MP1 |
| Develop and/or use strategies to estimate the area of a compound/composite figure | G.2.2.2.4 | MP1 |
| Find the side lengths of a polygon with a given perimeter to maximize the area of the polygon | G.2.2.2.3 | MP1 |
| Describe how a change in the linear dimension of a geometric figure affects its perimeter, circumference, and area | G.2.2.3.1 | MP1 |
| Model and solve real-world and mathematical problems applying perimeter, circumference, and area | CC.2.3.HS.A.3 CC.2.3.HS.A.14 | MP1 |
| Review: Simple probability | G.2.2.4A1.2.3.3.1 | MP1 |
| Use area models to find probabilities of non-mutually exclusive events (geometric probability) | G.2.2.4.1 | MP1 |
| Model and solve real-world and mathematical area problems using probability | G.2.2.4G.2.2.4.1CC.2.3.HS.A.14 | MP1 |
| Identify and name points, lines, planes, segments, and rays in a geometric diagram | CC.2.3.HS.A.3 | MP1 |
| Sketch and name intersections of lines and planes | CC.2.3.HS.A.3 | MP1 |
| Model and solve real-world and mathematical problems involving lines and planes | CC.2.3.HS.A.3 CC.2.3.HS.A.14 | MP1 |
| Use the Ruler Postulate | CC.2.3.HS.A.3 | MP1 |
| Compare segments for congruence | CC.2.3.HS.A.3 | MP1 |
| Use the Segment Addition Postulate to determine lengths of segments | CC.2.3.HS.A.3 | MP1 |
| Use the Midpoint and Distance Formulas | G.2.1.2.1 | MP1 |
| Find lengths using midpoints and segment bisectors | G.2.1.2.1 | MP1 |
| Classify polygons according to the number of sides and whether they are concave or convex | G.1.2.1.4 | MP1 |
| Find the perimeters and areas of polygons in the coordinate plane | G.1.2.1.4 | MP1 |
| Name, measure, and classify angles | CC.2.3.HS.A.3 | MP1 |
| Identify congruent angles | CC.2.3.HS.A.3 | MP1 |
| Find the measures of angles using the Angle Addition Postulate | CC.2.3.HS.A.3 | MP1 |
| Bisect angles to find missing measures | G.2.2.1.1 | MP1 |
| Identify complementary and supplementary angles | G.2.2.1.1 | MP1 |
| Identify linear pairs and vertical angles | G.2.2.1.1 | MP1 |
| Identify postulates using diagrams | CC.2.3.HS.A.3 | MP1 |
| Sketch and interpret geometric diagrams | CC.2.3.HS.A.3 | MP1 |
| Write and complete two-column proofs to prove statements about segments and angles | G.1.3.2.1CC.2.3.HS.A.3 | MP1 |
|  Name properties of congruence | G.1.3.2.1CC.2.3.HS.A.3 | MP1 |
| Write paragraph proofs to prove geometric relationships | G.1.3.2.1CC.2.3.HS.A.3 | MP1 |
| Identify parallel lines, skew lines, perpendicular lines, and parallel planes | CC.2.3.HS.A.3 | MP1 |
| Identify pairs of angles formed by transversals | G.2.2.1.2 | MP1 |
| Use properties of parallel lines cut by transversals to identify special angle pairs and find angle measures | G.2.2.1.2 | MP1 |
| Prove theorems about parallel lines using angle theorems and their converses | G.1.3.2.12.2.2.1.2 | MP1 |
| Use the Transitive Property of Parallel lines | G.2.2.1.2 | MP1 |
| Model and solve real-world and mathematical problems involving parallel lines | G.2.2.1.2CC.2.3.HS.A.14 | MP1 |
| Find the distance from a point to a line using the distance formula and slope | G.2.1.2.1G.2.1.2.2 | MP1 |
