Geometry is intended to be the second course in mathematics for high school students. There is no other school mathematics course that offers students the opportunity to act as mathematicians. Within this course, students will have the opportunity to make conjectures about geometric situations and prove in a variety of ways, both formal and informal, that their conclusion follows logically from their hypothesis. This course is meant to employ an integrated approach to the study of geometric relationships. Integrating synthetic, transformational, and coordinate approaches to geometry, students will justify geometric relationships and properties of geometric figures. Congruence and similarity of triangles will be established using appropriate theorems. Transformations including rotations, reflections, translations, and glide reflections and coordinate geometry will be used to establish and verify geometric relationships. A major emphasis of this course is to allow students to investigate geometric situations. Properties of triangles, quadrilaterals, and circles should receive particular attention. It is intended that students will use the traditional tools of compass and straightedge as well as dynamic geometry software that models these tools more efficiently and accurately, to assist in these investigations. Geometry is meant to lead students to an understanding that reasoning and proof are fundamental aspects of mathematics and something that sets it apart from the other sciences.

CROSSWALK

Comparison of 1999 Core Curriculum and 2005 Core Curriculum for High School Mathematics
September 2005

The following chart lists the concepts and skills in Geometry (2005 Core) and indicates where it was included in the 1999 Core.

GEOMETRY

Geometric Relationships			
2005 Core Curriculum		**1999 Core Curriculum**	
Performance	**Concept/Skill**	**Key Idea**	**Concept/Skill**

Indicator			
G.G.1	A line perpendicular to each of two intersecting lines at their point of intersection, is perpendicular to the plane determined by them		Not addressed
G.G.2	Through a given point there passes one and only one plane perpendicular to a given line		Not addressed
GG.3	Through a given point there passes one and only one plane perpendicular to a given line		Not addressed
G.G.4	Two lines perpendicular to the same plane are coplanar		Not addressed
G.G.5	Two planes are perpendicular to each other if and only if one plane contains a line perpendicular to the second plane		Not addressed

2005 Core Curriculum		1999 Core Curriculum	
Performance Indicator	**Concept/Skill**	**Key Idea**	**Concept/Skill**
G.G.6	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		Not addressed
G.G.7	If a line is perpendicular to a plane then every plane containing the line is perpendicular to the given plane		Not addressed
G.G.8	If a plane intersects two parallel planes, then the intersection is two parallel lines		Not addressed
G.G.9	Two planes perpendicular to the same line are parallel.		Not addressed
GG.10	The lateral edges of a prism are congruent and parallel		Not addressed
G.G.11	Two prisms have equal volumes if their bases have equal areas and their altitudes are equal		Not addressed
G.G.12	The volume of a prism is the product of the area of the base and the altitude	Math B – 5H	Derive formulas to find measures such as length, area, and volume in real-world context
G.G.13	Apply the properties of a regular pyramid, including: o Lateral edges are congruent o Lateral faces are congruent isosceles triangles o Volume of a pyramid equals one-third the product of the area of the base and the altitude	Math B – 5H	Derive formulas to find measures such as length, area, and volume in real-world context

2005 Core Curriculum		1999 Core Curriculum	
Performance Indicator	**Concept/Skill**	**Key Idea**	**Concept/Skill**
G.G.14	Apply the properties of a cylinder, including: o Bases are congruent o Volume equals the product of the area of the base and the altitude o Lateral area of a right circular cylinder equals the product of an altitude and the circumference of the base	Math B 5H	Derive formulas to find measures such as length, area, and volume in real-world context
G.G.15	Apply the properties of a right circular cone, including: o Lateral area equals one-half the product of the slant height and the circumference of its base o Volume is one-third the product of the area of it base and its altitude	Math B – 5H	Derive formulas to find measures such as length, area, and volume in real-world context
G.G.16	Apply the properties of a sphere, including: o The intersection of a plane and a sphere is a circle o A great circle is the largest circle that can be drawn on a sphere o Two planes equidistant from the center of the sphere and intersecting the sphere do so in congruent circles o surface area is $4\pi r^2$ o Volume is $4/3\ \pi r^3$		Derive formulas to find measures such as length, area, and volume in real-world context

GEOMETRY

Constructions			
2005 Core Curriculum		**1999 Core Curriculum**	
Performance Indicator	**Concept/Skill**	**Key Idea**	**Concept/Skill**
G.G.17	Bisect a given angle using a straightedge and compass, and justify the construction	Math A – 4B Math 7/8- 4J	Justify the procedures for basic geometric constructions Bisect an angle, using a compass and a straightedge
G.G.18	Construct the perpendicular bisector of a given segment, using a straightedge and compass, and justify the construction	Math A – 4B Math 7/8– 4J	Justify the procedures for basic geometric constructions Construct the perpendicular bisector of a line segment
G.G.19	Construct a line parallel (or perpendicular) to a given line through a given point, using a straightedge and compass, and justify the construction	Math A – 4B	Justify the procedures for basic geometric constructions
G.G.20	Construct an equilateral triangle, using a straightedge and compass, and justify the construction	Math A – 4B	Justify the procedures for basic geometric constructions

