VERNON TOWNSHIP
SCHOOL DISTRICT

Geometry CP
Curriculum Map

Adapted from:
Understanding By Design

Reviewed by:
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Adopted:
March 2025

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Course Description
Geometry CP will take a practical, hands-on approach to the study of Euclidean geometry. Emphasis will be on everyday applications on geometry concepts. Euclidean geometry is the core around which major themes of this course are organized. In addition, this course includes logical sequence, geometry applications of algebra and the use of transformations and constructions. Prerequisite: Algebra I CP or Algebra I ACP Based upon the following list of proficiencies, each student must demonstrate a minimum competency level of 65%. Competencies will be measured by way of an evaluation program consisting of teacher observations of student performance, tests, quizzes, classwork, homework, projects, and class participation, as well as class attendance in accordance with the high school's attendance policy. Successful completion of this course earns 5 credits toward graduation. Various Levels of Text: Supplemental text and audio visual materials are provided for above grade level and below grade level for students who need them. AI tools and Text to Speech tools may be used to adapt the lexile level of grade level materials.

New Jersey learning Standards covered throughout the course
In conjunction with the New Jersey Student Learning Standards, students enrolled in the **Geometry CP** courses will demonstrate the ability to:
• HSG-CO.A.1 Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc. • HSG-CO.D.1 Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.). • HSG-CO.C.9 Prove theorems about lines and angles. • HSG-GMD.A.3 Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems. • HSG-GPE.B.5 Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems (e.g., find the equation of a line parallel or perpendicular to a given line that passes through a given point). • HSG-MG.A.3 Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios).

- HSG-CO.B.7 Use the definition of congruence in terms of rigid motions to show that two triangles are congruent if and only if corresponding pairs of sides and corresponding pairs of angles are congruent.
- HSG-CO.C.10 Prove theorems about triangles.
- HSG-SRT.B.5 Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.
- HSG-GPE.B.4 Use coordinates to prove simple geometric theorems algebraically.
- .HSG-CO.C.11 Prove theorems about parallelograms.
- HSG-GPE.A.3 Derive the equations of ellipses and hyperbolas given the foci, using the fact that the sum or difference of distances from the foci is constant.
- HSG-MG.A.1 Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder).
- HSG-CO.A.3 Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry it onto itself.
- HSG-CO.A.4 Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.
- HSG-CO.A.5 Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure using, e.g., graph paper, tracing paper, or geometry software. Specify a sequence of transformations that will carry a given figure onto another.
- HSG-SRT.A.1 Verify experimentally the properties of dilations given by a center and a scale factor:
- HSG-SRT.A.2 Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar; explain using similarity transformations the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides.
- HSG-SRT.B.4 Prove theorems about triangles.
- HSG-C.A.1 Prove that all circles are similar.
- HSG-C.A.2 Identify and describe relationships among inscribed angles, radii, and chords.
- HSG-C.A.3 Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle.
- HSG-C.A.4 Construct a tangent line from a point outside a given circle to the circle.
- HSG-GPE.A.1 Derive the equation of a circle of given center and radius using the Pythagorean Theorem; complete the square to find the center and radius of a circle given by an equation.
- HSG-GPE.B.6 Find the point on a directed line segment between two given points that partitions the segment in a given ratio.
- HSG-C.B.5 Derive using similarity the fact that the length of the arc intercepted by an angle is proportional to the radius, and define the radian measure of the angle as the constant of proportionality; derive the formula for the area of a sector.
- HSG-GMD.A.1 Give an informal argument for the formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone.
- HSG-GMD.B.4 Identify the shapes of two-dimensional cross-sections of three-dimensional objects, and identify three-dimensional objects generated by rotations of two-dimensional objects.

- HSS-CP.A.1 Describe events as subsets of a sample space (the set of outcomes) using characteristics (or categories) of the outcomes, or as unions, intersections, or complements of other events ("or," "and," "not").
- HSS-CP.A.2 Understand that two events *A* and *B* are independent if the probability of *A* and *B* occurring together is the product of their probabilities, and use this characterization to determine if they are independent.
- HSS-CP.A.3 Understand the conditional probability of *A* given *B* as *P*(*A* and *B*)/*P*(*B*), and interpret independence of *A* and *B* as saying that the conditional probability of *A* given *B* is the same as the probability of *A*, and the conditional probability of *B* given *A* is the same as the probability of *B*.
- HSS-CP.B.7 Apply the Addition Rule, *P*(*A* or *B*) = *P*(*A*) + *P*(*B*) – *P*(*A* and *B*), and interpret the answer in terms of the model.
- HSS-CP.B.9 Use permutations and combinations to compute probabilities of compound events and solve problems.
- HSS-MD.B.6 Use probabilities to make fair decisions (e.g., drawing by lots, using a random number generator).
- HSS-MD.B.7 Analyze decisions and strategies using probability concepts (e.g., product testing, medical testing, pulling a hockey goalie at the end of a game).

Grading Criteria

- Major Assessments - 60%
- Minor Assessments - 40%

Course Resources

Text:

- Geometry, Common Core Edition, The McGraw-Hill Companies Inc.

Technologies

- School-issued computer with Internet access, a web browser and word processing, presentation software for both teacher and student use
- Software and web-based presentation resources
- Graphing Calculator

Supplemental Materials

- Learning Plans/Schoology
- Worksheets
- Extra Practice
- Homework

- Projects

Scope and Sequence- Topical Outline		
Unit	Title	Time
1	Tools of Geometry	2 Weeks
2	Reasoning and Proof	3 Weeks
3	Parallel and Perpendicular Lines (Climate Change)	3 Weeks
4	Classifying Triangles (Climate Change)	3 Weeks
5	Relationships in Triangles (Climate Change)	2 Weeks
6	Quadrilaterals (Climate Change)	4 Weeks
Exam	Midterm Exam	1 Week
7	Proportions and Similarity (DEI)	3 Weeks
8	Right Triangles and Trigonometry	4 Weeks
9	Transformations and Symmetry (DEI)	2 Weeks
10	Circles	1 Week
11	Areas of Polygons and Circles (Climate Change) (DEI)	3 Weeks
12	Extending Surface Area and Volume (Climate Change) (DEI)	3 Weeks
13	Probability and Measurement	1 Weeks
Exam	Final Exam	1 Week

The timeline is only an approximation. The inclusion of a classroom project in any one of the above units would extend the time allotment

Subject Area: Math Grade Level: Geometry CP	
Unit	**1 Tools of Geometry**
Timeframe	2 Weeks
Established Goals	• MP.1 Make sense of problems and persevere in solving them. • MP.2 Reason abstractly and quantitatively. • MP.3 Construct viable arguments & critique the reasoning of others. • MP.4 Model with mathematics. • MP.5 Use appropriate tools strategically. • MP.6 Attend to precision. • MP.7 Look for and make use of structure. • MP.8 Look for and express regularity in repeated reasoning.
NJSLS	• HSG-CO.A.1 Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc. • HSG-CO.D.12 Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.).
Essential Questions	• Why do we measure? • How precise do we need to be? • Why does a point not have a concrete definition?
Content Knowledge	*Students will learn:* • Prove geometric theorems • Use coordinates to prove simple geometric theorems • Apply geometric concepts in modeling situations
Skills	*Students will be able to:* • Identify and model points, lines, and planes. • Identify intersecting lines and planes. • Measure segments. • Calculate with measures. • Find the distance between two points

	● Find the midpoint of a segment. ● Measure and classify angles. ● Identify and use congruent angles and the bisectors of an angle. ● Identify and use special pairs of angles. ● Identify perpendicular lines.
Performance Tasks	● Quizzes ● Chapter Assessments including released NJGPA and SAT questions
Other Assessment Evidence	● Benchmark: ○ iReady - Fall 2024 ● Formative: ○ Warm up/Problem of the Day ○ Lesson ○ Scaffolded Classwork/Guided Practice that require students to extend understanding to new situations ○ Independent Practice/Classwork/Homework ● Summative: ○ Homework - 1.1, 1.2, 1.3, 1.4 Worksheets ○ Quizzes - 1.1-1.2 Quiz ○ Tests - Chapter 1 Test
Resources/Materials	**Core Materials** ● Geometry, Common Core Edition, The McGraw-Hill Companies Inc. **Supplemental Materials** ● Extra Practice Homework ● Schoology Links ● Quizizz ● Graph Paper ● Math Tools (ie compass, procetractor, ruler)
Interdisciplinary Connections	● Science: HS-PS2-1: Use the concepts of force and motion to analyze objects in motion and apply them to real-world scenarios (involving distance and angles). ○ Students will relate the distance formula and angle measure to understanding motion and forces in physics.