| Prove theorems about perpendicular lines | G.1.3.2.1G.2.1.2.2 | MP1 |
| Model and solve real-world and mathematical problems involving perpendicular lines | G.2.1.2.2CC.2.3.HS.A.14 | MP1 |
| Partition a directed line segment using slope | G.2.1.2.2 | MP1 |
| Identify parallel and perpendicular lines on a coordinate plane | G.2.1.2.1G.2.1.2.2G.2.1.2.3 | MP1 |
| Write equations of parallel and perpendicular lines | CC.2.3.HS.A.11 | MP1 |
| **Marking Period 1 Review and Assessment** |  | MP1 |
| * Review and extend knowledge of Perimeter, Circumference, and Area
 |  | MP1 |
| * Review and extend knowledge of Geometric Probability
 |  | MP1 |
| * Review and extend knowledge of the Basics of Geometry
 |  | MP1 |
| * Review and extend knowledge of Postulates and Proofs
 |  | MP1 |
| * Review and extend knowledge of Parallel and Perpendicular Lines
 |  | MP1 |
| Perform translations and compositions | CC.2.3.HS.A.1CC.2.3.HS.A.2 | MP2 |
| Model and solve real-world and mathematical problems using translations and compositions | CC.2.3.HS.A.1CC.2.3.HS.A.2CC.2.3.HS.A.14 | MP2 |
| Perform reflections and glide reflections | CC.2.3.HS.A.1CC.2.3.HS.A.2 | MP2 |
| Model and solve real-world and mathematical problems involving reflections | CC.2.3.HS.A.1CC.2.3.HS.A.2CC.2.3.HS.A.14 | MP2 |
| Identify lines of symmetry | CC.2.3.HS.A.1CC.2.3.HS.A.2 | MP2 |
| Perform rotations and compositions with rotations | CC.2.3.HS.A.1CC.2.3.HS.A.2 | MP2 |
| Identify rotational symmetry | CC.2.3.HS.A.1CC.2.3.HS.A.2 | MP2 |
| Identify congruent figures | G.1.3.1.1 | MP2 |
| Describe congruence transformations | CC.2.3.HS.A.1CC.2.3.HS.A.2 | MP2 |
| Use theorems about congruence transformations | CC.2.3.HS.A.1CC.2.3.HS.A.2 | MP2 |
| Identify and perform dilations | G.1.3.1.2CC.2.3.HS.A.1 | MP2 |
| Model and solve real-world and mathematical problems involving scale factors and dilations | G.1.3.1.2CC.2.3.HS.A.1CC.2.3.HS.A.14 | MP2 |
| Perform and describe similarity transformations | G.1.3.1.2 | MP2 |
| Prove that triangles are similar | G.1.2.1.1G.1.3.1.2G.1.3.2.1 | MP2 |
| Classify triangles by sides and angles | G.1.2.1.1CC.2.3.HS.A.3 | MP2 |
| Find interior and exterior angle measures of triangles | G.1.2.1.1 | MP2 |
| Identify and use corresponding parts to find missing measures of congruent figures | G.1.3.1G.1.3.2.1 | MP2 |
| Use triangle congruence theorems to prove triangles are congruent and to model and solve real-world and mathematical problems: Side-Angle-Side (SAS), Side-Side-Side (SSS), Hypotenuse-Leg (HL), Angle-Side-Angle (ASA), Angle-Angle-Side (AAS) | G.1.3.1.1G.1.3.2.1CC.2.3.HS.A.14 | MP2 |
| Use the Third Angles Theorem and the Base Angles Theorem | G.1.2.1.3 | MP2 |
| Use properties of isosceles and equilateral triangles to find missing values and complete proofs | G.1.2.1.3G.1.3.2.1 | MP2 |
| Model and solve real-world and mathematical problems using congruent triangles | G.1.2.1.1G.1.2.1.3G.1.3.1.1CC.2.3.HS.A.14 | MP2 |
| Write and complete two column proofs using the triangle postulates and corresponding parts of congruent triangles are congruent | G.1.3.1G.1.3.1.2G.1.3.2.1 | MP2 |
