



Alignment Document
State of New York and Aventa Learning Geometry

Geometry
2005-2007 Benchmark Blueprint

Strand	Goals	Bands	Standards	Unit Name	Course Topic Description
G.PS Problem Solving	Students will build new mathematical knowledge through problem solving.		G.PS.1 Use a variety of problem solving strategies to understand new mathematical content	Reasoning and Introduction to Proof Critical Thinking Assignments throughout the course	Overview Regular Pentagons
	Students will solve problems that arise in mathematics and in other contexts.		G.PS.2 Observe and explain patterns to formulate generalizations and conjectures	Reasoning and Introduction to Proof Reasoning and Introduction to Proof Reasoning and Introduction to Proof Reasoning and Introduction to Proof Special Triangles	Recognizing Number Patterns By Inductive Method Geometric Induction Check Your Understanding Regular Pentagons Indirect proof

			<p>G.PS.3 Use multiple representations to represent and explain problem situations (e.g., spatial, geometric, verbal, numeric, algebraic, and graphical representations)</p>	<p>Connections From Algebra</p> <p>Connections From Algebra</p> <p>Connections From Algebra</p> <p>Connections From Algebra</p> <p>Connections From Algebra</p> <p>Right Triangle and Trigonometry</p>	<p>The Concept of "Variable" in Geometry</p> <p>How Angles are Recognized</p> <p>How Angles Are Measured</p> <p>Properties of Equality</p> <p>Measuring Segments</p> <p>Indirect Measurement</p>
	<p>Students will apply and adapt a variety of appropriate strategies to solve problems.</p>		<p>G.PS.4 Construct various types of reasoning, arguments, justifications and methods of proof for problems</p>	<p>Connections From Algebra</p> <p>Reasoning and Introduction to Proof</p> <p>Reasoning and Introduction to Proof</p> <p>Reasoning and Introduction to Proof</p> <p>Reasoning and Introduction to Proof</p> <p>Reasoning and Introduction to Proof</p>	<p>Measuring Segments</p> <p>Language of Reasoning</p> <p>Inductive Reasoning</p> <p>Recognizing Number Patterns By Inductive Method</p> <p>Geometric Induction</p> <p>Counterexamples</p>



				Introduction to Proof	
				Reasoning and Introduction to Proof	Using Algebraic Properties in Geometric Proofs
				Reasoning and Introduction to Proof	Two Column Proof With Segments and Angles
				Special Triangles	Isosceles Triangle and its Parts Indirect Proof
				Special Triangles	Properties of Medians of Isosceles Triangle
				Special Triangles	Properties of Altitudes of Isosceles Triangle
				Special Triangles	Properties of Angle Bisectors of Isosceles Triangle
				Special Triangles	Properties of Perpendicular Bisectors of Isosceles Triangle
				Quadrilaterals and Polygons	Parallelograms
				Quadrilaterals and Polygons	Rectangles and Their Properties
			G.PS.5 Choose an effective approach to solve a problem from a variety of strategies (numeric, graphic, algebraic)	Right Triangle and Trigonometry Critical Thinking Assignments covered	Indirect Measurement

				throughout the course	
			G.PS.6 Use a variety of strategies to extend solution methods to other problems	Critical Thinking Assignments covered throughout the course	
			G.PS.7 Work in <i>collaboration</i> with others to propose, critique, evaluate, and value alternative approaches to problem solving	Discussion Board Collaboration Sessions Collaboration Sessions	Unit Review Discussions Lecture Hall Chat Office Hours Chat
	Students will monitor and reflect on the process of mathematical problem solving.		G.PS.8 Determine information required to solve a problem, choose methods for obtaining the information, and define parameters for acceptable solutions	Critical Thinking Assignments covered throughout the course	
			G.PS.9 Interpret solutions within the given constraints of a problem	Critical Thinking Assignments covered throughout the course	
			G.PS.10 Evaluate the relative efficiency of different representations and solution methods of a problem	Critical Thinking Assignments covered throughout the course	
G.RP Reasoning and Proof	Students will recognize reasoning and proof as fundamental aspects of mathematics.		G.RP.1 Recognize that mathematical ideas can be supported by a variety of strategies	Reasoning and Introduction to Proof Reasoning and Introduction to Proof	Inductive Reasoning Recognizing Number Patterns By Inductive Method



				Reasoning and Introduction to Proof	Geometric Induction
				Reasoning and Introduction to Proof	Using Algebraic Properties in Geometric Proofs
				Reasoning and Introduction to Proof	Two Column Proof With Segments and Angles
				Special Triangles	Isosceles Triangle and its Parts
				Special Triangles	Indirect Proof
				Special Triangles	Properties of Medians of Isosceles Triangle
				Special Triangles	Properties of Altitudes of Isosceles Triangle
				Special Triangles	Properties of Angle Bisectors of Isosceles Triangle
				Special Triangles	Properties of Perpendicular Bisectors of Isosceles Triangle
				Quadrilaterals and Polygons	Parallelograms
				Quadrilaterals and Polygons	Rectangles and Their Properties
			G.RP.2 Recognize and verify, where appropriate, geometric relationships of perpendicularity, parallelism,	Connections From Algebra	Pairs of Angles



			congruence, and similarity, using algebraic strategies	Connections From Algebra	Adjacent Angles
				Connections From Algebra	Supplementary Angles
				Connections From Algebra	Complementary Angles
				Connections From Algebra	Right Angles and Perpendicular Lines
				Parallel Lines and Coordinate Plane	Postulates about Parallel Lines
				Parallel Lines and Coordinate Plane	Angles Formed by Parallel Lines and their Transversals
				Parallel Lines and Coordinate Plane	Relationships Between Two Lines on a Plane
				Parallel Lines and Coordinate Plane	Important Theorems About Parallel and Transversal Lines
				Triangles: Basic Closed Figures in Geometry	Congruence of Geometric Figures
				Similarity	What are Similar Figures?
				Right Triangle and Trigonometry	Indirect Measurement
	Students will make and investigate mathematical conjectures.		G.RP.3 Investigate and evaluate conjectures in mathematical terms, using mathematical strategies to reach a conclusion	Reasoning and Introduction to Proof	Inductive Reasoning
				Reasoning and	Recognizing Number Patterns