	• Social Studies: 6.1.12.D.14.a: Use maps, atlases, and spatial data to interpret geographic patterns, including distance and angles between geographical locations.
	  ○ Students will use the distance formula and angle measure to calculate distances and angles between locations on a map.
	
	• Engineering and Technology: 8.2.12.C.6: Design a solution to a problem by applying geometric tools to calculate distances and angles.
	  ○ Students will use the distance formula and angle measure in an engineering design process.

Learning Activities	• Homework Check • Learn/Lesson • Classwork/Homework

Subject Area: Math **Grade Level: Geometry CP**	
Unit	**2 Reasoning & Proof**
Timeframe	3 Weeks
Established Goals	• MP.1 Make sense of problems and persevere in solving them. • MP.2 Reason abstractly and quantitatively. • MP.3 Construct viable arguments & critique the reasoning of others. • MP.4 Model with mathematics. • MP.5 Use appropriate tools strategically. • MP.6 Attend to precision. • MP.7 Look for and make use of structure. • MP.8 Look for and express regularity in repeated reasoning.
NJSLS	• HSG-CO.C.9 Prove theorems about lines and angles. • HSG-CO.D.12 Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.). • HSG-GMD.A.3 Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.

Essential Questions	• Why is it important to be able to think logically? • What does a proof accomplish? • How can statements be proved logically equivalent?
Content Knowledge	*Students will learn:* • Inductive/deductive reasoning • Understand process of proofs • Use logic to draw conclusions
Skills	*Students will be able to:* • Make conjectures based on inductive reasoning. • Find counterexamples. • Determine truth values of negations, conjunctions, and disjunctions and represent them using Venn diagrams and find counterexamples. • Analyze statements in if-then form. • Write inverses, converse, and contrapositives • Use the Law of Detachment • Use the Law of Syllogism. • Identify and use basic postulates about points. lines, and planes. • Write paragraph proofs. • Use algebra to write two-column proofs. • Use properties of equalities to write geometric proofs. • Identify and use basic postulates about points. lines, and planes. • Write paragraph proofs. • Use algebra to write two-column proofs. • Use properties of equalities to write geometric proofs. • Write proofs involving congruence. • Write proofs involving segment addition. • Write proofs involving complementary and supplementary angles. • Write proofs involving congruent and right angles. • Complete constructions using appropriate tools.
Performance Tasks	• Quizzes • Chapter Assessments including released NJGPA and SAT questions

Other Assessment Evidence	● Benchmark: ○ iReady - Fall 2024 ● Formative: ○ Warm up/Problem of the Day ○ Lesson ○ Scaffolded Classwork/Guided Practice that require students to extend understanding to new situations ○ Independent Practice/Classwork/Homework ● Summative: ○ Homework - 2.1, 2.2, 2.3, 2.4, 2.5, 2.6 Worksheets ○ Quizzes - 2.1-2.3 Quiz, 2.4-2.5 Quiz ○ Tests - Chapter 2 Test
Resources/Materials	**Core Materials** ● Geometry, Common Core Edition, The McGraw-Hill Companies Inc. **Supplemental Materials** ● Extra Practice Homework ● Schoology Links ● Quizizz ● Graph Paper ● Math Tools (ie compass, procetractor, ruler)
Interdisciplinary Connections	● Science: HS-ETS1-4: Use models and simulations to analyze and optimize designs in engineering and technology. ○ Students apply inductive reasoning to hypothesize solutions in science and use deductive reasoning to test and verify their hypotheses. ● Social Studies: 6.1.12.D.14.b: Analyze historical events by identifying causes and effects and using inductive and deductive reasoning to make inferences about the past. ○ Students will use inductive reasoning to identify patterns in historical data and deductive reasoning to draw conclusions. ● English Language Arts: **RST.9-10.8:** Evaluate the reasoning in texts, including identifying and analyzing logical reasoning, to determine whether the reasoning is valid. ○ Students will analyze arguments in written texts, identifying instances of inductive and

	deductive reasoning.
Learning Activities	• Homework Check • Learn/Lesson • Classwork/Homework

Subject Area: Math **Grade Level: Geometry CP**	
Unit	**3 Parallel & Perpendicular**
Timeframe	3 Weeks
Established Goals	• MP.1 Make sense of problems and persevere in solving them. • MP.2 Reason abstractly and quantitatively. • MP.3 Construct viable arguments & critique the reasoning of others. • MP.4 Model with mathematics. • MP.5 Use appropriate tools strategically. • MP.6 Attend to precision. • MP.7 Look for and make use of structure. • MP.8 Look for and express regularity in repeated reasoning.
NJSLS	• HSG-CO.A.1 Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc. • HSG-CO.C.9 Prove theorems about lines and angles. • HSG-CO.D.12 Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.). • HSG-GPE.B.5 Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems (e.g., find the equation of a line parallel or perpendicular to a given line that passes through a given point). • HSG-MG.A.3 Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios).

Essential Questions	• Why do we have undefined terms such as point and line? • How can we use undefined terms? • What is shortest distance between two points/ • What is the shortest distance from a point to a line?
Content Knowledge	*Students will learn:* • Make geometric constructions • Prove geometric theorems. • Use coordinates to prove simple geometric theorems • Angle relationships with parallel lines • Equations of lines
Skills	*Students will be able to:* • Identify the relationship between two lines or two planes. • Name angle pairs formed by parallel lines and transversals. • Determine the relationships between specific pairs of angles. • Use algebra to find angle measures. • Find slope of lines. • Use slope to identify parallel and perpendicular lines. • Write an equation of a line given information about the graph. • Solve problems by writing equations. • Recognize angle pairs that occur with parallel lines. • Prove that two lines are parallel. • Find the distance between a point and a line. • Find the distance between two parallel lines.
Performance Tasks	• Quizzes • Chapter Assessments including released NJGPA and SAT questions

Other Assessment Evidence	• Benchmark:
	  ○ iReady - Fall 2024
	• Formative:
	  ○ Warm up/Problem of the Day
	  ○ Lesson
	  ○ Scaffolded Classwork/Guided Practice that require students to extend understanding to new situations

	○ Independent Practice/Classwork/Homework ● Summative: ○ Homework - 3.1, 3.2, 3.3, 3.4 Worksheets ○ Quizzes - 3.1-3.2 Quiz ○ Tests - Chapter 3 Test
Resources/Materials	**Core Materials** ● Geometry, Common Core Edition, The McGraw-Hill Companies Inc. **Supplemental Materials** ● Extra Practice Homework ● Schoology Links ● Quizizz ● Graph Paper ● Math Tools (ie compass, procetractor, ruler)
Interdisciplinary Connections	● Science: HS-PS2-4: Use mathematical representations to describe and analyze forces and motion, connecting geometric principles to forces in physics. ○ The concept of parallel lines and transversals can be applied to study forces and vectors in physics, helping to analyze the equilibrium of structures in engineering. ● Geography: 6.1.12.D.14.a: Use maps, atlases, and spatial data to interpret geographic patterns, including parallels and meridians. ○ Understanding parallel lines is crucial in geography, particularly when studying latitude (parallels) and longitude (meridians) on maps. ● Engineering and Technology: 8.2.12.C.6: Design and model structures using geometric principles, including parallel lines and angles. ○ Students will apply the principles of parallel lines and transversals in the design and construction of various engineering projects, such as bridges or buildings.
Learning Activities	● Homework Check ● Learn/Lesson ● Classwork/Homework