GEOMETRY

Locus			
2005 Core Curriculum		**1999 Core Curriculum**	
Performance Indicator	**Concept/Skill**	**Key Idea**	**Concept/Skill**
G.G.21	Investigate and apply the concurrence of medians, altitudes, angles bisectors, and perpendicular bisectors of triangles		Not specifically addressed
G.G.22	Compound loci	Math A – 4D	Develop and apply the concept of basic loci to compound loci
G.G.23	Graph and solve compound loci in the coordinate plane	Math A – 4D	Not specifically related to the coordinate plane

GEOMETRY

Informal and Formal Proofs			
2005 Core Curriculum		**1999 Core Curriculum**	
Performance Indicator	**Concept/Skill**	**Key Idea**	**Concept/Skill**
G.G.24	Determine the negation of a statement and establish its truth value	Math A –1A 1B	Construct valid arguments Follow and judge the validity of arguments
G.G.25	Know and apply the conditions under which a compound statement (conjunction, disjunction, conditional, biconditional) is true	Math A –1A 1B	Construct valid arguments Follow and judge the validity of arguments
G.G.26	Identify and write the inverse, converse, and contrapositive of a given conditional statement and note the logical equivalences	Math A –1A 1B	Construct valid arguments Follow and judge the validity of arguments
G.G.27	Write a proof arguing from a given hypothesis to a given conclusion	Math B – 1A Math B – 1B Math B – 7H	Construct proofs based on deductive reasoning Construct indirect proofs Apply axiomatic structure to geometry • Geometric proof
G.G.28	Determine the congruence of two triangles using SSS, SAS, ASA, AAS, HL	Math A – 4B	Justify the procedures for basic geometric constructions
G.G.29	Identify corresponding parts of congruent triangles	Math A – 4B	Justify the procedures for basic geometric constructions
G.G.30	Investigate, justify, and apply theorems about the sum of the measures of the angles of a triangle	Math A – 4A	Sum of the measures of angles of a triangle
G.G.31	Investigate, justify, and apply the isosceles triangle and its converse	Math A – 4A	Base angles of an isosceles triangle
G.G.32	Investigate, justify, and apply theorems about geometric inequalities, using the exterior angle theorem	Math A – 4A	Exterior angle of a triangle

2005 Core Curriculum		1999 Core Curriculum	
Performance Indicator	**Concept/Skill**	**Key Idea**	**Concept/Skill**
G.G.33	Investigate, justify, and apply the triangle inequality theorem	Math A – 4A	Triangular inequality
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	Math A – 4A	Triangular inequality
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	Math A – 4A	Alternate interior and exterior angles and corresponding angles
G.G.36	Investigate, justify, and apply theorems about the sum of the measures of the interior and exterior angles of polygons	Math A – 4A	Sum of interior and exterior angles of a triangle
G.G.37	Investigate, justify, and apply theorems about each interior and exterior angle measure of regular polygons		Not directly addressed
G.G.38	Investigate, justify, and apply theorems about parallelograms involving their angles, sides, and diagonals	Math A – 4A	Study of quadrilaterals: properties of parallelograms
G.G.39	Investigate, justify and apply theorems about special parallelograms involving their angles, sides, and diagonals	Math A – 4A	Study of quadrilaterals: properties of rectangles, rhombi, squares, and trapezoids
G.G.40	Investigate justify, and apply theorems about trapezoids involving their angles, sides, medians, and diagonals	Math A – 4A	Study of quadrilaterals: properties of trapezoids

2005 Core Curriculum		1999 Core Curriculum	
Performance Indicator	**Concept/Skill**	**Key Idea**	**Concept/Skill**
G.G.41	Justify that some quadrilaterals are parallelograms, rhombuses, rectangles, squares, or trapezoids	Math A – 4A	Study of 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		Not addressed
G.G.43	Investigate, justify, and apply theorems about the centroid of a triangle diving each median into segment whose lengths are in the ratio2:1		Not addressed
G.G.44	Similarity of triangles (AA, SAS, and SSS)	Math A – 4B	Comparison of triangles : congruence
G.G.45	Investigate, justify, and apply theorems about similar triangles		Not specifically addressed
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 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		Not specifically addressed
G.G.47	Investigate, justify, and apply theorems about mean proportionality: o attitude to the hypotenuse of a right triangle		Not specifically addressed