				Introduction to Proof	By Inductive Method
				Reasoning and Introduction to Proof	Geometric Induction
				Reasoning and Introduction to Proof	Using Algebraic Properties in Geometric Proofs
				Reasoning and Introduction to Proof	Two Column Proof With Segments and Angles
				Special Triangles	Isosceles Triangle and its Parts
				Special Triangles	Indirect Proof
				Special Triangles	Properties of Medians of Isosceles Triangle
				Special Triangles	Properties of Altitudes of Isosceles Triangle
				Special Triangles	Properties of Angle Bisectors of Isosceles Triangle
				Special Triangles	Properties of Perpendicular Bisectors of Isosceles Triangle
				Quadrilaterals and Polygons	Parallelograms
				Quadrilaterals and Polygons	Rectangles and Their Properties
	Students will develop and		G.RP.4 Provide correct mathematical	Discussion Board	Unit Review Discussions

	<p>evaluate mathematical arguments and proofs.</p>		<p>arguments in response to <i>other students'</i> conjectures, reasoning, and arguments</p>	<p>Collaboration Sessions</p>	<p>Lecture Hall Chat</p>
			<p>G.RP.5 Present correct mathematical arguments in a variety of forms</p>	<p>Collaboration Sessions</p> <p>Reasoning and Introduction to Proof</p> <p>Reasoning and Introduction to Proof</p> <p>Reasoning and Introduction to Proof</p> <p>Reasoning and Introduction to Proof</p> <p>Reasoning and Introduction to Proof</p> <p>Reasoning and Introduction to Proof</p> <p>Special Triangles</p> <p>Special Triangles</p> <p>Special Triangles</p> <p>Special Triangles</p> <p>Special Triangles</p>	<p>Office Hours Chat</p> <p>Inductive Reasoning</p> <p>Recognizing Number Patterns By Inductive Method</p> <p>Geometric Induction</p> <p>Using Algebraic Properties in Geometric Proofs</p> <p>Two Column Proof With Segments and Angles</p> <p>Isosceles Triangle and its Parts</p> <p>Indirect Proof</p> <p>Properties of Medians of Isosceles Triangle</p> <p>Properties of Altitudes of Isosceles Triangle</p> <p>Properties of Angle Bisectors of</p>

				Special Triangles	Isosceles Triangle Properties of Perpendicular Bisectors of Isosceles Triangle
				Quadrilaterals and Polygons	Parallelograms
				Quadrilaterals and Polygons	Rectangles and Their Properties
			G.RP.6 Evaluate written arguments for validity	Reasoning and Introduction to Proof	Inductive Reasoning
				Reasoning and Introduction to Proof	Recognizing Number Patterns By Inductive Method
				Reasoning and Introduction to Proof	Geometric Induction
				Reasoning and Introduction to Proof	Using Algebraic Properties in Geometric Proofs
				Reasoning and Introduction to Proof	Two Column Proof With Segments and Angles
				Special Triangles	Isosceles Triangle and its Parts Indirect Proof
				Special Triangles	Properties of Medians of Isosceles Triangle
				Special Triangles	Properties of Altitudes of



				Special Triangles	Isosceles Triangle Properties of Angle Bisectors of Isosceles Triangle
				Special Triangles	Properties of Perpendicular Bisectors of Isosceles Triangle
				Quadrilaterals and Polygons	Parallelograms
				Quadrilaterals and Polygons	Rectangles and Their Properties
	Students will select and use various types of reasoning and methods of proof.		G.RP.7 Construct a proof using a variety of methods (e.g., deductive, analytic, transformational)	Reasoning and Introduction to Proof	If-Then Statements, Converses, and Postulates
				Reasoning and Introduction to Proof	Inductive Reasoning
				Reasoning and Introduction to Proof	Recognizing Number Patterns By Inductive Method
				Reasoning and Introduction to Proof	Geometric Induction
				Reasoning and Introduction to Proof	Using Algebraic Properties in Geometric Proofs
				Reasoning and Introduction to Proof	Two Column Proof With Segments and Angles

				Special Triangles	Isosceles Triangle and its Parts Indirect Proof
				Special Triangles	Properties of Medians of Isosceles Triangle
				Special Triangles	Properties of Altitudes of Isosceles Triangle
				Special Triangles	Properties of Angle Bisectors of Isosceles Triangle
				Special Triangles	Properties of Perpendicular Bisectors of Isosceles Triangle
				Quadrilaterals and Polygons	Parallelograms
				Quadrilaterals and Polygons	Rectangles and Their Properties
			G.RP.8 Devise ways to verify results or use counterexamples to refute incorrect statements	Reasoning and Introduction to Proof	Counterexamples
				Special Triangles	Indirect Proof
			G.RP.9 Apply inductive reasoning in making and supporting mathematical conjectures	Reasoning and Introduction to Proof	Inductive Reasoning
				Reasoning and Introduction to Proof	Recognizing Number Patterns By Inductive Method
				Reasoning and Introduction to Proof	Geometric Induction



