Resource Title: Geometry Student Edition

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Core Subject Area: Geometry

Mathematics, Geometry

Standard	Designated Sections
Domain: Geometry (Congruence)	
Experiment with transformations in the plane.	
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.	Module 1 Task 1 Leaping Lizards! Module 1 Task 2 Is It Right? Module 1 Task 4 Leap Year
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).	Module 1 Task 1 Leaping Lizards! Module 1 Task 4 Leap Year
G.CO.3 Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry it onto itself.	Module 1 Task 5 Symmetries of Quadrilaterals Module 1 Task 6 Symmetries of Regular Polygons Module 1 Task 7 Quadrilaterals-Beyond Definition
G.CO.4 Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.	Module 1 Task 1 Leaping Lizards! Module 1 Task 3 Leap Frog Module 1 Task 4 Leap Year Module 1 Task 7 Quadrilaterals-Beyond Definition

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.	Module 1 Task 1 Leaping Lizards! Module 1 Task 3 Leap Frog Module 2 Task 3 Can You Get There From Here?
Understand congruence in terms of rigid motions.	
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.	Module 1 Task 5 Symmetries of Quadrilaterals Module 1 Task 6 Symmetries of Regular Polygons Module 1 Task 7 Quadrilaterals-Beyond Definition Module 2 Task 4 Congruent Triangles
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.	Module 2 Task 4 Congruent Triangles Module 2 Task 5 Congruent Triangles to the Rescue
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.	Module 2 Task 4 Congruent Triangles Module 2 Task 5 Congruent Triangles to the Rescue
Prove geometric theorems.	
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.*	Module 3 Task 2 Do You See What I See? Module 3 Task 3 It's All in Your Head Module 3 Task 4 Parallelism Preserved and Protected Module 3 Task 5 Claims and Conjectures Module 3 Task 6 Justification and Proof Module 4 Task 5 Measured Reasoning
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.*	Module 3 Task 1 How Do You Know That? Module 3 Task 2 Do You See What I See? Module 3 Task 3 It's All in Your Head Module 3 Task 5 Claims and Conjectures Module 3 Task 6 Justification and Proof Module 3 Task 9 Centers of a Triangle Module 4 Task 5 Measured Reasoning
G.CO.11 Prove theorems about parallelograms. *Theorems include: opposite sides are congruent, opposite angles are congruent, the diagonals of a parallelogram bisect each other, and conversely, rectangles are parallelograms with congruent diagonals.*	Module 3 Task 2 Do You See What I See? Module 3 Task 7 Parallelogram Conjectures and Proof Module 3 Task 8 Guess My Parallelogram
Make geometric constructions.	
G.CO.12 Make formal geometric constructions with a variety of tools and methods	Module 2 Task 1 Under Construction

(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.*	Module 2 Task 2 More Things Under Construction Module 2 Task 6 Justifying Constructions
G.CO.13 Construct an equilateral triangle, a square, and a regular hexagon inscribed in a circle.	Module 2 Task 1 Under Construction Module 2 Task 2 More Things Under Construction Module 2 Task 6 Justifying Constructions
Domain: Geometry (Similarity, Right Triangles, and Trigonometry)	
Understand similarity in terms of similarity transformations.	
G.SRT.1 Verify experimentally the properties of dilations given by a center and a scale factor. a. A dilation takes a line not passing through the center of the dilation to a parallel line, and leaves a line passing through the center unchanged. b. The dilation of a line segment is longer or shorter in the ratio given by the scale factor.	Module 4 Task 1 Photocopy Faux Pas
G.SRT.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.	Module 4 Task 2 Triangle Dilations Module 4 Task 3 Similar Triangles and Other Figures
G.SRT.3 Use the properties of similarity transformations to establish the AA criterion for two triangles to be similar.	Module 4 Task 3 Similar Triangles and Other Figures
Prove theorems involving similarity.	
G.SRT.4 Prove theorems about triangles. *Theorems include: a line par- allel to one side of a triangle divides the other two proportionally, and conversely; the Pythagorean Theorem proved using triangle similarity.*	Module 4 Task 2 Triangle Dilations Module 4 Task 4 Cut By A Transversal Module 4 Task 5 Measured Reasoning Module 4 Task 7 Pythagoras By Proportions
G.SRT.5 Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figure	Module 4 Task 2 Triangle Dilations Module 4 Task 5 Measured Reasoning Module 4 Task 7 Pythagoras By Proportions
Define trigonometric ratios and solve problems involving right triangles.	
G.SRT.6 Understand that by similarity, side ratios in right triangles are properties of the	Module 4 Task 8 Are Relationships Predictable?