| Use perpendicular bisectors to find measures | CC.2.3.HS.A.3CC.2.3.HS.A.14 | MP2 |
| Use angle bisectors to find measures and distance relationships | CC.2.3.HS.A.3CC.2.3.HS.A.14 | MP2 |
| Write equations for perpendicular bisectors | CC.2.3.HS.A.3CC.2.3.HS.A.14 | MP2 |
| Define and identify medians and altitudes of triangles | G.1.2.1.1 | MP2 |
| Use midsegments of triangles in the coordinate plane | G.1.2.1.1 | MP2 |
| Use the Triangle Midsegment Theorem to find distances | G.1.2.1.1 | MP2 |
| List sides and angles of a triangle in order by size | G.1.2.1.1 | MP2 |
| Use the Triangle Inequality Theorem to find the possible side lengths of triangles | G.1.2.1.1G.1.3.1.2 | MP2 |
| Compare measures in triangles | G.1.3.1.1 | MP2 |
| Model and solve real-world and mathematical problems using the Hinge Theorem | G.1.3.1.1CC.2.3.HS.A.14 | MP2 |
| **Mid-Term Review and Assessment** |  | MP2 |
| * Review and extend knowledge of Perimeter, Circumference, and Area
 |  | MP2 |
| * Review and extend knowledge of Geometric Probability
 |  | MP2 |
| * Review and extend knowledge of the Basics of Geometry
 |  | MP2 |
| * Review and extend knowledge of Postulates and Proofs
 |  | MP2 |
| * Review and extend knowledge of Parallel and Perpendicular Lines
 |  | MP2 |
| * Review and extend knowledge of Transformations
 |  | MP2 |
| * Review and extend knowledge of Congruent Triangles
 |  | MP2 |
| * Review and extend knowledge of Relationships within Triangles
 |  | MP2 |
| Use interior and exterior angles of polygons to find missing measures | G.1.2.1CC.2.3.HS.A.3 | MP3 |
| Use properties to find side lengths and angles of parallelograms | G.1.2.1CC.2.3.HS.A.3 | MP3 |
| Use parallelograms in the coordinate plane | G.1.2.1.2 | MP3 |
| Identify and verify parallelograms | G.1.2.1.2 | MP3 |
| Show that a quadrilateral is a parallelogram in the coordinate plane | G.1.2.1.2 | MP3 |
| Use properties of special parallelograms | G.1.2.1.2 | MP3 |
| Use coordinate geometry to identify special types of parallelograms | G.1.2.1.2 | MP3 |
| Use properties of trapezoids and kites | G.1.2.1.2 | MP3 |
| Use the Trapezoid Midsegment Theorem to find distances | G.1.2.1.2 | MP3 |
| Identify quadrilaterals | G.1.2.1.2 | MP3 |
| Model and solve real-world and mathematical quadrilateral and other polygon problems | CC.2.3.HS.A.14 | MP3 |
| Use similarity statements to find the scale factor, list all pairs of congruent angles, and write the ratios of the corresponding side lengths | G.1.3.1.2 | MP3 |
| Find corresponding lengths in similar polygons (separate and overlapping) | G.1.3.1.2 | MP3 |
| Find perimeters and areas of similar polygons (separate and overlapping) | G.1.3.1.2 | MP3 |
| Determine whether polygons are similar | G.1.3.1.2 | MP3 |
| Model and solve real-world and mathematical problems involving similar polygons (separate and overlapping) | CC.2.3.HS.A.14 | MP3 |
| Use the Angle-Angle (AA), Side-Side-Side (SSS), and Side-Angle-Side (SAS) Similarity Theorems to show that two triangles are similar | G.1.2.1.1G.1.3.1.2 | MP3 |
| Use the Triangle Proportionality Theorem and its converse | G.1.2.1.1G.1.3.1.2 | MP3 |