2005 Core Curriculum		1999 Core Curriculum	
Performance Indicator	**Concept/Skill**	**Key Idea**	**Concept/Skill**
G.G. 48	Pythagorean theorem and its converse	Math B – 5H Math 7/8 -7I	Pythagorean Theorem Develop and apply the Pythagorean principle in the solution of problems
G.G.49	Investigate, justify and apply theorems regarding chords of a circle	Math B 5D	Prove and apply theorems related to lengths of segments in a circle
G.G.50	Investigate, justify, and apply theorems about tangent lines to a circle	Math B – 5D	Prove theorems related to lengths of line segments in a circle
G.G.51	Investigate, justify, and apply theorems about the arcs determined by the rays of angles formed by two lines intersecting a circle	Math B – 5D	Prove theorems related to lengths of line segments in a circle
G.G.52	Investigate justify, and apply theorems about arcs of a circle cut by two parallel lines.	Math B – 5D	Prove theorems related to lengths of line segments in a circle
G.G.53	Investigate, justify, and apply theorems regarding segments intersected by a circle	Math B – 5D	Prove theorems related to lengths of line segments in a circle

GEOMETRY

Transformational Geometry			
2005 Core Curriculum		**1999 Core Curriculum**	
Performance Indicator	**Concept/Skill**	**Key Idea**	**Concept/Skill**
G.G.54	Define, investigate, justify, and apply isometries in the plane	Math A – 4C Math B – 7L Math B –7M	Use transformations in the coordinate plane Use basic transformations to demonstrate similarity and congruence of figures • Transformations that provide similarity • Direct isometries • Opposite isometries Identify and differentiate between direct and indirect isometries
G.G.55	Investigate, justify, and apply the properties that remain invariant under translations, rotations, reflections, and glide reflections	Math A – 4C	Use transformations in the coordinate plane
G.G.56	Identify specific isometries by observing orientation, numbers of invariant points, and/or parallelogram		Not specifically addressed
G.G.57	Justify geometric relationships using transformational techniques	Math B – 3C	Use transformations on figures in the coordinate plan
G.G.58	Define, investigate, justify and apply similarities	Math B – 7L	Use transformations to demonstrate similarity of figures
G.G.59	Investigate, justify, and apply the properties that remain invariant under similarities	Math B – 7L	Use basic transformations to demonstrate similarity of figures
G.G.60	Identify specific similarities by observing orientation, numbers of invariant points, and/or parallelism		Not specifically addressed

2005 Core Curriculum		1999 Core Curriculum	
Performance Indicator	**Concept/Skill**	**Key Idea**	**Concept/Skill**
G.G.61	Investigate, justify, and apply the analytical representations for translations, rotations about the origin of 90˚ and 180˚, reelections over the lines x = 0, y = 0, and y = x, and dilations centered at the origin.		Not addressed

GEOMETRY

Coordinate Geometry			
2005 Core Curriculum		**1999 Core Curriculum**	
Performance Indicator	**Concept/Skill**	**Key Idea**	**Concept/Skill**
G.G.62	Slope of a perpendicular line, given the equation the a line		Not addressed
G.G.63	Determine whether two lines are parallel, perpendicular, or neither, given their equations		Not addressed
G.G.64	Equation of a line given a point on the line and the equation of a line perpendicular to the given line		Not addressed
G.G.65	Find the length of a line segment, given its endpoints		Not addressed
G.G.66	Midpoint of a line segment		Not addressed
G.G.67	Length of a line segment		Not addressed
G.G.68	Equation of a line that is the perpendicular bisector of a line segment, given the endpoints of the line segment		Not addressed
G.G.69	Properties of triangles and quadrilaterals in the coordinate plane, using the distance, midpoint, and slope formulas		Not addressed
G.G.70	Graphic solutions of systems of equations involving one linear equation and one quadratic equation	Math A –7A	Graphic solution of systems of linear equations, inequalities, and quadratic-linear pair

2005 Core Curriculum		1999 Core Curriculum	
Performance Indicator	**Concept/Skill**	**Key Idea**	**Concept/Skill**
G.G.71	Equation of a circle, given its center ad radius or the endpoints of a diameter		Not addressed
G.G.72	Equation of a circle given its graph (center is an ordered pair of integers and the radius is an integer)		Not addressed
G.G.73	Find the center and radius of a circle, given the equation of the circle in center-radius form		Not addressed
G.G.74	Graph circles of the form $(x - h)^2 + (y - k)^2 = r^2$		Not addressed