Archdiocese of Newark Catholic Schools

Curriculum Mapping

Curriculum mapping is a process that helps schools and districts/dioceses determine the "agreed-upon" learning for all students. Curriculum mapping was undertaken in the Archdiocese of Newark in order to ensure that a consistent, clearly articulated curriculum infused with Gospel values is being provided to all students in our schools. The curriculum maps for the Catholic schools of the Archdiocese of Newark identify the content to be taught and skills to be mastered at each grade level.

The expertise and experience of the educators within our schools is the main source for determining the content and skills students will be expected to master. The Archdiocesan curriculum maps are developed through a collaborative process which involves individual teacher contributions, small group sessions and larger group meetings. Relevant educational standards, including those proposed by content area experts, the New Jersey Core Curriculum Content Standards, and the Common Core State Standards, are used as a resource in the curriculum mapping process. The resulting consensus maps reflect the collective thinking of classroom teachers based on their observation of student learning and their knowledge of educational practice and research. The Archdiocesan curriculum maps include teacher generated ideas for the infusion of Gospel values and faith connection activities.

While the curriculum maps clearly articulate the expected learning for all students, individual teachers have the flexibility to teach the content and skills in their own manner by:

- utilizing their own particular strengths and teaching style
- addressing the varying learning needs of their students
- determining the order in which the content and skills are presented within a marking period
- including additional content and skills once students have met the learning expectations identified in the curriculum map

Administrators at all levels will maintain the responsibility to ensure that teachers are following the curriculum maps and that appropriate teaching is being conducted. This will be done through a combination of classroom observations, faculty meetings, professional development opportunities and teacher evaluations, as well as by using various measurement tools, including but not limited to in-class and standardized testing. The Archdiocesan curriculum maps will help ensure the academic excellence that is integral to the mission of our Catholic schools and will provide educators and parents with a clear understanding of the learning expectations at each grade level.

Archdiocese of Newark Catholic Schools
Curriculum Map for High School Geometry

Standards	Content	Skills	Assessment	Gospel Values
This curriculum map reflects the general expectations of student learning in Geometry at the high school level. Each school will determine the course-specific expectations based on the level of the course or courses offered. Schools will also determine the sequence in which the various topics are taught within the specific course.				
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.	**Basics of Geometry** • Inductive and Deductive reasoning • Conjecture • Patterns • Counterexample ○ Points, Space, line, rays, planes ○ Collinear and Non-collinear points ○ Coplanar ○ Intersecting lines and planes ○ Parallel, skew, perpendicular lines ○ Line segment ○ Coordinate on a number line ○ Vertex ○ Acute, Right, Obtuse, Straight angles	**Basics of Geometry** Demonstrate understanding of the basic terms in geometry. Formulate conjectures based on inductive reasoning. Use patterns to determine the next number in a sequence. Sketch and label points, lines, and planes. Compare and contrast line, ray, and segment. Identify opposite rays, collinear, and non-collinear points. Classify lines as parallel, perpendicular, or skew. Problem-solve using the Segment Addition Postulate.	Student learning will be assessed on a continual basis using various types of formal and informal assessments. A list of possible assessment methods is provided below: Tests Quizzes Projects Homework Classwork Student presentations Observation of student work Critical thinking activities Performance Tasks Online Programs Class participation Mid-term exams Final exams	Gospel values should be evident in the classroom environment and referenced and reinforced throughout the curriculum. **Gospel Values** Community Compassion Faith in God Forgiveness Hope Justice Love Peace Respect For Life Service Simplicity Truth Teachers will also highlight elements of Catholic identity that can be related to topics in the Math curriculum.

Archdiocese of Newark Catholic Schools Curriculum Map for High School Geometry				
Standards	**Content**	**Skills**	**Assessment**	**Gospel Values**
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. 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.*	○ Congruent segments ○ Midpoint and distance formulas ○ Angle Congruence ○ Congruent angles ○ Angle bisector ○ Segment Addition Postulate ○ Segment addition ○ Angle Addition Postulate ○ Perpendicular bisector	Analyze errors in various sketches. Calculate the length of a line segment by use of the distance formula or a number line. Use absolute value of the difference of coordinates of points to determine the length of a line segment. Use the midpoint formula to find the midpoint of a line segment. Measure segments to determine congruency. Analyze errors in the application of the distance and midpoint formulas. Problem-solve and determine angle measurements using the Angle Addition Postulate. Classify angles by measure. Identify parts of an angle.		