| Use the Three Parallel Lines and Triangle Bisector Theorems to find missing values | CC.2.3.HS.A.3 | MP3 |
| Prove triangles are similar using the triangle similarity theorems (two-column proof) | G.1.3.2.1CC.2.3.HS.A.6 | MP3 |
| Model and solve real-world and mathematical problems involving similar triangles (separate and overlapping) | CC.2.3.HS.A.6CC.2.3.HS.A.14 | MP3 |
| Use the Pythagorean Theorem and the Converse of the Pythagorean Theorem | G.2.1.1.1 | MP3 |
| Classify triangles using the Triangle Inequality Theorem and the Pythagorean Identities Theorem: Acute, Right, Obtuse | G.1.2.1.1G.1.3.1.2G.2.1.1.1 | MP3 |
| Find side lengths in special right triangles: 30-60-90, 45-45-90 | G.2.1.1G.2.1.1.1 | MP3 |
| Model and solve real-world and mathematical problems involving special right triangles | G.1.2.1.1G.2.1.1G.2.1.1.1 | MP3 |
| Identify similar triangles containing right angles | G.1.3.1.1G.2.1.1G.2.1.1.1 | MP3 |
| Model and solve real-world and mathematical problems involving similar right triangles | G.1.3.1.1G.2.1.1G.2.1.1.1CC.2.3.HS.A.14 | MP3 |
| Find the geometric mean | G.1.3.1.2 | MP3 |
| Use geometric mean to find the value of a missing length | G.1.3.1.2 | MP3 |
| Model and solve real-world and mathematical problems using the geometric mean | G.1.3.1.2CC.2.3.HS.A.14 | MP3 |
| **Marking Period 3 Review and Assessment** |  | MP3 |
| * Review and extend knowledge of Quadrilaterals and Other Polygons
 |  | MP3 |
| * Review and extend knowledge of Similarity
 |  | MP3 |
| * Review and extend knowledge of Right Triangles
 |  | MP3 |
| Use the tangent ratio | G.2.1.1.2 | MP4 |
| Model and solve real-world and mathematical problems involving the tangent ratio | G.2.1.1.2CC.2.3.HS.A.14 | MP4 |
| Use the sine and cosine ratios | G.2.1.1.2 | MP4 |
| Find the sine and cosine of angle measures in special right triangles | G.2.1.1.2 | MP4 |
| Model and solve real-world and mathematical problems involving sine and cosine ratios | G.2.1.1.2CC.2.3.HS.A.14 | MP4 |
| Use inverse trigonometric ratios | G.2.1.1.2 | MP4 |
| Solve right triangles | G.2.1.1.2 | MP4 |
| Find the area of triangles using the trigonometric area formula | G.2.1.1.2 | MP4 |
| Identify special segments and lines of circles | G.1.1.1.1 | MP4 |
| Draw and identify common tangents of circles | G.1.1.1.1 | MP4 |
| Use the properties of tangents of circles | G.1.1.1.1CC.2.3.HS.A.8 | MP4 |
| Find arc measures of circles | G.1.1.1.3CC.2.3.HS.A.9 | MP4 |
| Identify congruent arcs of circles | G.1.1.1.2 | MP4 |
| Use chords of circles to find lengths and arc measures | G.1.1.1.3CC.2.3.HS.A.9 | MP4 |
| Use inscribed angles | G.1.1.1.2 | MP4 |
| Use inscribed polygons | G.1.1.1.2 | MP4 |
| Find angle and arc measures | G.1.1.1.3CC.2.3.HS.A.9 | MP4 |
| Use circumscribed angles | G.1.1.1.2 | MP4 |
| Use segments of chords, tangents, and secants | G.1.1.1.3 | MP4 |
| Write and graph equations of circles | CC.2.3.HS.A.11 | MP4 |
| Model and solve real-world and mathematical problems using graphs of circles | CC.2.3.HS.A.3CC.2.3.HS.A.11CC.2.3.HS.A.14 | MP4 |
| Use the formula for circumference | G.2.2.2 | MP4 |