angles in the triangle, leading to definitions of trigonometric ratios for acute angles.	Module 4 Task 9 Relationships with Meaning Module 4 Task 11 Solving Right Triangles Using Trigonometric Relationships
G.SRT.7 Explain and use the relationship between the sine and cosine of complementary angles.	Module 4 Task 9 Relationships with Meaning Module 4 Task 10 Finding the Value of a Relationship Module 4 Task 11 Solving Right Triangles Using Trigonometric Relationships
G.SRT.8 Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.	Module 4 Task 8 Are Relationships Predictable? Module 4 Task 10 Finding the Value of a Relationship
Apply trigonometry to general triangles.	
G.SRT.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.	Module 7 Task 8 Triangle Areas by Trig
G.SRT.10 (+) Prove the Laws of Sines and Cosines and use them to solve problems	Module 7 Task 6 More than Right Module 7 Task 7 Justifying the Laws Module 7 Task 8 Triangle Areas by Trig
G.SRT.11 (+) Understand and apply the Law of Sines and the Law of Cosines to find unknown measurements in right and non-right triangles (e.g., surveying problems, resultant forces).	Module 7 Task 5 Special Rights Module 7 Task 6 More than Right Module 7 Task 7 Justifying the Laws Module 7 Task 8 Triangle Areas by Trig
Domain: Geometry (Circles)	
Understand and apply theorems about circles.	
G.C.1 Prove that all circles are similar.	Module 5 Task 2 Circle Dilations
G.C.2 Identify and describe relationships among inscribed angles, radii, and chords. *Include the relationship between central, inscribed, and circumscribed angles; inscribed angles on a diameter are right angles; the radius of a circle is perpendicular to the tangent where the radius intersects the circle.*	Module 5 Task 1 Centered Module 5 Task 3 Cyclic Polygons Module 5 Task 6 Circular Reasoning
G.C.3 Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle.	Module 5 Task 3 Cyclic Polygons
G.C.4 Construct a tangent line from a point outside a given circle to the circle.	Module 5 Task 3 Cyclic Polygons
Find arc lengths and areas of sectors of circles.	
Domain: Geometry (Expressing Geometric Properties with Equations)	
Translate between the geometric description and the equation for a conic section.	
G.GPE.1 Derive the equation of a circle of given center and radius using the Pythagorean	Module 6 Task 4 Circling Triangles (Or Triangulating Circles)

Theorem; complete the square to find the center and radius of a circle given by an equation.	Module 6 Task 5 Getting Centered Module 6 Task 6 Circe Challenges
G.GPE.2 Derive the equation of a parabola given a focus and directrix.	Module 6 Task 7 Directing Our Focus Module 6 Task 8 Functioning with Parabolas Module 6 Task 9 Turn It Around
Use coordinates to prove simple geometric theorems algebraically.	
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).*	Module 6 Task 3 Prove It! Module 6 Task 4 Circling Triangles (Or Triangulating Circles) Module 6 Task 6 Circe Challenges
G.GPE.5 Prove the slope criteria for parallel and perpendicular lines and uses 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).	Module 6 Task 2 Slippery Slopes
G.GPE.6 Find the point on a directed line segment between two given points that partitions the segment in a given ratio.	Module 4 Task 6 Yard Work in Segments
G.GPE.7 Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula.	Module 6 Task 1 Go the Distance
Domain: Geometry (Geometric Measurement and Dimension)	
Explain volume formulas and use them to solve problems.	
G.GMD.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. *Use dissection arguments, Cavalieri's principle, and informal limit arguments.*	Module 5 Task 4 Planning the Gazebo Module 5 Task 5 From Polygons to Circles Module 5 Task 10 Sand Castles Module 5 Task 11 Footprints in the Sand Module 7 Task 3 Take Another Spin
G.GMD.2 Give an informal argument using Cavelieri's principle for the formula for the volume of a sphere and other solid figures.	Module 5 Task 12 Cavalieri to the Rescue
G.GMD.3 Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.	Module 5 Task 10 Sand Castles Module 5 Task 11 Footprints in the Sand
Visualize the relation between two-dimensional and three-dimensional objects.	
G.GMD.4 Identify the shapes of two-dimensional cross-sections of three-dimensional objects, and identify three-dimensional objects generated by rotations of two-dimensional	Module 7 Task 1 Any Way You Slice It Module 7 Task 2 Any Way You Spin It