<p>G.CM Communication</p>	<p>Students will organize and consolidate their mathematical thinking through communication.</p>		<p>G.CM.1 Communicate verbally and in writing a correct, complete, coherent, and clear design (outline) and explanation for the steps used in solving a problem</p>	<p>Reasoning and Introduction to Proof Reasoning and Introduction to Proof Reasoning and Introduction to Proof Reasoning and Introduction to Proof Reasoning and Introduction to Proof Special Triangles Special Triangles Special Triangles Special Triangles Special Triangles Special Triangles Special Triangles Quadrilaterals</p>	<p>Inductive Reasoning Recognizing Number Patterns By Inductive Method Geometric Induction Using Algebraic Properties in Geometric Proofs Two Column Proof With Segments and Angles Isosceles Triangle and its Parts Indirect Proof Properties of Medians of Isosceles Triangle Properties of Altitudes of Isosceles Triangle Properties of Angle Bisectors of Isosceles Triangle Properties of Perpendicular Bisectors of Isosceles Triangle Parallelograms</p>
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				and Polygons	
				Quadrilaterals and Polygons	Rectangles and Their Properties
			G.CM.2 Use mathematical representations to communicate with appropriate accuracy, including numerical tables, formulas, functions, equations, charts, graphs, and diagrams	Reasoning and Introduction to Proof	Inductive Reasoning
				Reasoning and Introduction to Proof	Recognizing Number Patterns By Inductive Method
				Reasoning and Introduction to Proof	Geometric Induction
				Reasoning and Introduction to Proof	Using Algebraic Properties in Geometric Proofs
				Reasoning and Introduction to Proof	Two Column Proof With Segments and Angles
				Parallel Lines and Coordinate Plane	Lines in the Coordinate Plane
				Parallel Lines and Coordinate Plane	How to Write the Equation of a Line
				Right Triangle and Trigonometry	Indirect Measurement
	Students will communicate their mathematical thinking coherently and clearly to peers, teachers, and others.		G.CM.3 Present organized mathematical ideas with the use of appropriate standard notations, including the use of symbols and other representations when sharing an idea in	Connections From Algebra	The Concept of "Variable" in Geometry
				Reasoning and Introduction to	Inductive Reasoning Conjecture

			verbal and written form	Proof	
			G.CM.4 Explain relationships among different representations of a problem	Rays and Angles	How Angles Are Measured Measuring Segments
			G.CM.5 Communicate logical arguments clearly, showing why a result makes sense and why the reasoning is valid	Reasoning and Introduction to Proof	Inductive Reasoning
				Reasoning and Introduction to Proof	Recognizing Number Patterns By Inductive Method
				Reasoning and Introduction to Proof	Geometric Induction
				Reasoning and Introduction to Proof	Using Algebraic Properties in Geometric Proofs
				Reasoning and Introduction to Proof	Two Column Proof With Segments and Angles
				Special Triangles	Isosceles Triangle and its Parts
				Special Triangles	Indirect Proof
				Special Triangles	Properties of Medians of Isosceles Triangle
				Special Triangles	Properties of Altitudes of Isosceles Triangle
				Special Triangles	Properties of Angle Bisectors of Isosceles Triangle
			Special Triangles	Properties of Perpendicular	

				Quadrilaterals and Polygons	Bisectors of Isosceles Triangle Parallelograms
				Quadrilaterals and Polygons	Rectangles and Their Properties
			G.CM.6 Support or reject arguments or questions <i>raised by others</i> about the correctness of mathematical work	Discussion Board Collaboration Sessions Reasoning and Introduction to Proof	Unit Review Discussions Lecture Hall Chat Office Hours Chat If-Then Statements, Converses, and Postulates
	Students will analyze and evaluate the mathematical thinking and strategies of others.		G.CM.7 Read and listen for logical understanding of mathematical thinking shared by <i>other students</i>	Discussion Board Collaboration Sessions Collaboration Sessions	Unit Review Discussions Lecture Hall Chat Office Hours Chat
		G.CM.8 Reflect on strategies of <i>others</i> in relation to one's own strategy	Discussion Board Collaboration Sessions Collaboration Sessions	Unit Review Discussions Lecture Hall Chat Office Hours Chat	
		G.CM.9 Formulate mathematical questions that elicit, extend, or challenge strategies, solutions, and/or conjectures of <i>others</i>	Discussion Board Collaboration Sessions Collaboration Sessions	Unit Review Discussions Lecture Hall Chat Office Hours Chat	

	<p>Students will use the language of mathematics to express mathematical ideas precisely.</p>		<p>G.CM.10 Use correct mathematical language in developing mathematical questions that elicit, extend, or challenge <i>other students'</i> conjectures</p>	<p>Discussion Board Collaboration Sessions Collaboration Sessions</p>	<p>Unit Review Discussions Lecture Hall Chat Office Hours Chat</p>
			<p>G.CM.11 Understand and use appropriate language, representations, and terminology when describing objects, relationships, mathematical solutions, and geometric diagrams</p>	<p>Connections From Algebra Connections From Algebra Connections From Algebra Connections From Algebra Connections From Algebra Connections From Algebra Connections From Algebra Parallel Lines and Coordinate Plane Parallel Lines and Coordinate Plane Parallel Lines and Coordinate Plane</p>	<p>The Concept of "Variable" in Geometry Basic Elements of Geometry: Points, Lines, and Planes Rays and Angles Points Planes Absolute Value Right Angles and Perpendicular Lines Positions of Two Lines in a Plane Angles Formed by Parallel Lines and their Transversals Two Perpendicular Number Lines</p>



				Parallel Lines and Coordinate Plane	Properties of Points on a Coordinate Plane
				Triangles: Basic Closed Figures in Geometry	The Structure of a Triangle
				Triangles: Basic Closed Figures in Geometry	Classification of Triangles
				Triangles: Basic Closed Figures in Geometry	Angle Based Classification of Triangles
				Triangles: Basic Closed Figures in Geometry	Special Segments in Triangles
				Special Triangles and Special Relationships in Triangles	Isosceles Triangle and its Parts
				Special Triangles and Special Relationships in Triangles	Equilateral or Equiangular Triangle
				Special Triangles and Special Relationships in Triangles	Right Triangles
				Special Triangles and Special Relationships in	Pythagorean Theorem