Archdiocese of Newark Catholic Schools Curriculum Map for High School Geometry				
Standards	**Content**	**Skills**	**Assessment**	**Gospel Values**
		Use the definition of an angle bisector to find the measure of angles. Problem-solve using congruent angles. Analyze errors in problems dealing with angles.		
N.RN.2: Rewrite expressions involving radicals and rational exponents using the properties of exponents. 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).*	**Coordinate Geometry** o Radicals- adding, subtracting, multiplying, dividing o Simplifying radicals o Ordered pair o Coordinate plane o Plotting points in the coordinate plane o Quadrants	**Coordinate Geometry** Perform basic function with radicals. Use the coordinate plane to represent points. Name the quadrants or axis and be able to identify the quadrant in which or axis on which a point lies. Find the distance between two points on the coordinate plane. Find the midpoint of a line segment graphed on the coordinate plane.		

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Standards	**Content**	**Skills**	**Assessment**	**Gospel Values**
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). A.REI.1 Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.	○ Graphing lines on the coordinate plane ○ x and y intercepts ○ Slope ○ Writing equations of lines **<u>Properties</u>** ○ Addition, Subtraction, Multiplication, and Division Properties of Equality ○ Reflexive, Symmetric, and Transitive Properties of Equality	Verify the midpoint is equidistant from the endpoints. Apply slope of lines to determine if lines are parallel, perpendicular, or neither. Use the slope intercept form to write the equation of a line. Problem-solve using the coordinate plane. Analyze errors using coordinate geometry. **<u>Properties</u>** Decide when a property is used in solving a problem. Analyze errors in the application of properties.		

Archdiocese of Newark Catholic Schools Curriculum Map for High School Geometry				
Standards	**Content**	**Skills**	**Assessment**	**Gospel Values**
	○ Substitution property of equality ○ Reflexive, Symmetric, and Transitive Properties of Congruence			
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.*	**Parallel and Perpendicular Lines** ○ Angles and Intersecting lines ○ Complementary and Supplementary Angles ○ Right Angles Congruence Theorem ○ Proving lines parallel ○ Proving lines perpendicular	**Parallel and Perpendicular Lines** Compare and contrast vertical and adjacent angles. Compare and contrast complementary and supplementary angles. Sketch vertical, adjacent complementary, and supplementary angles. Understand the relationship between a transversal and 2 or more lines.		

Archdiocese of Newark Catholic Schools Curriculum Map for High School Geometry				
Standards	**Content**	**Skills**	**Assessment**	**Gospel Values**
	○ Vertical and Adjacent angles ○ Angle pairs formed by two parallel lines cut by a transversal	Compare and contrast alternate interior angle, same-side interior angles, alternate exterior angles, and corresponding angles. Apply the Corresponding Angles Postulate, Alternate Interior Angles Theorem, Same Side Interior Angles Theorem. Problem-solve using parallel lines cut by transversal. Analyze errors using parallel and perpendicular lines.		

Archdiocese of Newark Catholic Schools Curriculum Map for High School Geometry				
Standards	**Content**	**Skills**	**Assessment**	**Gospel Values**
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.* 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.	**Triangles** ○ Triangle definition ○ Triangle Angle Sum Theorem ○ Acute, Right, Obtuse, Equiangular triangles ○ Equilateral, Isosceles, Scalene triangles ○ Exterior Angle Theorem ○ Base Angle Theorem ○ Converse of Base Angle Theorem ○ Bisector of vertex angle in isosceles triangles ○ Equilateral and Equiangular Triangles ○ Proving triangles congruent using SSS, SAS, ASA, AAS, HL	**Triangles** Apply the Triangle Sum Theorem. Classify triangles by sides and by angle measures. Compare and contrast interior and exterior angles of a triangle. Solve problems using triangles. Use Pythagorean Theorem to find the missing side lengths of a right triangle. Use the Converse of Pythagorean Theorem to determine if a triangle is a right, obtuse, or acute triangle. Analyze errors in problems using triangles. Sketch a triangle labeling the altitude and corresponding base.		