Subject Area: Math Grade Level: Geometry CP	
Unit	**4 Classifying Triangles**
Timeframe	3 Weeks
Established Goals	• MP.1 Make sense of problems and persevere in solving them. • MP.2 Reason abstractly and quantitatively. • MP.3 Construct viable arguments & critique the reasoning of others. • MP.4 Model with mathematics. • MP.5 Use appropriate tools strategically. • MP.6 Attend to precision. • MP.7 Look for and make use of structure. • MP.8 Look for and express regularity in repeated reasoning.
NJSLS	• HSG-CO.B.7 Use the definition of congruence in terms of rigid motions to show that two triangles are congruent if and only if corresponding pairs of sides and corresponding pairs of angles are congruent. • HSG-CO.C.10 Prove theorems about triangles. • HSG-CO.D.12 Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.). • HSG-SRT.B.5 Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures. • HSG-GPE.B.4 Use coordinates to prove simple geometric theorems algebraically.
Essential Questions	• How can you compare two objects? • How can you tell if two objects are congruent? • How can you tell if two triangles are congruent? • What is the difference between equal and congruent?
Content Knowledge	*Students will learn:* • Understand congruence in terms of rigid motions • Prove geometric theorems • Prove theorems involving congruence • Prove triangles congruent

Skills	*Students will be able to:* ● Identify and classify triangles by angle and side measures. ● Apply the Triangle Angle-Sum Theorem Apply the Exterior Angle Theorem. ● Name and use corresponding parts of congruent polygons. ● Prove triangles congruent using the definition of congruence. ● Use the SSS and SAS Postulates to test for triangle congruence. ● Use the ASA & AAS Postulates to test for triangle congruence. ● Use the HL Postulate to test for triangle congruence. ● Use properties of isosceles and equilateral triangles. ● Use in a coordinate proof. ● Write coordinate proofs.
Performance Tasks	● Quizzes ● Chapter Assessments including released NJGPA and SAT questions
Other Assessment Evidence	● Benchmark: ○ iReady - Fall 2024 ● Formative: ○ Warm up/Problem of the Day ○ Lesson ○ Scaffolded Classwork/Guided Practice that require students to extend understanding to new situations ○ Independent Practice/Classwork/Homework ● Summative: ○ Homework - 4.1, 4.2, 4.3, 4.4, 4.5, 4.6, 4.7 Worksheets ○ Quizzes - 4.2-4.2 Quiz, 4.3-4.5 Quiz ○ Tests - Chapter 4 Test
Resources/Materials	**Core Materials** ● Geometry, Common Core Edition, The McGraw-Hill Companies Inc. **Supplemental Materials** ● Extra Practice Homework ● Schoology Links ● Quizizz ● Graph Paper

	• Math Tools (ie compass, procetractor, ruler)

Interdisciplinary Connections	• Science: HS-ETS1-2: Analyze data to determine how the design of a structure can affect its stability and performance.
	  ○ Students will understand how congruent triangles are essential in the design of stable structures in engineering, such as bridges or buildings.
	
	• Engineering and Technology: 8.2.12.C.4: Use the design process to identify criteria for the structural design of products, ensuring that the design is both functional and efficient.
	  ○ Students will apply the concept of congruent triangles to the structural design process, particularly in ensuring the stability of various architectural designs.
	
	• Art: 1.1.12.D.1: Use geometric principles to create works of art, including symmetry, proportion, and congruence.
	  ○ Students will explore how congruent triangles can be used in art, especially in creating symmetrical and proportionate designs.

Learning Activities	• Homework Check • Learn/Lesson • Classwork/Homework

Subject Area: Math **Grade Level: Geometry CP**	
Unit	**5 Relationships in Triangles**
Timeframe	2 Weeks
Established Goals	• MP.1 Make sense of problems and persevere in solving them. • MP.2 Reason abstractly and quantitatively. • MP.3 Construct viable arguments & critique the reasoning of others. • MP.4 Model with mathematics. • MP.5 Use appropriate tools strategically. • MP.6 Attend to precision.

	• MP.7 Look for and make use of structure. • MP.8 Look for and express regularity in repeated reasoning.
NJSLS	• HSG-CO.C.10 Prove theorems about triangles. • HSG-MG.A.3 Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios).
Essential Questions	• What information do we to prove a segment is a median, altitude or angle bisector of a triangle? • What information do we get from knowing that a segment is a median, altitude or angle bisector of a triangle? • What inequalities apply to the relationships between angles and sides in triangles?
Content Knowledge	*Students will learn:* • Perpendicular/Angle Bisectors • Points of Concurrency • Inequalities of Triangles
Skills	*Students will be able to:* • Identify and use perpendicular bisectors in triangles. • Identify and use angle bisectors in triangles. • Identify and use medians in triangles Identify and use altitudes in triangles. • Recognize and apply properties of inequalities to the measures of the angles of a triangle. • Recognize and apply properties of inequalities to the relationships between the angles and sides of a triangle. • Use the Triangle Inequality Theorem to identify possible triangles. • Prove triangle relationships using the Triangle Inequality Theorem. • Apply the Hinge Theorem or its converse to make comparisons in two triangles. • Prove triangle relationships using the Hinge Theorem or its converse.
Performance Tasks	• Quizzes • Chapter Assessments including released NJGPA and SAT questions

Other Assessment Evidence	• Benchmark:
	  ○ iReady - January 2025
	• Formative:
	  ○ Warm up/Problem of the Day

	○ Lesson ○ Scaffolded Classwork/Guided Practice that require students to extend understanding to new situations ○ Independent Practice/Classwork/Homework ● Summative: ○ Homework - 5.1, 5.2, 5.3, 5.4, 5.5, 5.6 Worksheets ○ Quizzes - 51.-5.3 Quiz, 5.4-5.5 Quiz ○ Tests - Chapter 5 Test
Resources/Materials	**Core Materials** ● Geometry, Common Core Edition, The McGraw-Hill Companies Inc. **Supplemental Materials** ● Extra Practice Homework ● Schoology Links ● Quizizz ● Graph Paper ● Math Tools (ie compass, procetractor, ruler)
Interdisciplinary Connections	● Science: HS-PS2-4: Use mathematical representations to describe and analyze forces and motion, including the use of perpendicular bisectors to balance forces in structures. ○ Perpendicular bisectors are used in physics to describe symmetrical forces and moments in equilibrium in engineering and architecture. ● Engineering and Technology: 8.2.12.C.3: Apply geometric principles to design and create solutions to real-world engineering problems. ○ Perpendicular bisectors and angle bisectors are integral to architectural and structural design, particularly in ensuring symmetry and balance in buildings and bridges. ● Art: 1.1.12.D.2: Use geometric principles to create aesthetically pleasing designs and compositions, including symmetry and balance. ○ Students will explore how perpendicular and angle bisectors can be used in art to create balanced and symmetric designs.

Learning Activities	• Homework Check • Learn/Lesson • Classwork/Homework

Subject Area: Math **Grade Level: Geometry CP**	
Unit	**6 Quadrilaterals**
Timeframe	4 Weeks
Established Goals	• MP.1 Make sense of problems and persevere in solving them. • MP.2 Reason abstractly and quantitatively. • MP.3 Construct viable arguments & critique the reasoning of others. • MP.4 Model with mathematics. • MP.5 Use appropriate tools strategically. • MP.6 Attend to precision. • MP.7 Look for and make use of structure. • MP.8 Look for and express regularity in repeated reasoning.
NJSLS	• HSG-CO.C.11 Prove theorems about parallelograms. • HSG-GPE.A.3 Derive the equations of ellipses and hyperbolas given the foci, using the fact that the sum or difference of distances from the foci is constant. • HSG-GPE.B.4 Use coordinates to prove simple geometric theorems algebraically. • HSG-MG.A.1 Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder).
Essential Questions	• What properties determine a parallelogram and/or special parallelograms? • Is a rectangle a square? Is a square a rectangle? • What properties do each of the special quadrilaterals have?
Content Knowledge	*Students will learn:* • Use coordinates to prove simple geometric theorems • Properties of quadrilaterals • Interior/exterior angles of polygons

Skills	*Students will be able to:* ● Find and use the sum of the measures of the interior angles of a polygon. ● Find and use the sum of the measures of the exterior angles of a polygon. ● Recognize and apply the properties of the sides and angles of parallelograms. ● Recognize and apply the properties of the diagonals of parallelograms. ● Recognize the conditions that ensure a quadrilateral is a parallelogram. ● Prove that a set of points form a parallelogram in the coordinate plane. ● Recognize and apply properties of rectangles. ● Determine whether parallelograms are rectangles. ● Recognize and apply properties of rhombi and squares. ● Determine whether quadrilaterals are rectangles, shombi, or squares. ● Recognize and apply the properties of trapezoids, including the medians of trapezoids. ● Recognize and apply the properties of kites.
Performance Tasks	● Quizzes ● Chapter Assessments including released NJGPA and SAT questions ● Midterm Exam
Other Assessment Evidence	● Benchmark: ○ iReady - January 2025 ● Formative: ○ Warm up/Problem of the Day ○ Lesson ○ Scaffolded Classwork/Guided Practice that require students to extend understanding to new situations ○ Independent Practice/Classwork/Homework ● Summative: ○ Homework - 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7 Worksheets ○ Quizzes - 6.1-6.3 Quiz, 6.4-6.6 Quiz ○ Tests - Chapter 6 Test
Resources/Materials	**Core Materials** ● Geometry, Common Core Edition, The McGraw-Hill Companies Inc. **Supplemental Materials**

	• Extra Practice Homework • Schoology Links • Quizizz • Graph Paper • Math Tools (ie compass, procetractor, ruler)

Interdisciplinary Connections	• Science: HS-ETS1-2: Analyze data to determine how the design of a structure can affect its stability and performance.
	  ○ Students will explore how quadrilaterals are used in the design of stable structures, such as bridges and buildings.
	