				<p>Triangles</p> <p>Special Triangles and Special Relationships in Triangles</p> <p>Special Triangles and Special Relationships in Triangles</p> <p>Special Triangles and Special Relationships in Triangles</p> <p>Special Triangles and Special Relationships in Triangles</p> <p>Special Triangles and Special Relationships in Triangles</p> <p>Special Triangles and Special Relationships in Triangles</p> <p>Special Triangles and Special Relationships in Triangles</p>	<p>What are Quadrilaterals?</p> <p>Classifications of Quadrilaterals</p> <p>A Square and Its Properties</p> <p>Rectangles and Their Properties What are Parallelograms?</p> <p>Rhombus and Its Properties</p> <p>The Trapezoid</p> <p>What are Polygons?</p>
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				Right Triangle and Trigonometry	Indirect Measurement
			G.CM.12 Draw conclusions about mathematical ideas through decoding, comprehension, and interpretation of mathematical visuals, symbols, and technical writing	Reasoning and Introduction to Proof	Deductive Reasoning
				Reasoning and Introduction to Proof	Inductive Reasoning
				Reasoning and Introduction to Proof	Recognizing Number Patterns By Inductive Method
				Reasoning and Introduction to Proof	Geometric Induction
				Reasoning and Introduction to Proof	Using Algebraic Properties in Geometric Proofs
G.CN Connections	Students will recognize and use connections among mathematical ideas.		G.CN.1 Understand and make connections among multiple representations of the same mathematical idea	Connections From Algebra	Measuring Segments
				Connections From Algebra	Absolute Value
			G.CN.2 Understand the corresponding procedures for similar problems or	Connections From Algebra	Measuring Segments
				Connections From Algebra	Addition and Subtraction Properties of Equality
				Critical Thinking Assignments covered throughout the course	

			mathematical concepts	Connections From Algebra	Absolute Value
				Connections From Algebra	Measuring a the Length of a Segment Using a Number Line
				Connections From Algebra	Addition and Subtraction Properties of Equality
				Perimeters and Areas of Quadrilaterals	Area and Perimeter of Rhombus Sector of a Circle and Its Area
	Students will understand how mathematical ideas interconnect and build on one another to produce a coherent whole.		G.CN.3 Model situations mathematically, using representations to draw conclusions and formulate new situations	Connections From Algebra	Measuring Segments
Connections From Algebra				Measuring a the Length of a Segment Using a Number Line	
Critical Thinking Assignments covered throughout the course					
G.CN.4 Understand how concepts, procedures, and mathematical results in one area of mathematics can be used to solve problems in other areas of mathematics			Area and Perimeter	Area and Perimeter of Rhombus Sector of a Circle and Its Area	
	Connections From Algebra	Overview			
	Connections From Algebra	Measuring Segments			
	Connections From Algebra	Measuring a the Length of a Segment Using a Number Line			
			Triangles	Overview	

				<p>Quadrilaterals and Polygons</p> <p>Right Triangle and Trigonometry</p> <p>Right Triangle and Trigonometry</p> <p>Right Triangle and Trigonometry</p> <p>Critical Thinking Assignments covered throughout the course</p>	<p>Overview</p> <p>Overview</p> <p>Relationships Between Trigonometric Ratios</p> <p>Special Segments in Triangles</p>
			<p>G.CN.5 Understand how quantitative models connect to various physical models and representations</p>	<p>Right Triangle and Trigonometry</p> <p>Connections From Algebra</p>	<p>Indirect Measurement</p> <p>Classifying Angles</p>
	<p>Students will recognize and apply mathematics in contexts outside of mathematics.</p>		<p>G.CN.6 Recognize and apply mathematics to situations in the outside world</p>	<p>Right Triangle and Trigonometry</p> <p>Connections From Algebra</p> <p>Connections From Algebra</p> <p>Connections From Algebra</p> <p>Connections From Algebra</p>	<p>Indirect Measurement</p> <p>Overview</p> <p>Rays and Angles</p> <p>The Concept of "Variable" in Geometry</p> <p>Basic Elements of Geometry: Points, Lines, and Planes</p>

				Similarity	Overview
			G.CN.7 Recognize and apply mathematical ideas to problem situations that develop outside of mathematics	Parallel Lines and the Coordinate Plane	Overview
				Right Triangle and Trigonometry	Indirect Measurement
				Connections From Algebra	Rays and Angles
				Connections From Algebra	Rules and Principles for All Quantities
			G.CN.8 Develop an appreciation for the historical development of mathematics	Reasoning and Introduction to Proof	Overview
				Reasoning and Introduction to Proof	A Historical Example
G.R Representation	Students will create and use representations to organize, record, and communicate mathematical ideas.		G.R.1 Use physical objects, diagrams, charts, tables, graphs, symbols, equations, or objects created using technology as representations of mathematical concepts	Parallel Lines and Coordinate Plane	Lines in the Coordinate Plane
				Parallel Lines and Coordinate Plane	How to Write the Equation of a Line
				Connections From Algebra	The Concept of "Variable" in Geometry
				Connections From Algebra	How Angles are Recognized
			G.R.2 Recognize, compare, and use an array of representational forms	Connections From Algebra	How Angles Are Measured
				Connections	Properties of Equality



