

New York State Core Curriculum - Geometry
Curriculum mapping

Geometry Strand		Boardworks High School Geometry presentations
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	Points, lines, planes and intersections
G.G.2	Know and apply that through a given point there passes one and only one plane perpendicular to a given line	Points, lines, planes and intersections
G.G.3	Know and apply that through a given point there passes one and only one line perpendicular to a given plane	Points, lines, planes and intersections
G.G.4	Know and apply that two lines perpendicular to the same plane are coplanar	Points, lines, planes and intersections
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	Points, lines, planes and intersections
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	Points, lines, planes and intersections
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	Points, lines, planes and intersections
G.G.8	Know and apply that if a plane intersects two parallel planes, then the intersection is two parallel lines	Points, lines, planes and intersections
G.G.9	Know and apply that if two planes are perpendicular to the same line, they are parallel	Points, lines, planes and intersections
G.G.10	Know and apply that the lateral edges of a prism are congruent and parallel	Prisms
G.G.11	Know and apply that two prisms have equal volumes if their bases have equal areas and their altitudes are equal	Prisms
G.G.12	Know and apply that the volume of a prism is the product of the area of the base and the altitude	Prisms
G.G.13	Apply the properties of a regular pyramid, including:	
	lateral edges are congruent	Pyramids
	lateral faces are congruent isosceles triangles	Pyramids
	volume of a pyramid equals one-third the product of the area of the base and the altitude	Pyramids
G.G.14	Apply the properties of a cylinder, including:	
	bases are congruent	Cylinders, cones and spheres
	volume equals the product of the area of the base and the altitude	Cylinders, cones and spheres
	lateral area of a right circular cylinder equals the product of an altitude and the circumference of the base	Cylinders, cones and spheres
G.G.15	Apply the properties of a right circular cone, including:	

	lateral area equals one-half the product of the slant height and the circumference of its base	Cylinders, cones and spheres
	volume is one-third the product of the area of its base and its altitude	Cylinders, cones and spheres
G.G.16	Apply the properties of a sphere, including:	
	the intersection of a plane and a sphere is a circle	–
	a great circle is the largest circle that can be drawn on a sphere	–
	two planes equidistant from the center of the sphere and intersecting the sphere do so in congruent circles	–
Constructions		
G.G.17	Construct a bisector of a given angle, using a straightedge and compass, and justify the construction	Constructing bisecting lines and angles
G.G.18	Construct the perpendicular bisector of a given segment, using a straightedge and compass, and justify the construction	Constructing bisecting lines and angles
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	Constructing bisecting lines and angles
G.G.20	Construct an equilateral triangle, using a straightedge and compass, and justify the construction	Constructing triangles
Locus		
G.G.21	Investigate and apply the concurrence of medians, altitudes, angle bisectors, and perpendicular bisectors of triangles	Loci
G.G.22	Solve problems using compound loci	Loci
G.G.23	Graph and solve compound loci in the coordinate plane	–
Informal and Formal Proofs		
G.G.24	Determine the negation of a statement and establish its truth value	–
G.G.25	Know and apply the conditions under which a compound statement (conjunction, disjunction, conditional, biconditional) is true	–
G.G.26	Identify and write the inverse, converse, and contrapositive of a given conditional statement and note the logical equivalences	–
G.G.27	Write a proof arguing from a given hypothesis to a given conclusion	–
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	Congruence and similarity
G.G.29	Identify corresponding parts of congruent triangles	Congruence and similarity
G.G.30	Investigate, justify, and apply theorems about the sum of the measures of the angles of a triangle	Triangles
G.G.31	Investigate, justify, and apply the isosceles triangle theorem and its converse	Triangles

G.G.32	Investigate, justify, and apply theorems about geometric inequalities, using the exterior angle theorem	Triangles
G.G.33	Investigate, justify, and apply the triangle inequality theorem	The Triangle Inequality Theorem
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	Right triangles The sine ratio The cosine ratio The tangent ratio Trigonometry summary Applying trigonometry
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	Angles
G.G.36	Investigate, justify, and apply theorems about the sum of the measures of the interior and exterior angles of polygons	Polygons Interior and exterior angles of a polygon Using polygons
G.G.37	Investigate, justify, and apply theorems about each interior and exterior angle measure of regular polygons	Polygons Interior and exterior angles of a polygon Using polygons
G.G.38	Investigate, justify, and apply theorems about parallelograms involving their angles, sides, and diagonals	Quadrilaterals
G.G.39	Investigate, justify, and apply theorems about special parallelograms (rectangles, rhombuses, squares) involving their angles, sides, and diagonals	Quadrilaterals
G.G.40	Investigate, justify, and apply theorems about trapezoids (including isosceles trapezoids) involving their angles, sides, medians, and diagonals	Quadrilaterals
G.G.41	Justify that some quadrilaterals are parallelograms, rhombuses, rectangles, squares, or trapezoids	Quadrilaterals
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	–
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	Congruence and similarity
G.G.45	Investigate, justify, and apply theorems about similar triangles	Similar right triangles Congruence and similarity
G.G.46	Investigate, justify, and apply theorems about proportional relationships among the segments of the sides of the triangle, given one or more lines parallel to one side of a triangle and intersecting the other two sides of the triangle	Dilation Constructing triangles
G.G.47	Investigate, justify, and apply theorems about mean proportionality:	