	• Engineering and Technology: 8.2.12.C.5: Apply geometric principles in the design and development of solutions to real-world engineering challenges.
	  ○ Quadrilaterals are essential in structural design, such as for roofs, floors, and bridges, where different types of quadrilaterals provide stability.
	
	• Art: 1.1.12.D.2: Use geometric principles, including quadrilaterals, to create balanced and proportional designs.
	  ○ Quadrilaterals are often used in creating artistic patterns, designs, and architecture. Students will explore the role of quadrilaterals in artistic creations and designs.

Learning Activities	• Homework Check • Learn/Lesson • Classwork/Homework

Subject Area: Math **Grade Level: Geometry CP**	
Unit	**7 Proportions & Similarity**
Timeframe	3 Weeks
Established Goals	• MP.1 Make sense of problems and persevere in solving them. • MP.2 Reason abstractly and quantitatively. • MP.3 Construct viable arguments & critique the reasoning of others.

	• MP.4 Model with mathematics. • MP.5 Use appropriate tools strategically. • MP.6 Attend to precision. • MP.7 Look for and make use of structure. • MP.8 Look for and express regularity in repeated reasoning.
NJSLS	• HSG-CO.A.3 Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry it onto itself. • HSG-CO.A.4 Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments. • HSG-CO.A.5 Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure using, e.g., graph paper, tracing paper, or geometry software. Specify a sequence of transformations that will carry a given figure onto another. • HSG-SRT.A.1 Verify experimentally the properties of dilations given by a center and a scale factor: • HSG-SRT.A.2 Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar; explain using similarity transformations the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides. • HSG-SRT.B.4 Prove theorems about triangles. • HSG-SRT.B.5 Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures. • HSG-MG.A.3 Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios).
Essential Questions	• How do we prove that triangles are similar? • How can we use proportional relationships in similar triangles to find missing dimensions? • How do the areas of similar figure compare to their ratios of similitude?
Content Knowledge	*Students will learn:* • Prove theorems involving similarity • Using proportions and applying to geometric definitions • Apply geometric concepts in modeling situations
Skills	*Students will be able to:* • Write ratios. • Write and solve proportions

	• Interpret scale models. • Use scale factors to solve problems. • Use proportions to identify similar polygons. • Solve problems using the properties of similar polygons. • Identify similar triangles using AA, SSS, and SAS similarity postulates. • Use proportional parts within triangles. • Use proportional parts with parallel lines. • Recognize and use proportional relationships of corresponding segments of similar triangles. • Use Triangle Angle Bisector Theorem.
Performance Tasks	• Quizzes • Chapter Assessments including released NJGPA and SAT questions

Other Assessment Evidence	• Benchmark:
	  ○ iReady - January 2025
	• Formative:
	  ○ Warm up/Problem of the Day
	  ○ Lesson
	  ○ Scaffolded Classwork/Guided Practice that require students to extend understanding to new situations
	  ○ Independent Practice/Classwork/Homework
	• Summative:
	  ○ Homework - 7.1, 7.2, 7.3, 7.4, 7.5, 7.6 Worksheets
	  ○ Quizzes - 7.1-7.3 Quiz
	  ○ Tests - Chapter 7 Test

Resources/Materials	**Core Materials** • Geometry, Common Core Edition, The McGraw-Hill Companies Inc. **Supplemental Materials** • Extra Practice Homework • Schoology Links • Quizizz • Graph Paper

	• Math Tools (ie compass, procetractor, ruler)

Interdisciplinary Connections	• Social Studies: 6.1.12.GeoSP.1.A: Use maps and other geographic representations to evaluate environmental and human conditions.
	  ○ Students analyze map scales and create proportional distance conversions to measure real-world distances between locations.
	• Art: 1.2.12prof.Re8a: Analyze forms, methods, and styles of art and design to understand how aesthetic principles are used in creative works.
	  ○ Students explore the use of the Golden Ratio in famous artworks and buildings, analyzing proportions and similarity.

Learning Activities	• Homework Check • Learn/Lesson • Classwork/Homework

Subject Area: Math **Grade Level: Geometry CP**	
Unit	**8 Right Triangles & Trigonometry**
Timeframe	4 Weeks
Established Goals	• MP.1 Make sense of problems and persevere in solving them. • MP.2 Reason abstractly and quantitatively. • MP.3 Construct viable arguments & critique the reasoning of others. • MP.4 Model with mathematics. • MP.5 Use appropriate tools strategically. • MP.6 Attend to precision. • MP.7 Look for and make use of structure. • MP.8 Look for and express regularity in repeated reasoning.
NJSLS	• HSG-SRT.B.4 Prove theorems about triangles. • HSG-SRT.B.5 Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures. • HSG-SRT.C.6 Understand that by similarity, side ratios in right triangles are properties of the angles in

	the triangle, leading to definitions of trigonometric ratios for acute angles. ● HSG-SRT.C.7 Explain and use the relationship between the sine and cosine of complementary angles. ● HSG-SRT.C.8 Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems. ● HSG-SRT.D.9 Derive the formula $A = 1/2\ ab\ \sin(C)$ for the area of a triangle by drawing an auxiliary line from a vertex perpendicular to the opposite side. ● HSG-SRT.D.10 Prove the Laws of Sines and Cosines and use them to solve problems. ● HSG-MG.A.3 Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios).
Essential Questions	● How do we use the Pythagorean Theorem and trigonometric ratios to solve problems? ● What are the relationships between the sides of special right triangles? ●
Content Knowledge	*Students will learn:* ● Prove geometric theorems. ● Define trigonometric ratios and solve problems involving right triangles ● Special right triangles
Skills	*Students will be able to:* ● Find the geometric mean between two numbers. ● Solve problems involving relationships between parts of a right triangle and the altitude of the hypotenuse. ● Use the Pythagorean Theorem. ● Use the Converse of the Pythagorean Theorem ● Use the properties of 45-45-90 triangles. ● Use the properties of 30-60-90 triangles. ● Find trigonometric ratios using right triangles. ● Use trigonometric ratios to find angle measures in right triangles. ● Solve problems involving angles of elevation and depression. ● Use angles of elevation and depression to find the distance between two objects. ● Use the Law of Sines to solve triangles. ● Use the Law of Cosines to solve triangles.

Performance Tasks	• Quizzes • Chapter Assessments including released NJGPA and SAT questions

Other Assessment Evidence	• Benchmark:
	  ○ iReady - January 2025
	• Formative:
	  ○ Warm up/Problem of the Day
	  ○ Lesson
	  ○ Scaffolded Classwork/Guided Practice that require students to extend understanding to new situations
	  ○ Independent Practice/Classwork/Homework
	• Summative:
	  ○ Homework - 8.1, 8.2, 8.3, 8.4, 8.5, 8.6, 8.7, 8.8 Worksheets
	  ○ Quizzes - 8.1-8.3 Quiz, 8.4-8.6 Quiz
	  ○ Tests - Chapter 8 Test

Resources/Materials	**Core Materials** • Geometry, Common Core Edition, The McGraw-Hill Companies Inc. **Supplemental Materials** • Extra Practice Homework • Schoology Links • Quizizz • Graph Paper • Math Tools (ie compass, procetractor, ruler)

Interdisciplinary Connections	• Science: HS-PS4-1: Use mathematical representations to support a claim regarding relationships among the frequency, wavelength, and speed of waves traveling in various media.
	  ○ Students use sine and cosine functions to model sound waves, exploring frequency, amplitude, and resonance.
	• Social Studies: 6.1.12.GeoSP.1.A: Use maps and other geographic representations to evaluate environmental and human conditions.
	  ○ Students use trigonometry to calculate distances between locations on a map, considering latitude and longitude coordinates.