				From Algebra	
				Connections From Algebra	Measuring Segments
				Right Triangle and Trigonometry	Indirect Measurement
				Parallel Lines and Coordinate Plane	Lines in the Coordinate Plane
				Parallel Lines and Coordinate Plane	How to Write the Equation of a Line
			G.R.3 Use representation as a tool for exploring and understanding mathematical ideas	Connections From Algebra	The Concept of "Variable" in Geometry
				Connections From Algebra	How Angles are Recognized
				Connections From Algebra	How Angles Are Measured
				Connections From Algebra	Properties of Equality
				Connections From Algebra	Measuring Segments
				Right Triangle and Trigonometry	Indirect Measurement
				Parallel Lines and Coordinate Plane	Lines in the Coordinate Plane
				Parallel Lines and Coordinate Plane	How to Write the Equation of a Line
	Students will select, apply, and		G.R.4 Select appropriate		

	translate among mathematical representations to solve problems.		representations to solve problem situations		
	Students will use representations to model and interpret physical, social, and mathematical phenomena.		G.R.5 Investigate relationships between different representations and their impact on a given problem		
			G.R.6 Use mathematics to show and understand physical phenomena (e.g., determine the number of gallons of water in a fish tank)	Right Triangle and Trigonometry	Indirect Measurement
			G.R.7 Use mathematics to show and understand social phenomena (e.g., determine if conclusions from another person's argument have a logical foundation)		
			G.R.8 Use mathematics to show and understand mathematical phenomena (e.g., use investigation, discovery, conjecture, reasoning, arguments, justification and proofs to validate that the two base angles of an isosceles triangle are congruent)	Reasoning and Introduction to Proof Reasoning and Introduction to Proof Reasoning and Introduction to Proof Reasoning and Introduction to Proof Reasoning and Introduction to Proof Triangles	Inductive Reasoning Recognizing Number Patterns By Inductive Method Geometric Induction Using Algebraic Properties in Geometric Proofs Two Column Proof With Segments and Angles Congruence of Geometric Figures

				<p>Triangles</p> <p>Triangles</p> <p>Triangles</p> <p>Triangles</p> <p>Triangles</p> <p>Triangles</p> <p>Special Triangles</p>	<p>When Two Triangles Are Congruent</p> <p>SAS Postulate</p> <p>ASA Postulate</p> <p>SSS Postulate</p> <p>AAS Postulate</p> <p>HL Postulate</p> <p>When Two Equilateral Triangles Are Congruent?</p>
G.A Algebra			Note: The algebraic skills and concepts within the Algebra process and content performance indicators must be maintained and applied as students are asked to investigate, make conjectures, give rationale, and justify or prove geometric concepts.	<p>Connections From Algebra</p> <p>Connections From Algebra</p> <p>Connections From Algebra</p> <p>Reasoning and Introduction to Proof</p>	<p>The Concept of "Variable" in Geometry</p> <p>Basic Algebraic Principles</p> <p>Rules and Principles for All Quantities</p> <p>Using Algebraic Properties in Geometric Proofs</p>
G.G Geometry	Students will use visualization and spatial reasoning to analyze characteristics and properties of geometric shapes.	Geometric Relationships	G.G.1 Know and apply that if a line is perpendicular to each of two intersecting lines at their point of intersection, then the line is perpendicular to the plane determined by them	<p>Connections From Algebra</p> <p>Connections From Algebra</p> <p>Parallel Lines and Coordinate Plane</p>	<p>Right Angles and Perpendicular Lines</p> <p>Points</p> <p>Positions of Two Lines in a Plane</p>

				Parallel Lines and Coordinate Plane	Important Theorems About Parallel and Transversal Lines: Two Perpendicular Number Lines
			G.G.2 Know and apply that through a given point there passes one and only one plane perpendicular to a given line	Parallel Lines and Coordinate Plane	Positions of Two Lines in a Plane
				Parallel Lines and Coordinate Plane	Relationships Between Two Lines on a Plane
			G.G.3 Know and apply that through a given point there passes one and only one line perpendicular to a given plane		
			G.G.4 Know and apply that two lines perpendicular to the same plane are coplanar	Parallel Lines and Coordinate Plane	Relationships Between Two Lines on a Plane
			G.G.5 Know and apply that two planes are perpendicular to each other if and only if one plane contains a line perpendicular to the second plane		
			G.G.6 Know and apply that if a line is perpendicular to a plane, then any line perpendicular to the given line at its point of intersection with the given plane is in the given plane		
			G.G.7 Know and apply that if a line is perpendicular to a plane, then every plane containing the line is perpendicular to the given plane		
			G.G.8 Know and apply that if a plane intersects two parallel planes, then the intersection is two parallel lines		
			G.G.9 Know and apply that if two planes are perpendicular to the same line, they are parallel		
			G.G.10 Know and apply that the lateral edges of a prism are congruent and		

			parallel		
			G.G.11 Know and apply that two prisms have equal volumes if their bases have equal areas and their altitudes are equal		
			G.G.12 Know and apply that the volume of a prism is the product of the area of the base and the altitude		
			G.G.13 Apply the properties of a regular pyramid, including:		
			G.G.13.a lateral edges are congruent		
			G.G.13.b lateral faces are congruent isosceles triangles		
			G.G.13.c volume of a pyramid equals one-third the product of the area of the base and the altitude		
			G.G.14 Apply the properties of a cylinder, including:		
			G.G.14.a bases are congruent		
			G.G.14.b volume equals the product of the area of the base and the altitude		
			G.G.14.c lateral area of a right circular cylinder equals the product of an altitude and the circumference of the base		
			G.G.15 Apply the properties of a right circular cone, including:		
			G.G.15.a lateral area equals one-half the product of the slant height and the circumference of its base		
			G.G.15.b volume is one-third the product of the area of its base and its altitude		
			G.G.16 Apply the properties of a sphere, including:		
			G.G.16.a the intersection of a plane and a sphere is a circle		