	the altitude to the hypotenuse of a right triangle is the mean proportional between the two segments along the hypotenuse	–
	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	The Pythagorean Theorem Identifying right triangles Pythagorean triples Similar right triangles Calculating sides of a triangle Finding the length of diagonals using the Pythagorean Theorem Finding the height of triangles using the Pythagorean Theorem Using the Pythagorean Theorem to solve problems in context Finding the distance between two points using the Pythagorean Theorem Finding the diagonal in a rectangular prism
G.G.49	Investigate, justify, and apply theorems regarding chords of a circle:	
	perpendicular bisectors of chords	Parts of a circle
	the relative lengths of chords as compared to their distance from the center of the circle	Parts of a circle
G.G.50	Investigate, justify, and apply theorems about tangent lines to a circle:	
	a perpendicular to the tangent at the point of tangency	Parts of a circle
	two tangents to a circle from the same external point	Parts of a circle
	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:	
	inside the circle (two chords)	Angles in a circle
	on the circle (tangent and chord)	Parts of a circle
	outside the circle (two tangents, two secants, or tangent and secant)	Parts of a circle Angles in a circle
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:	
	along two tangents from the same external point	Parts of a circle
	along two secants from the same external point	–
	along a tangent and a secant from the same external point	–
	along two intersecting chords of a given circle	–
Transformational geometry		
G.G.54	Define, investigate, justify, and apply isometries in the plane (rotations, reflections, translations, glide reflections). Note: Use proper function notation.	Reflection symmetry Rotational symmetry Translation Rotation Combining transformations
G.G.55	Investigate, justify, and apply the properties that remain invariant under translations, rotations, reflections, and glide reflections	Reflection symmetry Rotational symmetry Translation Rotation Combining transformations
G.G.56	Identify specific isometries by observing orientation, numbers of invariant points, and/or parallelism	Reflection symmetry Rotational symmetry Translation Rotation Combining transformations
G.G.57	Justify geometric relationships (perpendicularity, parallelism, congruence) using transformational techniques (translations, rotations, reflections)	Reflection symmetry Rotational symmetry Translation Rotation Combining transformations
G.G.58	Define, investigate, justify, and apply similarities (dilations and the composition of dilations and isometries)	Dilation
G.G.59	Investigate, justify, and apply the properties that remain invariant under similarities	Congruence and similarity
G.G.60	Identify specific similarities by observing orientation, numbers of invariant points, and/or parallelism	Congruence and similarity
G.G.61	Investigate, justify, and apply the analytical representations for translations, rotations about the origin of 90° and 180° , reflections over the lines and dilations centered at the origin	Dilation Rotation Reflection symmetry
Coordinate geometry		

G.G.62	Find the slope of a perpendicular line, given the equation of a line	Linear graphs Slopes and intercepts
G.G.63	Determine whether two lines are parallel, perpendicular, or neither, given their equations	Parallel and perpendicular lines
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	Linear graphs Parallel and perpendicular lines Slopes and intercepts
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	Linear graphs Parallel and perpendicular lines Slopes and intercepts
G.G.66	Find the midpoint of a line segment, given its endpoints	The midpoint of a line segment
G.G.67	Find the length of a line segment, given its endpoints	The distance between two points
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	Parallel and perpendicular lines
G.G.69	Investigate, justify, and apply the properties of triangles and quadrilaterals in the coordinate plane, using the distance, midpoint, and slope formulas	–
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	The equation of a circle
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.	The equation of a circle
G.G.73	Find the center and radius of a circle, given the equation of the circle in center-radius form	The equation of a circle
G.G.74	Graph circles of the form $(x - h)^2 + (y - k)^2 = r^2$	The equation of a circle

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