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Standards	**Content**	**Skills**	**Assessment**	**Gospel Values**
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. G.SRT.4: Prove theorems about triangles. *Theorems include: a line parallel to one side of a triangle divides the other two proportionally, and conversely; the Pythagorean Theorem proved using triangle similarity.* G.SRT.6: Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles. G.SRT.8: Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.	○ CPCTC (*Corresponding parts of congruent triangles are congruent*) ○ 2-column proofs ○ Special Right Triangles ○ Hypotenuse ○ Pythagorean Theorem ○ Converse of Pythagorean Theorem ○ Pythagorean triples	Compare and contrast included and non-included sides and angles. Apply the properties of Special Right Triangles. Determine if two triangles are congruent using SSS, SAS, ASA, AAS, or HL. Compare corresponding parts of congruent triangles using CPCTC. Apply the properties of isosceles triangles. Identify overlapping triangles and prove congruency. Analyze errors involving proving triangles congruent. Recognize that equilateral triangles are isosceles triangles. Sketch concurrent lines and an altitude of a triangle.		

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Standards	**Content**	**Skills**	**Assessment**	**Gospel Values**
		Predict if three line segments can form a triangle. Problem-solve using triangles. Analyze errors in problems using triangles		
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).* 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.10: Prove theorems about triangles. *Theorems include: measures*	**<u>Relationships Within Triangles</u>** ○ Triangles in the coordinate plane ○ Concurrent lines ○ Point of concurrency ○ Altitude of a triangle ○ Mid-segment Theorem	**<u>Relationships Within Triangles</u>** Understand the relationship between the mid-segment and the base of a triangle. Distinguish between an altitude, median, angle bisector, and perpendicular bisector within a triangle. Apply Triangle Inequality to determine the largest and smallest angles of a triangle. Problem-solve using relationships within triangles.		

Standards	Content	Skills	Assessment	Gospel Values
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. G.SRT.8: Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems. 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 objects. 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). 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.	○ Triangle inequalities theorems **Polygons** ○ Classification of polygons by sides ○ Naming polygons by vertices ○ Convex and Concave polygons ○ Regular polygon ○ Polygon Angle Sum Theorem ○ Polygon Exterior Angle Sum Theorem ○ Congruent polygons ○ Identifying congruent parts of polygons	Analyze errors in problems using relationships within triangles. **Polygons** Classify polygons by sides. Compare and contrast convex and concave polygons. Explore the relationship between the number of sides of a polygon and how that relates to the sum of the interior angles. Explore how the number of sides of a polygon relates to the measure of an exterior angle of a regular polygon. Identify congruent parts of congruent polygons.		

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G.CO.13: 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.SRT.8: Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems. G.GPE.7: Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula.	○ Equilateral and Equiangular polygon ○ Perimeter and area of polygons ○ Areas of composite/irregular polygons ○ Area of a region is the sum of the non-overlapping parts	Compare and contrast perimeter and area. Discover congruent figures have equal areas. Decide the best way to analyze composite figures. Problem-solve using perimeter and area. Analyze errors in the application of perimeter and area. Problem-solve using polygons. Analyze errors in problems involving polygons.		

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Standards	**Content**	**Skills**	**Assessment**	**Gospel Values**
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*. 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).* G.GPE.7: Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula. G.SRT.5: Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.	**<u>Quadrilaterals</u>** ○ Classification of Quadrilaterals ○ Definition/Properties of parallelograms, rhombuses, rectangles, squares, kites, trapezoids, isosceles trapezoids ○ Proving a quadrilateral is a parallelogram ○ Classification of quadrilaterals by coordinate methods	**<u>Quadrilaterals</u>** Classify quadrilaterals. Compare and contrast properties of quadrilaterals. Problem-solve using quadrilaterals. Recognize same side interior angles as consecutive angles. Use properties of isosceles triangles and kites to illustrate the properties of the diagonals within a kite. Use the properties of the special parallelograms to determine the most specific name of a quadrilateral. Use properties of right triangles in a rhombus and square. Relate properties of parallel lines cut by a transversal with parallelograms.		

