**SUBJECT AREA: Mathematics - Geometry**
**GRADE LEVEL: 11 (some students from 9th, 10th, and 12th grade)**
**SEMESTER: Fall**

| UNIT TITLE/ ESSENTIAL QUESTION(S) | UNIT SKILLS AND CONTENT (Skills should be identified from core content skills identified in Vertical Planning) | CORE TEXTS AND MATERIALS | FORMATIVE & SUMMATIVE ASSESSMENTS | COMMON CORE/CONTENT STANDARDS |
|---|---|---|---|---|
| Unit 1: Essential Geometric Concepts<br><br>How do we classify and compare objects in geometry?<br><br>How do we use definitions to guide problem solving?<br><br>How do we use visualization in geometry? | Proper annotation techniques, including identifying relevant information and labeling it on a diagram<br><br>Identifying variables and setting up equations to solve a problem.<br><br>Foundation of measurement and construction.<br><br>Using a compass to compare lengths and create geometric shapes based on the given information.<br><br>The idea of congruence, and understanding that, when it comes to congruence, actual value is not relevant. | eMathInstruction.com (videos and worksheets)<br><br>DeltaMath.com (hands-on practice with geometric concepts)<br><br>EdPuzzle.com (edited videos)<br><br>IXL (practice skills and diagnostics) | Problem-Attic.com (regents-level questions based on previous CC Geometry regents exams)<br><br>DeltaMath.com task assessments | G-CO.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<br>G-CO.12 Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.). Copying a segment; copying an angle; bisecting a segment; bisecting an angle; constructing perpendicular lines, including the perpendicular bisector of a line segment; and constructing a line parallel to a given line through a point not on the line |

| UNIT TITLE/ ESSENTIAL QUESTION(S) | UNIT SKILLS AND CONTENT (Skills should be identified from core content skills identified in Vertical Planning) | CORE TEXTS AND MATERIALS | FORMATIVE & SUMMATIVE ASSESSMENTS | COMMON CORE/CONTENT STANDARDS |
|---|---|---|---|---|
| Unit 2: Transformations, Rigid Motions, and Congruence<br><br>How do we use rigid motions to prove congruence?<br><br>How do we perform rigid motions, such as rotation, translation, and reflection? | Understanding rotation and the necessary components involved with it (center, direction, angle)<br><br>Understanding translation and the necessary components involved with it (the only rigid motion where orientation stays intact)<br><br>Understanding reflection and the necessary components involved with it (line of reflection being the perpendicular bisector of a segment connecting each point and its image after a reflection)<br><br>Using properties of circles, as well as properties of parallel and perpendicular lines to perform rotations, translations, and reflections. | eMathInstruction.com (videos and worksheets)<br><br>DeltaMath.com (hands-on practice with geometric concepts)<br><br>EdPuzzle.com (edited videos)<br><br>IXL (practice skills and diagnostics) | Problem-Attic.com (regents-level questions based on previous CC Geometry regents exams)<br><br>DeltaMath.com task assessments | G-CO.2 Represent transformations in the plane using, e.g., transparencies and geometry software; describe transformations as functions that take points in the plane as inputs and give other points as outputs. Compare transformations that preserve distance and angle to those that do not (e.g., translation versus horizontal stretch).<br>G-CO.3 Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry it onto itself.<br>G-CO.4 Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.<br>G-CO.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.<br>G-CO.6 Use geometric descriptions of rigid motions to transform figures and to predict the effect of a given rigid motion on a given figure; given two figures, use the definition of congruence in terms of rigid motions to decide if they are congruent.<br>G-CO.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.<br>G-CO.8 Explain how the criteria for triangle congruence (ASA, SAS, and SSS) follow from the definition of congruence in terms of rigid motions.<br>G-CO.9 Prove theorems about lines and angles. Theorems include: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angles are congruent; points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints.<br>G-CO.10 Prove theorems about triangles. Theorems include: measures of interior angles of a triangle sum to 180°; base angles of isosceles triangles are congruent; the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length; the medians of a triangle meet at a point. |