objects.	Module 7 Task 3 Take Another Spin
Domain: Geometry (Modeling with Geometry)	
Apply geometric concepts in modeling situations.	
G.MG.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).	Module 7 Task 4 You Nailed It!
G.MG.2 Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile, BTUs per cubic foot).	Module 5 Task 10 Sand Castles Module 7 Task 4 You Nailed It!
G.MG.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).	Module 7 Task 4 You Nailed It!
Domain: Functions (Trigonometric Functions)	
Prove and apply trigonometric identities.	
F.TF.8 Prove the Pythagorean identity $\sin^2(\theta) + \cos^2(\theta) = 1$ and use it to find sin (θ), cos (θ), or tan (θ), given sin (θ), cos (θ), or tan (θ), and the quadrant of the angle.	Module 4 Task 9 Relationships with Meaning Module 4 Task 11 Solving Right Triangles Using Trigonometric Relationships
Domain: Statistics (Conditional Probability)	
Understand independence and conditional probability and use them to interpret data.	
S.CP.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").	Module 8 Task 3 Fried Freddy's *S.CP.1 is a related standard in several tasks throughout Module 8
S.CP.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.	Module 8 Task 3 Fried Freddy's Module 8 Task 5 Freddy Revisited Module 8 Task 6 Striving for Independence
S.CP.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*.	Module 8 Task 5 Freddy Revisited Module 8 Task 6 Striving for Independence
S.CP.4 Construct and interpret two-way frequency tables of data when two categories are associated with each object being classified. Use the two-way table as a sample space to decide if events are independent and to approximate conditional probabilities. *For example, collect data from a random sample of students in your school on their favorite subject among math, science, and English. Estimate the probability that a randomly*	Module 8 Task 2 Chocolate vs Vanilla Module 8 Task 5 Freddy Revisited Module 8 Task 6 Striving for Independence

selected student from your school will favor science given that the student is in tenth grade. Do the same for other subjects and compare the results.	
S.CP.5 Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations. *For ex- ample, compare the chance of having lung cancer if you are a smoker with the chance of being a smoker if you have lung cancer.*	Module 8 Task 5 Freddy Revisited Module 8 Task 6 Striving for Independence
Use the rules of probability to compute probabilities of compound events in a uniform probability model.	
S.CP.6 Find the conditional probability of *A* given *B* as the fraction of *B*'s outcomes that also belong to *A*, and interpret the answer in terms of the model.	Module 8 Task 1 TB or Not TB Module 8 Task 2 Chocolate vs Vanilla Module 8 Task 3 Fried Freddy's Module 8 Task 4 Visualizing with Venn Module 8 Task 6 Striving for Independence
S.CP.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.	Module 8 Task 3 Fried Freddy's Module 8 Task 4 Visualizing with Venn
S.CP.8 (+) Apply the general Multiplication Rule in a uniform probability model, *P(A and B) = P(A)P(B|A) = P(B)P(A|B)*, and interpret the answer in terms of the model.	Module 8 Task 6 Striving for Independence