			G.G.16.b a great circle is the largest circle that can be drawn on a sphere		
			G.G.16.c two planes equidistant from the center of the sphere and intersecting the sphere do so in congruent circles		
			G.G.16.d surface area is $4\pi r^2$		
			G.G.16.e volume is $\frac{4}{3}\pi r^3$		
	Constructions		G.G.17 Construct a bisector of a given angle, using a straightedge and compass, and justify the construction	Connections From Algebra	Bisector of an Angle
			G.G.18 Construct the perpendicular bisector of a given segment, using a straightedge and compass, and justify the construction	Connections From Algebra Connections From Algebra	Bisecting a Segment Perpendicular-Bisector of a Segment
			G.G.19 Construct lines parallel (or perpendicular) to a given line through a given point, using a straightedge and compass, and justify the construction	Parallel Lines and Coordinate Plane	Perpendicular Lines
			G.G.20 Construct an equilateral triangle, using a straightedge and compass, and justify the construction		
	Locus		G.G.21 Investigate and apply the concurrence of medians, altitudes, angle bisectors, and perpendicular bisectors of triangles	Triangles: Basic Closed Figures in Geometry Triangles: Basic Closed Figures in Geometry Triangles: Basic Closed Figures in Geometry Triangles: Basic Closed Figures in	Special Segments in Triangles Altitude Median Angle Bisector

				Geometry	
				Triangles: Basic Closed Figures in Geometry	Perpendicular Bisectors
				Special Triangles	Properties of Medians of Isosceles Triangle
				Special Triangles	Properties of Altitudes of Isosceles Triangle
				Special Triangles	Properties of Angle Bisectors of Isosceles Triangle
				Special Triangles	Properties of Perpendicular Bisectors of Isosceles Triangle
			G.G.22 Solve problems using compound loci		
			G.G.23 Graph and solve compound loci in the coordinate plane		
	Students will identify and justify geometric relationships formally and informally.	Informal and Formal Proofs	G.G.24 Determine the negation of a statement and establish its truth value	Reasoning and Introduction to Proof	Truth Tables
G.G.25 Know and apply the conditions under which a compound statement (conjunction, disjunction, conditional, biconditional) is true			Reasoning and Introduction to Proof	Compound Statements	
G.G.26 Identify and write the inverse, converse, and contrapositive of a given conditional statement and note the logical equivalences			Reasoning and Introduction to Proof	Language of Reasoning	
				Reasoning and Introduction to Proof	Converses, and Postulates

				Reasoning and Introduction to Proof	Inverse of a Conditional Statement
			G.G.27 Write a proof arguing from a given hypothesis to a given conclusion	Reasoning and Introduction to Proof	Inductive Reasoning
				Reasoning and Introduction to Proof	Recognizing Number Patterns By Inductive Method
				Reasoning and Introduction to Proof	Geometric Induction
				Reasoning and Introduction to Proof	Using Algebraic Properties in Geometric Proofs
				Reasoning and Introduction to Proof	Two Column Proof With Segments and Angles
				Special Triangles	Isosceles Triangle and its Parts Indirect Proof
				Special Triangles	Properties of Medians of Isosceles Triangle
				Special Triangles	Properties of Altitudes of Isosceles Triangle
				Special Triangles	Properties of Angle Bisectors of Isosceles Triangle
				Special Triangles	Properties of Perpendicular Bisectors of Isosceles Triangle

				<p>Quadrilaterals and Polygons</p> <p>Quadrilaterals and Polygons</p>	<p>Parallelograms</p> <p>Rectangles and Their Properties</p>
			<p>G.G.28 Determine the congruence of two triangles by using one of the five congruence techniques (SSS, SAS, ASA, AAS, HL), given sufficient information about the sides and/or angles of two congruent triangles</p>	<p>Triangles: Basic Closed Figures in Geometry</p>	SAS Postulate
				<p>Triangles: Basic Closed Figures in Geometry</p>	ASA Postulate
				<p>Triangles: Basic Closed Figures in Geometry</p>	SSS Postulate
				<p>Triangles: Basic Closed Figures in Geometry</p>	AAS Postulate
				<p>Triangles: Basic Closed Figures in Geometry</p>	HL Postulate
				<p>Special Triangles</p>	When Two Equilateral Triangles Are Congruent?
			<p>G.G.29 Identify corresponding parts of congruent triangles</p>	<p>Triangles: Basic Closed Figures in Geometry</p>	Congruence of Geometric Figures
				<p>Triangles: Basic Closed Figures in Geometry</p>	SAS Postulate
				<p>Triangles: Basic</p>	ASA Postulate

				<p>Closed Figures in Geometry</p> <p>Triangles: Basic Closed Figures in Geometry</p> <p>Triangles: Basic Closed Figures in Geometry</p> <p>Triangles: Basic Closed Figures in Geometry</p> <p>Special Triangles</p>	<p>SSS Postulate</p> <p>AAS Postulate</p> <p>HL Postulate</p> <p>When Two Equilateral Triangles Are Congruent</p>
			G.G.30 Investigate, justify, and apply theorems about the sum of the measures of the angles of a triangle	<p>Triangles: Basic Closed Figures in Geometry</p> <p>Triangles: Basic Closed Figures in Geometry</p> <p>Triangles: Basic Closed Figures in Geometry</p> <p>Special Triangles</p> <p>Special Triangles</p>	<p>Theorem 1</p> <p>Classification of Triangles</p> <p>Fundamental Principle of Triangles</p> <p>30-60-90 Triangle</p> <p>45-45-90 Triangle (Isosceles Right Triangle)</p>
			G.G.31 Investigate, justify, and apply the isosceles triangle theorem and its converse	<p>Special Triangles</p> <p>Special Triangles</p>	<p>Isosceles Triangle and its Parts</p> <p>Properties of Medians of Isosceles Triangle</p>

