

Geometry: Basics of Geometry

Stage 1 Desired Results		
ESTABLISHED GOALS: <u>Competencies:</u> - Students will demonstrate the ability to solve problems involving one- two- and three-dimensional objects by applying algebraic models and geometric formulas. - Students will demonstrate the ability to reason with definitions, properties, and theorems of geometry to create conjectures and to prove or analyze statements. - Students will demonstrate the ability to analyze and summarize text and integrate knowledge to make meaning of discipline-specific materials. - Students will demonstrate the ability to produce coherent and supported writing in order to communicate effectively for a range of discipline-specific tasks, purposes, and audiences. - Students will demonstrate the ability to speak purposefully and effectively by strategically making decisions about content, language use, and discourse style. <u>Content Standards:</u> - 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. - 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. - 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. - G.GPE.6 Find the point on a directed line segment between two given points that partitions the segment in a given ratio. - 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). - MP2 Reason abstractly and quantitatively. - MP3 Construct viable arguments and critique the reasoning of others. - MP6 Attend to precision. - MP7 Look for and make use of structure.	Transfer	
	Students will be able to independently use their learning to make logical arguments that are supported by evidence.	
	Meaning	
	ENDURING UNDERSTANDINGS Students will understand that... - a proof goes beyond supporting or justifying; it proves for all cases. - the tools of geometry allow us to study real-world situations.	ESSENTIAL QUESTIONS - How can you know when a conclusion is valid? - What would civilization be like without an understanding of geometry?
	Acquisition	
	Students will know... - that 2 points define a line and that 3 noncollinear points define a plane. - that 2 planes intersect in a line. - that if three (or more) parallel lines cut off congruent segments on one transversal, then they cut off congruent segments on every transversal. - the Angle Pair Relationships including those formed by transversals and/or parallel lines (and their converses). - that a counterexample disproves a conjecture, but that an example does not prove a conjecture. - why we call points, lines and planes the "Essentials of Geometry". - the following properties, proofs, formulas, and postulates: - Properties of Equality - Properties of Congruence 2-column Proofs - Paragraph Proofs - Flow Proofs - Segment Addition Postulate - Angle Addition Postulate - Midpoint Formula - Distance Formula	Students will be skilled at... - using undefined terms (points, lines, and planes) to describe and analyze relationships. - using symbolic notation. - applying angle and segment addition postulates (leading to proofs) to solve for unknown values to determine angle/segment measures. - observing patterns to make conjectures. - creating and analyzing conjectures and determining their truth values. - justifying the steps involved in solving equations using properties of equality. - creating formal geometric constructions using a variety geometric tools and methods. - finding the midpoint given two endpoints and finding an endpoint given an endpoint and midpoint using the midpoint formula. - finding the length of a segment given two coordinate points using the distance formula. - identifying angle-pair relationships. - proving geometric relationships through 2-column, paragraph and flow proofs. - using given information, definitions, properties, postulates, and theorems in proofs.

MP8 Look for and express regularity in repeated reasoning.	<i>vocabulary:</i> point, line, plane, collinear points, coplanar, space, segment, ray, opposite rays, postulate, axiom, intersection, congruent segments, midpoint, segment bisector, congruent angles, adjacent angles, vertical angles, complementary angles, supplementary angles, linear pair, angle bisector, perpendicular bisector, equidistant, inductive reasoning, conjecture, counterexample, conditional, hypothesis, conclusion, truth value, negation, converse, inverse, contrapositive, equivalent statements, biconditional, deductive reasoning, reflexive, symmetric, transitive, proof, skew lines, transversal, alternate interior angles, consecutive (same-side) interior angles, corresponding angles, alternate exterior angles, exterior angle of a polygon, remote interior angle	- proving that parallel lines have the same slope and that perpendicular lines have opposite reciprocal slopes. - proving that 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.
Content Area Literacy Standards		21st Century Skills
- RST.9-10.1 Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. - RST.9-10.2 Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. - RST.9-10.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. - RST.9-10.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to <i>grades 9-10 texts and topics</i>. - RST.9-10.5 Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., <i>force, friction, reaction force, energy</i>). - RST.9-10.7 Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.		- reason effectively - use systems thinking - think creatively - be flexible

Stage 2 - Evidence	
Evaluative Criteria	Assessment Evidence
	PERFORMANCE TASK(S):
	OTHER EVIDENCE:

Stage 3 – Learning Plan

Summary of Key Learning Events and Instruction

Language Arts Integration

- 1.OA.1 Use

Mathematics Integration

- 1.OA.1 Use

Technology Integration

- 1.OA.1 Use

District Materials