| Use arc lengths to find measures | CC.2.3.HS.A.9 | MP4 |
| Model and solve real-world and mathematical problems using circumference and arc lengths of circles | G.2.2.2CC.2.3.HS.A.9CC.2.3.HS.A.14 | MP4 |
| Measure angles in radians | CC.2.2.HS.C.7 | MP4 |
| Use the formula for the area of a circle | G.2.2.2.2 | MP4 |
| Find and use areas of sectors | G.2.2.2.5 | MP4 |
| Find the area of the shaded region of composite figures | G.2.2.2.4 | MP4 |
| Find areas of rhombuses and kites | G.1.2.1.2 | MP4 |
| Find angle measures in regular polygons | G.1.2.1.4 | MP4 |
| Find areas of regular polygons | G.1.2.1.4 | MP4 |
| Classify solids | CC.2.3.HS.A.3 | MP4 |
| Describe cross sections of a polyhedron | G.2.3.1CC.2.3.HS.A.13 | MP4 |
| Sketch and describe solids of revolution | G.2.3.1CC.2.3.HS.A.13 | MP4 |
| Find and use volumes: Prisms, Cylinders, Pyramids, Cones, Spheres | G.2.3.1.2G.1.3.1.3CC.2.3.HS.A.12 | MP4 |
| Find and use surface area: Prisms, Cylinders, Pyramids, Cones, Spheres | G.2.3.1.1G.2.3.1.3 | MP4 |
| Model and solve real-world and mathematical problems using volumes and surface areas of prisms, cylinders, pyramids, cones, and spheres | G.2.3.1.1G.2.3.1.2G.2.3.1.3CC.2.3.HS.A.12CC.2.3.HS.A.14 | MP4 |
| Find the measure of a composite three-dimensional figure containing prisms, cylinders, pyramids, cones, and spheres  | G.2.3.1.1G.2.3.1.2 | MP4 |
| **Final Exam Review and Assessment** |  | MP4 |
| * Review and extend knowledge of Quadrilaterals and Other Polygons
 |  | MP4 |
| * Review and extend knowledge of Similarity
 |  | MP4 |
| * Review and extend knowledge of Right Triangles
 |  | MP4 |
| * Review and extend knowledge of Trigonometry
 |  | MP4 |
| * Review and extend knowledge of Circles
 |  | MP4 |
| * Review and extend knowledge of Circumference, Area, and Volume
 |  | MP4 |

**ASSESSMENTS**

**PDE Academic Standards, Assessment Anchors, and Eligible Content:** The teacher must be knowledgeable of the PDE Academic Standards, Assessment Anchors, and Eligible Content and incorporate them regularly into planned instruction.

**Formative Assessments:** The teacher will utilize a variety of assessment methods to conduct in-process evaluations of student learning.

**Effective formative assessments for this course include:
Suggested but not limited to:**

* Pre-assessments of prior knowledge (e.g., Entrance cards or KWL chart)
* Bellringers/Problems of the Day (PODs)
* Discussions
* Exit ticket
* Teacher observations/Questioning
* Graphic organizers (e.g., Venn Diagrams, word mapping, webbing, KWL chart, etc.)
* Outlining
* Cooperative learning
* Written work
* Quizzes
* Oral response
* Self-evaluation
* Homework
* Summarizing
* Note-taking

**Summative Assessments:** The teacher will utilize a variety of assessment methods to evaluate student learning at the end of an instructional task, lesson, and/or unit.

**Effective summative assessments for this course include:
Suggested but not limited to:**

* Performance assessment
* Chapter/unit tests
* Quizzes
* Marking period assessments
* Mid-Term exam
* Final exam
* Projects
* Student presentations