				Special Triangles	Properties of Altitudes of Isosceles Triangle
				Special Triangles	Properties of Angle Bisectors of Isosceles Triangle
				Special Triangles	Properties of Perpendicular Bisectors of Isosceles Triangle
			G.G.32 Investigate, justify, and apply theorems about geometric inequalities, using the exterior angle theorem	Special Triangles	Analyzing Distinct Sides and Angles in Triangles
				Special Triangles	Side-Angle Inequality in a Triangle
				Special Triangles	Exterior Angle Inequality
			G.G.33 Investigate, justify, and apply the triangle inequality theorem	Special Triangles	Side-Angle Inequality in a Triangle
				Special Triangles	Exterior Angle Inequality
				Special Triangles	Shortest Distance Between a Point and a Line
			G.G.34 Determine either the longest side of a triangle given the three angle measures or the largest angle given the lengths of three sides of a triangle	Special Triangles	Shortest Distance Between a Point and a Line
				Right Triangle and Trigonometry	Special Ratios in a Right Triangle
			G.G.35 Determine if two lines cut by a transversal are parallel, based on the measure of given pairs of angles formed by the transversal and the lines	Right Triangle and Trigonometry	Relationships Between Trigonometric Ratios
				Parallel Lines and Coordinate Plane	Parallel Lines and Transversals
				Parallel Lines and Coordinate Plane	Postulates about Parallel Lines

				Parallel Lines and Coordinate Plane	Angles Formed by Parallel Lines and their Transversals
				Parallel Lines and Coordinate Plane	Important Theorems About Parallel and Transversal Lines
			G.G.36 Investigate, justify, and apply theorems about the sum of the measures of the interior and exterior angles of polygons	Quadrilaterals and Polygons	Angle Measures in Polygons
			G.G.37 Investigate, justify, and apply theorems about each interior and exterior angle measure of regular polygons	Quadrilaterals and Polygons	Angle Measures in Polygons
			G.G.38 Investigate, justify, and apply theorems about parallelograms involving their angles, sides, and diagonals	Quadrilaterals and Polygons	Parallelograms
			G.G.39 Investigate, justify, and apply theorems about special parallelograms (rectangles, rhombuses, squares) involving their angles, sides, and diagonals	Quadrilaterals and Polygons	Properties of Diagonals in Squares and Rectangles
				Quadrilaterals and Polygons	Properties of Diagonals in a Rhombus
				Quadrilaterals and Polygons	Parallelograms
			G.G.40 Investigate, justify, and apply theorems about trapezoids (including isosceles trapezoids) involving their angles, sides, medians, and diagonals	Quadrilaterals and Polygons	The Trapezoid
			G.G.41 Justify that some quadrilaterals are parallelograms, rhombuses, rectangles, squares, or trapezoids	Quadrilaterals and Polygons	What are Quadrilaterals?
				Quadrilaterals and Polygons	Main Classes of Quadrilaterals
				Quadrilaterals	A Square and Its Properties

				and Polygons	
				Quadrilaterals and Polygons	Rectangles and Their Properties What are Parallelograms?
				Quadrilaterals and Polygons	Rhombus and Its Properties The Trapezoid
			G.G.42 Investigate, justify, and apply theorems about geometric relationships, based on the properties of the line segment joining the midpoints of two sides of the triangle	Quadrilaterals and Polygons	Properties of Diagonals in Squares and Rectangles
				Quadrilaterals and Polygons	Properties of Diagonals in a Rhombus
				Quadrilaterals and Polygons	Parallelograms
			G.G.43 Investigate, justify, and apply theorems about the centroid of a triangle, dividing each median into segments whose lengths are in the ratio 2:1		
			G.G.44 Establish similarity of triangles, using the following theorems: AA, SAS, and SSS	Triangles: Basic Closed Figures in Geometry	Congruent Postulate 1 (SAS Postulate)
				Triangles: Basic Closed Figures in Geometry	Postulate 2 (ASA Postulate)
				Triangles: Basic Closed Figures in Geometry	Postulate 3 (SSS Postulate)
				Triangles: Basic Closed Figures in Geometry	Postulate 4 (AAS Postulate)
				Triangles: Basic	Postulate 5 (HL Postulate)

				<p>Closed Figures in Geometry</p> <p>Special Triangles</p> <p>Similarity</p>	<p>When Two Equilateral Triangles Are Congruent?</p> <p>When are Two Triangles Similar?</p>
			<p>G.G.45 Investigate, justify, and apply theorems about similar triangles</p>	<p>Triangles: Basic Closed Figures in Geometry</p>	<p>Congruent Postulate 1 (SAS Postulate)</p>
				<p>Triangles: Basic Closed Figures in Geometry</p>	<p>Postulate 2 (ASA Postulate)</p>
				<p>Triangles: Basic Closed Figures in Geometry</p>	<p>Postulate 3 (SSS Postulate)</p>
				<p>Triangles: Basic Closed Figures in Geometry</p>	<p>Postulate 4 (AAS Postulate)</p>
				<p>Triangles: Basic Closed Figures in Geometry</p>	<p>Postulate 5 (HL Postulate)</p>
				<p>Special Triangles</p> <p>Similarity</p>	<p>When Two Equilateral Triangles Are Congruent?</p> <p>When are Two Triangles Similar?</p>
			<p>G.G.46 Investigate, justify, and apply theorems about proportional relationships among the segments of the sides of the triangle, given one or more</p>	<p>Special Triangles and Special Relationships in Triangles</p>	<p>Equilateral Triangles</p>

			lines parallel to one side of a triangle and intersecting the other two sides of the triangle		
			G.G.47 Investigate, justify, and apply theorems about mean proportionality:		
			G.G.47.a the altitude to the hypotenuse of a right triangle is the mean proportional between the two segments along the hypotenuse	Special Triangles	Right Triangles and Pythagorean Theorem
			G.G.47.b the altitude to the hypotenuse of a right triangle divides the hypotenuse so that either leg of the right triangle is the mean proportional between the hypotenuse and segment of the hypotenuse adjacent to that leg		
			G.G.48 Investigate, justify, and apply the Pythagorean theorem and its converse	Special Triangles	Right Triangles and Pythagorean Theorem
				Special Triangles	How to apply the Pythagorean Theorem
				Special Triangles	30-60-90 Triangle
				Special Triangles	45-45-90 Triangle (Isosceles Right Triangle)
				Quadrilaterals and Polygons	Application of Pythagorean Theorem in Squares
				Right Triangle and Trigonometry	Review of Pythagorean Theorem
				Right Triangle and Trigonometry	Indirect Measurement
			G.G.49 Investigate, justify, and apply theorems regarding chords of a circle:	Circles	Theorems About Chords and Tangents