Learning Activities	• Homework Check • Learn/Lesson • Classwork/Homework

Subject Area: Math **Grade Level: Geometry CP**	
Unit	**9 Transformations & Symmetry**
Timeframe	2 Weeks
Established Goals	• MP.1 Make sense of problems and persevere in solving them. • MP.2 Reason abstractly and quantitatively. • MP.3 Construct viable arguments & critique the reasoning of others. • MP.4 Model with mathematics. • MP.5 Use appropriate tools strategically. • MP.6 Attend to precision. • MP.7 Look for and make use of structure. • MP.8 Look for and express regularity in repeated reasoning.
NJSLS	• HSG-CO.A.3 Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry it onto itself. • HSG-CO.A.4 Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments. • HSG-CO.A.5 Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure using, e.g., graph paper, tracing paper, or geometry software. Specify a sequence of transformations that will carry a given figure onto another. • HSG-SRT.A.1 Verify experimentally the properties of dilations given by a center and a scale factor. • HSG-SRT.A.2 Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar; explain using similarity transformations the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides. • HSG-SRT.B.4 Prove theorems about triangles. • HSG-SRT.B.5 Use congruence and similarity criteria for triangles to solve problems and to prove

	relationships in geometric figures.
Essential Questions	• Where can transformations be found? • What types of symmetry can a shape have? • How does a reflection work? • What does a dilation do to the sides and angles of a figure? • How does the area of the image of a figure after a dilation compare to the preimage area?
Content Knowledge	*Students will learn:* • Experiment with transformations in the plane • Understand similarity in terms of similarity transformations • Use coordinates to prove simple geometric theorems
Skills	*Students will be able to:* • Draw reflections. • Draw reflections in the coordinate plane. • Draw translations. • Draw translations in the coordinate plane. • Draw rotations. • Draw rotations in the coordinate plane. • Draw dilations. • Draw dilations in the coordinate plane • Draw glide reflections and other composition of isometries in the coordinate plane. • Draw compositions of reflections in parallel and intersecting lines. • Identify line and rotational symmetries in two-dimensional figures. • Identify plane and axis symmetries in three-dimensional figures.
Performance Tasks	• Quizzes • Chapter Assessments including released NJGPA and SAT questions

Other Assessment Evidence	• Benchmark:
	  ○ iReady - January 2025
	• Formative:
	  ○ Warm up/Problem of the Day
	  ○ Lesson
	  ○ Scaffolded Classwork/Guided Practice that require students to extend understanding to new

	situations ○ Independent Practice/Classwork/Homework ● Summative: ○ Homework - 9.1, 9.2, 9.3, 9.4, 9.5, 9.6 Worksheets ○ Quizzes - 9.1-9.3 Quiz ○ Tests - Chapter 9 Test
Resources/Materials	**Core Materials** ● Geometry, Common Core Edition, The McGraw-Hill Companies Inc. **Supplemental Materials** ● Extra Practice Homework ● Schoology Links ● Quizizz ● Graph Paper ● Math Tools (ie compass, procetractor, ruler)
Interdisciplinary Connections	● Science: HS-PS2-4: Use mathematical representations to describe and analyze forces and motion, including how objects transform under forces. ○ Transformations are used to understand the movement and behavior of objects in physics, particularly with translations, rotations, and reflections. ● Engineering and Technology: 8.2.12.C.5: Apply geometric principles to solve problems and design real-world solutions. ○ Engineers use transformations to model and create designs for structures, such as bridges, buildings, and machines, ensuring symmetry, balance, and functionality. ● Art: 1.1.12.D.2: Use geometric principles to create and analyze visual compositions, patterns, and symmetry. ○ Artists use transformations such as translations, rotations, and reflections to create symmetry and patterns in their artwork.
Learning Activities	● Homework Check ● Learn/Lesson ● Classwork/Homework

Subject Area: Math Grade Level: Geometry CP	
Unit	**10 Circles**
Timeframe	1 Weeks
Established Goals	• MP.1 Make sense of problems and persevere in solving them. • MP.2 Reason abstractly and quantitatively. • MP.3 Construct viable arguments & critique the reasoning of others. • MP.4 Model with mathematics. • MP.5 Use appropriate tools strategically. • MP.6 Attend to precision. • MP.7 Look for and make use of structure. • MP.8 Look for and express regularity in repeated reasoning.
NJSLS	• HSG-CO.A.1 Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc. • HSG-CO.D.12 Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.). • HSG-C.A.1 Prove that all circles are similar. • HSG-C.A.2 Identify and describe relationships among inscribed angles, radii, and chords. • HSG-C.A.3 Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle. • HSG-C.A.4 Construct a tangent line from a point outside a given circle to the circle. • HSG-GPE.A.1 Derive the equation of a circle of given center and radius using the Pythagorean Theorem; complete the square to find the center and radius of a circle given by an equation. • HSG-GPE.B.6 Find the point on a directed line segment between two given points that partitions the segment in a given ratio.
Essential Questions	• What is the definition of a circle? • How can proportions be used to find arc length? Area of a sector? • How is the equation of a circle related to the distance formula and why? • How does arc length relate to an intercepted arc?

Content Knowledge	*Students will learn:* ● Understand similarity in terms of similarity transformations ● Prove geometric theorems. ● Prove theorems involving similarity ● Use coordinates to prove simple geometric theorems ● Understand and apply theorems about circles ● Find arc lengths and areas of sectors of circles
Skills	*Students will be able to:* ● Identify and use parts of circles. Solve problems involving the circumference of a circle. ● Identify central angles, major arcs, minor arcs, and semicircles, and find their measures. ● Find arc lengths. ● Recognize and use relationships between arcs and chords. ● Recognize and use relationships between arcs, chords, and diameters. ● Find measures of inscribed angles. ● Find measures of angles of inscribed polygons. ● Use properties on tangents. ● Solve problems involving circumscribed polygons. ● Find measures of angles formed by lines intersecting on or inside a circle. ● Find measures of angles formed by lines intersecting outside the circle. ● Find measures of segments that intersect in the interior of a circle . ● Find measures of segments that intersect in the exterior of a circle. ● Write the equation of a circle. ● Graph a circle on the coordinate plane.
Performance Tasks	● Quizzes ● Chapter Assessments including released NJGPA and SAT questions
Other Assessment Evidence	● Benchmark: ○ iReady - April/May 2025 ● Formative: ○ Warm up/Problem of the Day ○ Lesson ○ Scaffolded Classwork/Guided Practice that require students to extend understanding to new situations

	○ Independent Practice/Classwork/Homework ● Summative: ○ Homework - 10.1, 10.2, 10.3, 10.4, 10.5 Worksheets ○ Quizzes - 10.1-10.3 Quiz ○ Tests - Chapter 10 Test
Resources/Materials	**Core Materials** ● Geometry, Common Core Edition, The McGraw-Hill Companies Inc. **Supplemental Materials** ● Extra Practice Homework ● Schoology Links ● Quizizz ● Graph Paper ● Math Tools (ie compass, procetractor, ruler)
Interdisciplinary Connections	● Science Standard: NJSLS Science - HS-PS2-1 (Motion and Stability: Forces and Interactions) Description: Analyze data to support the claim that Newton's second law of motion describes the mathematical relationship among the net force on a macroscopic object, its mass, and its acceleration. ○ Students derive the area of circular sectors or arc lengths (math), applying these to analyze circular motion (e.g., centripetal acceleration) in physics experiments (science). ● Visual Arts Standard: NJSLS Visual and Performing Arts - 1.3.12acc.Cr1a Description: Use multiple approaches to begin creative endeavors, including envisioning and planning artistic solutions that incorporate form, structure, and materials. ○ Students use circle properties (e.g., inscribed angles) to design circular patterns or compositions (math), applying these to create balanced artwork like mandalas or radial designs (arts).
Learning Activities	● Homework Check ● Learn/Lesson ● Classwork/Homework