| UNIT TITLE/ ESSENTIAL QUESTION(S) | UNIT SKILLS AND CONTENT (Skills should be identified from core content skills identified in Vertical Planning) | CORE TEXTS AND MATERIALS | FORMATIVE & SUMMATIVE ASSESSMENTS | COMMON CORE/CONTENT STANDARDS |
|---|---|---|---|---|
| Unit 3: Euclidean Triangle Proof<br><br>How do we prove things congruent if we don't know their size?<br><br>How do we work backwards to find all the information relevant to complete a congruence proof? | Understanding and utilizing basic geometric axioms to prove theorems about lines, angles, and triangles.<br><br>Understanding the two-column proof.<br><br>The layers of the two-column proof: givens, inferences, conclusions.<br><br>Outlining a proof before completing it.<br><br>Learning to self-assess: where am I when it comes to triangle proofs? How far can I go? | eMathInstruction.com (videos and worksheets)<br><br>DeltaMath.com (hands-on practice with geometric concepts)<br><br>EdPuzzle.com (edited videos)<br><br>IXL (practice skills and diagnostics) | Problem-Attic.com (regents-level questions based on previous CC Geometry regents exams)<br><br>DeltaMath.com task assessments | G-CO.9 Prove theorems about lines and angles. Theorems include: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angles are congruent; points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints.<br>G-CO.10 Prove theorems about triangles. Theorems include: measures of interior angles of a triangle sum to 180°; base angles of isosceles triangles are congruent; the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length; the medians of a triangle meet at a point. |
| Unit 4: Constructions<br><br>How do we use a compass and straightedge to perform constructions?<br><br>Why are circles at the core of construction?<br><br>How do we apply what we know about congruence to show that our constructions are accurate? | Performing various constructions using a compass and a straightedge.<br><br>Using reasoning to show that the construction is accurate.<br><br>Creating step-by-step guides for constructions that were learned. | eMathInstruction.com (videos and worksheets)<br><br>DeltaMath.com (hands-on practice with geometric concepts)<br><br>EdPuzzle.com (edited videos)<br><br>IXL (practice skills and diagnostics) | Problem-Attic.com (regents-level questions based on previous CC Geometry regents exams)<br><br>DeltaMath.com task assessments | G-CO.12 Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.). Copying a segment; copying an angle; bisecting a segment; bisecting an angle; constructing perpendicular lines, including the perpendicular bisector of a line segment; and constructing a line parallel to a given line through a point not on the line<br>G-CO.13 Construct an equilateral triangle, a square, and a regular hexagon inscribed in a circle.<br>G-C.3 Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle, i.e. opposite angles are supplementary. |

| UNIT TITLE/ ESSENTIAL QUESTION(S) | UNIT SKILLS AND CONTENT (Skills should be identified from core content skills identified in Vertical Planning) | CORE TEXTS AND MATERIALS | FORMATIVE & SUMMATIVE ASSESSMENTS | COMMON CORE/CONTENT STANDARDS |
|---|---|---|---|---|
| Unit 5: The Tools of Coordinate Geometry<br><br>What are the tools of coordinate geometry and why do we need them?<br><br>How do we use the tools of coordinate geometry to perform transformations on the coordinate plane?<br><br>How do we use tools of coordinate geometry in proofs?<br><br>Why is a two-column proof not necessary in coordinate geometry? | Understanding and utilizing the slope formula and its applications to parallelism and perpendicularity.<br><br>Understanding and utilizing the midpoint formula and its applications.<br><br>Understanding and utilizing the distance formula and its applications.<br><br>Using slope, midpoint, and distance formulas to perform transformations on the coordinate plane.<br><br>Utilizing both the geometric (diagram analysis) approach and the algebraic (more numerical) approach in coordinate geometry questions. | eMathInstruction.com (videos and worksheets)<br><br>DeltaMath.com (hands-on practice with geometric concepts)<br><br>EdPuzzle.com (edited videos)<br><br>IXL (practice skills and diagnostics) | Problem-Attic.com (regents-level questions based on previous CC Geometry regents exams)<br><br>DeltaMath.com task assessments | G-GPE.4 Use coordinates to prove simple geometric theorems algebraically. For example, prove or disprove that a figure defined by four given points in the coordinate plane is a rectangle; prove or disprove that the point (1, √3) lies on the circle centered at the origin and containing the point (0, 2).<br>G-GPE.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).<br>G-SRT.8 Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.<br>G-CO.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. |