Archdiocese of Newark Catholic Schools Curriculum Map for High School Geometry				
Standards	**Content**	**Skills**	**Assessment**	**Gospel Values**
		Problem-solve using quadrilaterals. Analyzing errors in problems involving quadrilaterals.		
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.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.*	**Circles** ○ Diameter, Radius, Pi, Chord, Secant ○ Central Angle of a circle ○ Semicircle ○ Arc and central angles ○ Arc Addition Postulate ○ Concentric circles ○ Vertical Angles in circles ○ Congruent arcs and chords	**Circles** Apply knowledge of diameter and radius to solve problems using area and circumference. Recognize minor arcs, major arcs, adjacent arcs, and vertical angles. Name arcs. Generalize the relationship between Angle Addition Postulate and the Arc Addition Postulate. Apply measure of arcs and central angles to draw and interpret circle graphs.		

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Standards	**Content**	**Skills**	**Assessment**	**Gospel Values**
G.C.3: Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle. G.C.4: Construct a tangent line from a point outside a given circle to the circle. G.C.5: Derive using similarity the fact that the length of the arc intercepted by an angle is proportional to the radius, and define the radian measure of the angle as the constant of proportionality; derive the formula for the area of a sector. 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*.	○ Inscribed or circumscribed polygons ○ Point of tangency ○ Relationship between the measures of an arc and the corresponding central angle ○ Arc length ○ Sector of a circle ○ Area of a sector of a circle ○ Percent in terms of a circle ○ Circumference and Area	Calculate the area of the inscribed or circumscribed polygon. Calculate the measure of the intercepted arc. Utilize the relationship between tangent and radius at the point of tangency. Problem-solve using circles. Analyze errors in problems using circles.		

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Standards	**Content**	**Skills**	**Assessment**	**Gospel Values**
7.RPA.1: – Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units. G.SRT.3: Use the properties of similarity transformations to establish the AA criterion for two triangles to be similar. G.SRT.4: Prove theorems about triangles. *Theorems include: a line parallel to one side of a triangle divides the other two proportionally, and conversely; the Pythagorean Theorem proved using triangle similarity.* G.SRT.5: Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.	**Similarity** ○ Ratio, proportion, extended proportion ○ Properties of proportions ○ Cross Product Property ○ Proving triangles similar by using AA~ ○ Parallel Proportionality (Side-Splitter Theorem) ○ Triangle-Angle-Bisector Theorem ○ Prove triangles similar by SAS~, SSS~ ○ Scale drawing ○ Similarity ratios ○ Perimeters and areas of similar figures	**Similarity** Write and simplify ratios. Use Cross Product Properties to solve proportions. Apply proportions when dealing with similar polygons. Prove triangle similar using AA~, SAS~, SSS~. Determine the relationship between perimeter and areas of similar figures. Apply proportions when dealing with parallel lines and transversals. Problem-solve using similarity in polygons. Analyze errors involving similarity in polygons		

Standards	Content	Skills	Assessment	Gospel Values
	○ Similarity/perimeter ratios of similar figures ○ Indirect measurement ○ Similar polygons			
G.SRT.6: Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles. G.SRT.7: Explain and use the relationship between the sine and cosine of complementary angles. G.SRT.8: Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.	**Trigonometry** ○ Tangent, Sine, and Cosine Ratios ○ Inverse Tangent, Sine, and Cosine Ratios ○ Angles of elevation and depression	**Trigonometry** Identify the adjacent and opposite legs to the named angle. Apply the correct. trigonometric ratio to a given problem. Solve problems using angles of elevations and depression. Analyze errors involving trigonometry.		

Archdiocese of Newark Catholic Schools Curriculum Map for High School Geometry				
Standards	**Content**	**Skills**	**Assessment**	**Gospel Values**
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*. G.GMD.3: Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems. 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 objects.	**Solid Geometry** ○ Nets of solids ○ Volume ○ Volume of Prisms and Cylinders ○ Definition of a solid ○ Polyhedron ○ Face, Edge, and Vertex ○ Right Prisms ○ Bases, Lateral Faces ○ Altitude, Height, Perimeter ○ Lateral and Surface Area of Prisms ○ Cylinder ○ Lateral and Surface Area of Cylinders ○ Composite figures ○ Lateral Area, Surface area, and Volume of Composite Figures	**Solid Geometry** Recognize and name the parts of a solid. Correlate the net of a solid with the formula for lateral area and surface area. Determine the relationship between lateral area and surface area. Determine the relationship between perimeter, area, and volume of a solid. Solve problems using lateral area and surface area. Analyze errors involving solids.		