Subject Area: Math **Grade Level: Geometry CP**	
Unit	**11 Area of Polygons & Circles**

Timeframe	3 Weeks
Established Goals	• MP.1 Make sense of problems and persevere in solving them. • MP.2 Reason abstractly and quantitatively. • MP.3 Construct viable arguments & critique the reasoning of others. • MP.4 Model with mathematics. • MP.5 Use appropriate tools strategically. • MP.6 Attend to precision. • MP.7 Look for and make use of structure. • MP.8 Look for and express regularity in repeated reasoning.
NJSLS	• HSG-C.B.5 Derive using similarity the fact that the length of the arc intercepted by an angle is proportional to the radius, and define the radian measure of the angle as the constant of proportionality; derive the formula for the area of a sector. • HSG-GPE.B.6 Find the point on a directed line segment between two given points that partitions the segment in a given ratio. • HSG-GMD.A.1 Give an informal argument for the formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone. • HSG-MG.A.1 Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder). • HSG-MG.A.3 Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios).
Essential Questions	• How can decomposing and recomposing shapes help us build our understanding of mathematics? • What does area measure as opposed to perimeter? • What units do we measure are in?
Content Knowledge	*Students will learn:* • Prove geometric theorems. • Find arc lengths and areas of sectors of circles • Explain area formulas and use them to solve problems. • Visualize relationships between two dimensional and three-dimensional objects • Apply geometric concepts in modeling situations

Skills	*Students will be able to:* ● Find perimeters and areas of parallelograms. ● Find perimeters and areas of triangles. ● Find areas of trapezoids. ● Find areas of rhombi and kites. ● Find areas of circles. ● Find areas of sectors of circles. ● Find areas of regular polygons. ● Find areas of composite figures. ● Find areas of similar figures by using scale factors. ● Find scale factors or missing measures given the areas of similar figures.
Performance Tasks	● Quizzes ● Chapter Assessments including released NJGPA and SAT questions
Other Assessment Evidence	● Benchmark: ○ iReady -April/May 2025 ● Formative: ○ Warm up/Problem of the Day ○ Lesson ○ Scaffolded Classwork/Guided Practice that require students to extend understanding to new situations ○ Independent Practice/Classwork/Homework ● Summative: ○ Homework - 11.1, 11.2, 11.3, 11.4, 11.5, 11.6, 11.7 Worksheets ○ Quizzes - 11.1-11.4 Quiz, 11.5-11.6 Quiz ○ Tests - Chapter 11 Test
Resources/Materials	**Core Materials** ● Geometry, Common Core Edition, The McGraw-Hill Companies Inc. **Supplemental Materials** ● Extra Practice Homework ● Schoology Links ● Quizizz ● Graph Paper

	• Math Tools (ie compass, procetractor, ruler)

Interdisciplinary Connections	• Social Studies Standard: NJSLS Social Studies - 6.1.12.GeoPP.4.a Description: Use geographic tools and data to analyze the impact of population density and distribution on resource use and sustainability over time.
	  ○ Students compute the area of land areas (math), analyzing how these measurements relate to population density and resource sustainability in geographic regions (social studies).
	• Career Readiness Standard: NJSLS Career Readiness, Life Literacies, and Key Skills - 9.4.12.TL.2 Description: Use technology to acquire, analyze, and apply information to solve real-world challenges in career contexts, such as navigation or technical design.
	  ○ Students calculate the area of polygonal floor plans or roofing sections (math), applying these to construction projects or technical designs using digital tools (career readiness).

Learning Activities	• Homework Check • Learn/Lesson • Classwork/Homework

Subject Area: Math **Grade Level: Geometry CP**	
Unit	**12 Surface Area & Volume**
Timeframe	3 Weeks
Established Goals	• MP.1 Make sense of problems and persevere in solving them. • MP.2 Reason abstractly and quantitatively. • MP.3 Construct viable arguments & critique the reasoning of others. • MP.4 Model with mathematics. • MP.5 Use appropriate tools strategically. • MP.6 Attend to precision. • MP.7 Look for and make use of structure. • MP.8 Look for and express regularity in repeated reasoning.
NJSLS	• HSG-GMD.A.1 Give an informal argument for the formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone.

	• HSG-GMD.A.3 Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems. • HSG-GMD.B.4 Identify the shapes of two-dimensional cross-sections of three-dimensional objects, and identify three-dimensional objects generated by rotations of two-dimensional objects. • HSG-MG.A.1 Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder). • HSG-MG.A.3 Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios).
Essential Questions	• How are two-dimensional and three-dimensional figures related? • What units do we measure volume in? • How can we decompose a figure to surface area or volume? • Why does the volume formula of a pyramid use ⅓ ?
Content Knowledge	*Students will learn:* • Prove geometric theorems. • Find arc lengths and areas of sectors of circles • Explain volume formulas and use them to solve problems. • Visualize relationships between two dimensional and three-dimensional objects • Apply geometric concepts in modeling situations
Skills	*Students will be able to:* • Identify and sketch solids formed by translating two-dimensional. • Find lateral areas and surface areas of prisms. • Find lateral areas and surface areas of cylinders. • Find lateral areas and surface areas of pyramids. • Find lateral areas and surface areas of cones. • Find volumes of prisms. • Find volumes of cylinders. • Find volumes of pyramids. • Find volumes of cones. • Find surface areas of spheres. • Find volumes of spheres. • Describe a set of points on a sphere. • Compare and contrast Euclidean and spherical geometries. • Identify congruent and similar solids.

	• Use properties of similar solids.
Performance Tasks	• Quizzes • Chapter Assessments including released NJGPA and SAT questions

Other Assessment Evidence	• Benchmark:
	  ○ iReady - April/May 2025
	• Formative:
	  ○ Warm up/Problem of the Day
	  ○ Lesson
	  ○ Scaffolded Classwork/Guided Practice that require students to extend understanding to new situations
	  ○ Independent Practice/Classwork/Homework
	• Summative:
	  ○ Homework - 12.1, 12.2, 12.3, 12.4, 12.5, 12.6, 12.7, 12.8 Worksheets
	  ○ Quizzes - 12.1-12.3 Quiz, 12.4-12.7 Quiz
	  ○ Tests - Chapter 12 Test

Resources/Materials	**Core Materials** • Geometry, Common Core Edition, The McGraw-Hill Companies Inc. **Supplemental Materials** • Extra Practice Homework • Schoology Links • Quizizz • Graph Paper • Math Tools (ie compass, procetractor, ruler)
Interdisciplinary Connections	• Science Standard: NJSLS Science - HS-PS1-3 (Matter and Its Interactions) Description: Plan and conduct an investigation to gather evidence to compare the structure of substances at the bulk scale to infer the strength of electrical forces between particles. ○ Connection: Students calculate the volume of containers (e.g., cylindrical beakers) (math), using these measurements to design experiments that investigate substance density or molecular interactions (science). • Career Readiness Standard: NJSLS Career Readiness, Life Literacies, and Key Skills - 9.4.12.TL.3 Description: Analyze the capabilities and limitations of current and emerging technologies to address

	personal, career, or community needs. ○ Students compute volumes of materials (e.g., concrete for a cylindrical pillar) (math), applying these calculations to assess construction needs or technology applications in building projects (career readiness).
Learning Activities	● Homework Check ● Learn/Lesson ● Classwork/Homework ● Projects

Subject Area: Math **Grade Level: Geometry CP**	
Unit	**13 Probability and Measurement**
Timeframe	1 Weeks
Established Goals	● MP.1 Make sense of problems and persevere in solving them. ● MP.2 Reason abstractly and quantitatively. ● MP.3 Construct viable arguments & critique the reasoning of others. ● MP.4 Model with mathematics. ● MP.5 Use appropriate tools strategically. ● MP.6 Attend to precision. ● MP.7 Look for and make use of structure. ● MP.8 Look for and express regularity in repeated reasoning.
NJSLS	● HSG-MG.A.3 Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios). ● HSS-CP.A.1 Describe events as subsets of a sample space (the set of outcomes) using characteristics (or categories) of the outcomes, or as unions, intersections, or complements of other events (“or,” “and,” “not”). ● HSS-CP.A.2 Understand that two events *A* and *B* are independent if the probability of *A* and *B* occurring together is the product of their probabilities, and use this characterization to determine if they are independent.