		G.G.49.a perpendicular bisectors of chords	Circles	Theorem 5
		G.G.49.b the relative lengths of chords as compared to their distance from the center of the circle	Circles	Arcs and Special segments
		G.G.50 Investigate, justify, and apply theorems about tangent lines to a circle:	Circles	Theorems About Chords and Tangents
		G.G.50.a a perpendicular to the tangent at the point of tangency	Circles	Theorems About Chords and Tangents
		G.G.50.b two tangents to a circle from the same external point	Circles	Theorem 5
		G.G.50.c common tangents of two non-intersecting or tangent circles		
		G.G.51 Investigate, justify, and apply theorems about the arcs determined by the rays of angles formed by two lines intersecting a circle when the vertex is:	Circles	Special Angles in Circles
		G.G.51.a inside the circle (two chords)	Circles	Arcs and Special segments
		G.G.51.b on the circle (tangent and chord)	Circles	Arcs and Special segments
		G.G.51.c outside the circle (two tangents, two secants, or tangent and secant)	Circles	Arcs and Special segments
		G.G.52 Investigate, justify, and apply theorems about arcs of a circle cut by two parallel lines		
		G.G.53 Investigate, justify, and apply theorems regarding segments intersected by a circle:		
		G.G.53.a along two tangents from the same external point		
		G.G.53.b along two secants from the same external point		
		G.G.53.c along a tangent and a secant from the same external point		

			G.G.53.d along two intersecting chords of a given circle		
Students will apply transformations and symmetry to analyze problem solving situations.	Transformational Geometry		G.G.54 Define, investigate, justify, and apply isometries in the plane (rotations, reflections, translations, glide reflections) Note: Use proper function notation.		
			G.G.55 Investigate, justify, and apply the properties that remain invariant under translations, rotations, reflections, and glide reflections		
			G.G.56 Identify specific isometries by observing orientation, numbers of invariant points, and/or parallelism		
			G.G.57 Justify geometric relationships (perpendicularity, parallelism, congruence) using transformational techniques (translations, rotations, reflections)		
			G.G.58 Define, investigate, justify, and apply similarities (dilations and the composition of dilations and isometries)	Similarity Similarity Right Triangle and Trigonometry Right Triangle and Trigonometry Right Triangle and Trigonometry Right Triangle and Trigonometry	Similar Quadrilaterals Similar Polygons Indirect Measurement Review of Pythagorean Theorem Special Ratios in a Right Triangle
			G.G.59 Investigate, justify, and apply the properties that remain invariant under	Similarity	Similar Quadrilaterals

			similarities	Right Triangle and Trigonometry	Review of Pythagorean Theorem	
				Right Triangle and Trigonometry	Special Ratios in a Right Triangle	
				Right Triangle and Trigonometry	Relationships Between Trigonometric Ratios	
			G.G.60 Identify specific similarities by observing orientation, numbers of invariant points, and/or parallelism			
			G.G.61 Investigate, justify, and apply the analytical representations for translations, rotations about the origin of 90° and 180° , reflections over the lines $x = 0$, $y = 0$, and $y = x$, and dilations centered at the origin			
	Students will apply coordinate geometry to analyze problem solving situations.	Coordinate Geometry	G.G.62 Find the slope of a perpendicular line, given the equation of a line	Parallel Lines and Coordinate Plane	Slope-Intercept Form	
					Parallel Lines and Coordinate Plane	Relationships Between Two Lines on a Plane
				G.G.63 Determine whether two lines are parallel, perpendicular, or neither, given their equations	Parallel Lines and Coordinate Plane	Construction of a Line Parallel to an Axis Through a Point
					Parallel Lines and Coordinate Plane	Relationships Between Two Lines on a Plane
				G.G.64 Find the equation of a line, given a point on the line and the equation of a line perpendicular to the given line	Parallel Lines and Coordinate Plane	Relationships Between Two Lines on a Plane
				G.G.65 Find the equation of a line, given a point on the line and the equation of a line parallel to the desired line	Parallel Lines and Coordinate Plane	Equations of Lines in the Coordinate Plane
				G.G.66 Find the midpoint of a line segment, given its endpoints	Parallel Lines and Coordinate Plane	Midpoint of a Segment
			G.G.67 Find the length of a line	Parallel Lines and	Length of a Segment on a	

			segment, given its endpoints	Coordinate Plane	Coordinate Plane
			G.G.68 Find the equation of a line that is the perpendicular bisector of a line segment, given the endpoints of the line segment		
			G.G.69 Investigate, justify, and apply the properties of triangles and quadrilaterals in the coordinate plane, using the distance, midpoint, and slope formulas	Parallel Lines and Coordinate Plane	Slope-Intercept Form
			G.G.70 Solve systems of equations involving one linear equation and one quadratic equation graphically		
			G.G.71 Write the equation of a circle, given its center and radius or given the endpoints of a diameter	Circles Circles	Standard Equation of a Circle Equation of a Circle with Radius R units and Center at (a, b)
			G.G.72 Write the equation of a circle, given its graph Note: The center is an ordered pair of integers and the radius is an integer.	Circles Circles	Standard Equation of a Circle Equation of a Circle with Radius R units and Center at (a, b)
			G.G.73 Find the center and radius of a circle, given the equation of the circle in center-radius form	Circles Circles	Standard Equation of a Circle Equation of a Circle with Radius R units and Center at (a, b)
			G.G.74 Graph circles of the form $(x - h)^2 + (y - k)^2 = r^2$	Circles Circles	Standard Equation of a Circle Equation of a Circle with Radius R units and Center at (a, b)