	• HSS-CP.A.3 Understand the conditional probability of *A* given *B* as *P*(*A* and *B*)/*P*(*B*), and interpret independence of *A* and *B* as saying that the conditional probability of *A* given *B* is the same as the probability of *A*, and the conditional probability of *B* given *A* is the same as the probability of *B*. • HSS-CP.B.7 Apply the Addition Rule, *P*(*A* or *B*) = *P*(*A*) + *P*(*B*) – *P*(*A* and *B*), and interpret the answer in terms of the model. • HSS-CP.B.9 Use permutations and combinations to compute probabilities of compound events and solve problems. • HSS-MD.B.6 Use probabilities to make fair decisions (e.g., drawing by lots, using a random number generator). • HSS-MD.B.7 Analyze decisions and strategies using probability concepts (e.g., product testing, medical testing, pulling a hockey goalie at the end of a game).
Essential Questions	• How do we find the sample space and use it to calculate probability? • How do you calculate the probability of spinning a number on a spinner? • How can you use area to find the probability of a random dart that hits adart board actually hits the bull's eye?
Content Knowledge	*Students will learn:* • Permutations/Combinations • Independent/Dependent Events • Geometric Probability
Skills	*Students will be able to:* • Use permutations with probability. • Use combinations with probability. • Find probabilities using length. • Find probabilities using area. • Design simulations to estimate probabilities. • Summarize data from simulations. • Find probabilities of independent and dependent events. • Find probabilities of events given the occurrence of other events. • Find probabilities of events that are mutually exclusive and events that are not mutually exclusive. • Find probabilities of complements.

Performance Tasks	• Quizzes • Chapter Assessments including released NJGPA and SAT questions • Final Exam

Other Assessment Evidence	• Benchmark:
	  ○ iReady - April/May 2025
	• Formative:
	  ○ Warm up/Problem of the Day
	  ○ Lesson
	  ○ Scaffolded Classwork/Guided Practice that require students to extend understanding to new situations
	  ○ Independent Practice/Classwork/Homework
	• Summative:
	  ○ Homework - 13.1, 13.2, 13.3, 13.4, 13.5 Worksheets
	  ○ Quizzes - 13.1-13.3 Quiz
	  ○ Tests - Chapter 13 Test

Resources/Materials	**Core Materials** • Geometry, Common Core Edition, The McGraw-Hill Companies Inc. **Supplemental Materials** • Extra Practice Homework • Schoology Links • Quizizz • Graph Paper • Math Tools (ie compass, procetractor, ruler)

Interdisciplinary Connections	• Engineering Standard: NJSLS Science - HS-ETS1-3 (Engineering Design) Description: Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, and reliability.
	  ○ Students use probability to assess the likelihood of design failures (math - probability) and measure volumes of components (math - measurement), evaluating engineering solutions like storage tanks or structural supports (engineering).
	• Science Standard: NJSLS Science - HS-LS3-3 (Heredity: Inheritance and Variation of Traits) Description: Apply concepts of statistics and probability to explain the variation and distribution of traits in a population.
	  ○ Students use probability to determine independence of genetic events (e.g., inheriting two traits)

	(math), applying these to analyze trait distributions in populations (science).
Learning Activities	• Homework Check • Learn/Lesson • Classwork/Homework

21st Century Skills: Career Readiness, Life Literacies, and Key Skills	• 9.1.12.CFR.4: Demonstrate an understanding of the interrelationships among attitudes, assumptions, and patterns of behavior regarding money, saving, investing, and work across cultures. • 9.1.12.CDM.1: Identify the purposes, advantages, and disadvantages of debt. • 9.1.12.CDM.6: Compute and assess the accumulating effect of interest paid over time when using a variety of sources of credit. (e.g., student loans, credit cards, auto loans, mortgages, etc.). • 9.1.12.CDM.8: Compare and compute interest and compound interest and develop an amortization table using business tools. • 9.1.12.PB.1: Explain the difference between saving and investing. • 9.1.12.PB.5: Analyze how changes in taxes, inflation, and personal circumstances can affect a personal budget. • 9.1.12.PB.6: Describe and calculate interest and fees that are applied to various forms of spending, debt and saving. • 9.2.12.CAP.1: Analyze unemployment rates for workers with different levels of education and how the economic, social, and political conditions of a time period are affected by a recession. • 9.2.12.CAP.3: Investigate how continuing education contributes to one's career and personal growth. • 9.2.12.CAP.4: Evaluate different careers and develop various plans (e.g., costs of public, private, training schools) and timetables for achieving them, including educational/training requirements, costs, loans, and debt repayment. • 9.4.12.CI.1: Demonstrate the ability to reflect, analyze, and use creative skills and ideas (e.g., 1.1.12prof.CR3a). • 9.4.12.CI.3: Investigate new challenges and opportunities for personal growth, advancement, and transition (e.g., 2.1.12.PGD.1). • 9.4.12.CT.1: Identify problem-solving strategies used in the development of an innovative product or practice (e.g., 1.1.12acc.C1b, 2.2.12.PF.3). • 9.4.12.CT.2: Explain the potential benefits of collaborating to enhance critical thinking and problem solving (e.g., 1.3E.12profCR3.a). • 9.4.12.TL.2: Generate data using formula-based calculations in a spreadsheet and draw conclusions about the data. • 9.4.12.TL.3: Analyze the effectiveness of the process and quality of collaborative environments. • 9.4.12.TL.4: Collaborate in online learning communities or social networks or virtual worlds to analyze and propose a resolution to a real-world problem (e.g., 7.1.AL.IPERS.6). • 9.1 Standards Link - https://www.nj.gov/education/standards/clicks/Docs/2020NJSLS-9.1FinancialLiteracy.pdf

	• 9.2 Standards Link - https://www.nj.gov/education/standards/clicks/Docs/2020NJSLS-9.2CareerAwareness.pdf • 9.4 Standards Link - https://www.nj.gov/education/standards/clicks/Docs/2020NJSLS-9.4LifeLiteraciesandKeySkills.pdf • Our CTE offerings are extensive at the HS level. Currently, we offer 8 CTE programs at Vernon Township High School including: Engineering, Hospitality, Allied Health, Marketing, Construction, Computer Science, Cosmetology, and Graphic Design. • ARTSTANDING is a district-wide event that allows all "Special" areas to be highlighted -- of which CTE programs and Career Pathways are included.

Career Education with Diversity, Equity, and Inclusion	• Architect
	  ○ **Zaha Hadid**, a British-Iraqi architect known for her bold, futuristic designs and innovative use of fluid, curving forms. She was the first woman to receive the **Pritzker Architecture Prize** in 2004 and designed iconic buildings such as the **Heydar Aliyev Center in Azerbaijan**, the **London Aquatics Centre**, and the **Guangzhou Opera House**. Her work pushed the boundaries of architecture, blending technology, art, and engineering in groundbreaking ways.
	• Engineering
	  ○ **Dr. Shirley Ann Jackson**. She is an African American physicist and electrical engineer who made significant contributions to telecommunications while working at Bell Labs. Her research laid the groundwork for technologies such as touch-tone dialing, fiber optics, and caller ID. Dr. Jackson later became the president of Rensselaer Polytechnic Institute (RPI) and was the first African American woman to earn a Ph.D. from MIT in any field.
	• Land Surveyor
	• Graphic Designer
	• Teacher
	• Urban Planner
	  ○ **June Manning Thomas**. She is a highly respected urban planner and scholar whose work focuses on social equity in urban development, particularly in African American communities. Dr. Thomas has written extensively on the impacts of urban renewal, segregation, and displacement on Black communities in the U.S. She is a professor emerita of urban and regional planning at the University of Michigan and has been a strong advocate for incorporating racial and social justice considerations into urban planning policies.
	• Cartographer
	• Construction and Carpentry
	• Interior Designer
	  ○ **Vern Yip**, a Chinese-American interior designer and television personality best known for his work on *HGTV's Trading Spaces* and *Design Star*. Yip is recognized for blending modern aesthetics with cultural influences, often incorporating Asian-inspired elements into his designs.

Diversity, Equity, and Inclusion	**Analyzing Real-World Data on Social Issues**: Use functions and statistical analysis to examine data sets related to social justice topics, such as income inequality or environmental impacts on different communities. This approach helps students apply mathematical concepts to understand and discuss societal issues. **Exploring Mathematics in Various Cultures**: Investigate mathematical contributions from diverse cultures, like the development of algebra in the Islamic world or ancient Chinese mathematics. This can deepen students' appreciation for the global nature of mathematical thought. **Project-Based Learning on Community Issues**: Encourage students to identify local community challenges and use precalculus concepts to propose solutions. For example, modeling traffic patterns to improve safety or analyzing demographic trends to address local needs. **Collaborative Group Work Emphasizing Diverse Perspectives**: Design group activities that require students to approach problems from multiple viewpoints, fostering an inclusive environment where diverse problem-solving strategies are valued. **Geometry in Global Architecture** ● Explore geometric concepts through architectural designs from diverse cultures. ● Example: Study the symmetry and tessellations in Islamic architecture, the Golden Ratio in Greek temples, or fractals in African art. ● Activity: Students research and present on how geometry shapes different cultural architectural styles.
Technology Integrations: Computer Science and Design Thinking	● Course catalog includes CTE programs such as Engineering, Computer Science, and Graphic Arts to provide technological opportunities to prepare for careers ● All students are one-to-one with Chromebooks for day-to-day use in the classroom ● All students log onto computers where they utilize a variety of instructional and online tools to enhance their classroom instruction as well as aid in the problem solving process ● Many of the concepts that are explored in the high school mathematics curriculum involve solving problems using a step by step process and are eventually summarized using and algorithm ● All classrooms have access to an interactive Smart Board with speaker system so lessons can include video, sound, and interactive lessons for all learners ● TECH.8.1.8 All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge. ● TECH.8.1.8.A.CS1 Understand and use technology systems. ● TECH.8.1.8.A.CS2 Select and use applications effectively and productively. ● TECH.8.1.8.C Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others. ● TECH.8.1.8.C.CS1 Interact, collaborate, and publish with peers, experts, or others by employing a variety of

	digital environments and media. • TECH.8.1.8.F Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources. • TECH 8.2.12.D.1 Design and create a prototype to solve a real world problem using a design process, identify constraints addressed during the creation of the prototype, identify trade-offs made, and present the solution for peer review • TECH 8.1.12.A.2 Produce and edit a multi-page digital document for a commercial or professional audience and present it to peers and/or professionals in that related are for review • TECH 8.1.12.A.CS2 Select and use applications effectively and productively • 8.2.12.ED.1: Use research to design and create a product or system that addresses a problem and make modifications based on input from potential consumers. • 8.2.12.ED.2: Create scaled engineering drawings for a new product or system and make modification to increase optimization based on feedback. • 8.2.12.ED.3: Evaluate several models of the same type of product and make recommendations for a new design based on a cost benefit analysis. • 8.2.12.ED.4: Design a product or system that addresses a global problem and document decisions made based on research, constraints, trade-offs, and aesthetic and ethical considerations and share this information with an appropriate audience • 8.2.12.ED.5: Evaluate the effectiveness of a product or system based on factors that are related to its requirements, specifications, and constraints (e.g., safety, reliability, economic considerations, quality control, environmental concerns, manufacturability, maintenance and repair, ergonomics). • 8.2.12.ED.6: Analyze the effects of changing resources when designing a specific product or system (e.g., materials, energy, tools, capital, labor). • 8.2.12.ITH.1: Analyze a product to determine the impact that economic, political, social, and/or cultural factors have had on its design, including its design constraints. • 8.2.12.ITH.2: Propose an innovation to meet future demands supported by an analysis of the potential costs, benefits, trade-offs, and risks related to the use of the innovation. • 8.2.12.ITH.3: Analyze the impact that globalization, social media, and access to open source technologies has had on innovation and on a society's economy, politics, and culture. • 8.2.12.NT.1: Explain how different groups can contribute to the overall design of a product. • 8.2.12.NT.2: Redesign an existing product to improve form or function. • 8.2.12.ETW.1: Evaluate ethical considerations regarding the sustainability of environmental resources that are used for the design, creation, and maintenance of a chosen product. • 8.2.12.ETW.2: Synthesize and analyze data collected to monitor the effects of a technological product or system on the environment. • 8.2.12.ETW.3: Identify a complex, global environmental or climate change issue, develop a systemic plan of investigation, and propose an innovative sustainable solution. • 8.2.12.EC.1: Analyze controversial technological issues and determine the degree to which individuals, businesses, and governments have an ethical role in decisions that are made.

	• 8.2.12.EC.2: Assess the positive and negative impacts of emerging technologies on developing countries and evaluate how individuals, non-profit organizations, and governments have responded. • 8.2.12.EC.3: Synthesize data, analyze trends, and draw conclusions regarding the effect of a technology on the individual, culture, society, and environment and share this information with the appropriate audience. • 8.2.12.ETW.4: Research historical tensions between environmental and economic considerations as driven by human needs and wants in the development of a technological product and present the competing viewpoints. • https://www.nj.gov/education/standards/compsci/Docs/2020%20NJSLS-CSDT.pdf

Differentiation and Accommodations for: Special Education	• Special Education modifications will be implemented as per the Individualized Education Programs of the students in the class.
	• Such as:
	  ○ Use of calculator, graphing calculator, desmos calculator (on chromebook)
	  ○ Manipulatives - base blocks, algebra tiles, etc.
	  ○ Graph Paper
	• Please click here for an overview of the variety of accommodations set in place for IEP's and 504's
	• Accommodations will be dictated by the general makeup of the class.

MTSS/RTI	• The VTSD Response to Intervention and MTSS Manual and the NJTSS Early Reading Screening Guidelines outline the policies and procedures that 'exist to ensure a coordinated system for planning, delivering, measurement, and modification of intervention and referral services implemented in each school by a multidisciplinary team to address the learning, behavioral, and health needs of all students. (N.J.A.C. 6A:16-8)' This requirement is fulfilled through the district New Jersey Tiered System of Support (NJTSS) Early Reading grant initiative and our Multi-Tiered Systems of Support (MTSS) Response to Intervention plan which includes
	  ○ a. A continuum of supports and interventions available in each school to support learning, behavior, and health needs;
	  ○ b. Action plans for interventions based on student data and desired outcomes;
	  ○ c. Professional development for multidisciplinary teams and staff who provide interventions; and
	  ○ d. Review and assessment of effectiveness of interventions (e.g., progress monitoring).

English Language Learners	• Coordinate activities with ESL teacher to accommodate individual learning needs • Provide appropriate leveled texts • Students complete the ACCESS 2.0 test yearly to measure growth and guide instruction
Risk for School-Failure	• Credit Retrieval Programs • Apex - virtual • Viking Success Academy • Counseling interventions • Parent meetings • Student meetings • Individual and Group counseling

Gifted and Talented Learners	• Inclusive Identification process that depicts the child as a whole in order to provide the best learning environment possible for each student. Click here for Identification Profile Sample • Tiered Services utilizing NAGC K-12 Programming standards to ensure individual needs are being met. Click here for services map. • Formative Assessment utilized in order to promote acceleration, curriculum compacting, grouping, and asynchronous learning where appropriate. • Dynamic Model for Gifted Program Improvement is utilized in order to verify that our program is employing not only up to date methods, but also effective ones. • Teacher training in Gifted Education.
Climate Change Mandate	• The following standards will be implemented in the topics that discuss using shapes, specifically in units 3, 4, 5, 6, 11, and 12. • G.MG.A.1 Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder). Climate Change Example: Students may use circles, their measures, and their properties to describe the cross section of a tree and compare changes in radial diameter or circumference variations of tree trunks when considering changes in seasonal weather patterns over time. • G.MG.A.2 Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile, BTUs per cubic foot). Climate Change Example: Students may apply the concept of population density of different urban areas, including calculations of population density, and discuss different environmental factors (e.g., air and water quality, waste disposal, energy consumption) that might be exacerbated by increased population density. • G.MG.A.3 Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios). Climate Change Example: Students may apply geometric methods to solve design problems such as increasing access to green spaces in cities given physical and cost constraints. • A.CED.A.1 Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions. Climate Change Example: Students may create equations and/or inequalities to represent the economic impact of climate change.