

Williamsville C.U.S.D. #15

Mathematics Curriculum

Program Title: Geometry 103

Program Description: Geometry is a full-year course and is open to any student who has successfully completed Algebra I. This comprehensive course is enhanced by emphasizing and integrating logical reasoning and spatial visualization. Students will be instructed in computer programs to be used when appropriate. Also, hands-on and real-life projects will be incorporated.

Program Content: Geometry 103 is the same as Geometry 102, but it moves at a quicker pace and covers some additional materials.

Program Guide

Month	Content	Skills	Learning Standards
August and September	<p>Points, lines, planes, and angels.</p> <p>Deductive reasoning. If -then, converses, algebra properties, theorems. Special angels, perpendicular lines, begin proofs.</p> <p>Parallel Lines and planes. Definitions, parallel lines and their proofs.</p>	<p>Algebra-solving for one variable (SOV), computation, analyzing, identify and apply math terms.</p> <p>Logic, Algebra-(SOV), computation, algebra, reasoning, identify and apply math terms, plan proofs.</p> <p>Algebra-(SOV) SE-Systems of equations-SE, distinguish lines, state and apply theorems about parallel and perpendicular lines, identify angles formed by parallel lines and transversals.</p>	<p>6.A.4 6.D.4 7.A.4a 7.A.4b 7.A.4c 7.C.4b 9.A.4b 9.B.4 9.C.4a 9.C.4b 9.C.4c</p>

<p>October</p>	<p>Angles of a triangle, polygons, inductive reasoning</p> <p>Congruent triangles, proving triangles congruent, using congruent triangles.</p> <p>Isosceles Triangle Theorem and using congruent triangles.</p> <p>Using more than one pair of congruent triangles, medians, altitude, perpendicular bisectors.</p>	<p>Classify triangles using sides and angles, state/apply thms about interior/exterior angles of a triangle, recognize/name polygons, find interior/exterior angles of polygons, reasoning. Algebra- (SOV), SE</p> <p>Identify corresponding parts of congruent figures, prove triangles congruent by ASA, SSS, SAS, use corresponding parts to solve for angles and sides. Algebra-(SOV), SE</p> <p>Apply theorems to Isosceles triangles, Use AAS and HL, prove overlapping triangles congruent. Algebra-(SOV), SE</p> <p>Prove triangles congruent using congruent triangles, apply definitions /thms of median, altitude and perpendicular bisector and angle bisector. Algebra-(SOV), SE</p>	<p>6.A.4</p> <p>8.A.4b</p> <p>9.B.4</p> <p>9.C.4a</p> <p>9.C.4b</p> <p>9.C.4c</p>
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November	<p>Quadrilaterals, properties of parallelograms, proving quads to be parallelograms.</p> <p>Special parallelograms, trapezoids.</p>	<p>Apply definitions, properties, and theorems of parallelograms, prove quads are parallelograms using theorem of parallel lines and triangles. Algebra-(SOV), SE</p> <p>Apply definitions and identify special quads and trapezoids, measuring, and inscribing angles. Algebra-(SOV), SE</p>	<p>6.A.4 6.B.4 6.C.4 7.A.4b 9.A.4b 9.B.4 9.C.4a 9.C.4b 9.C.4c</p>
December	<p>Inequalities in geometry, inequalities, logic, and indirect proofs.</p> <p>Triangle inequalities.</p>	<p>Apply properties of inequalities to sides and angles, know converses, inverses, contrapositives, logic, plan indirect proofs. Algebra-(SOV), SE</p> <p>Apply inequality theorems to triangles. Algebra-(SOV), SE</p>	<p>6.A.4 7.C.4b 9.A.4a 9.B.4 9.C.4a 9.C.4b 9.C.4c</p>

January	<p>Similar Polygons. Ratios, proportions, similar polygons, project-cartoons (scale factor).</p> <p>Similar Triangles, Proportional lengths.</p>	<p>Express a ratio in simplest form , express equivalent proportions, solve proportions, apply proportions to similar polygons, Algebra-(SOV), SE</p> <p>Prove triangles similar by using AA, SAS, and SSS similarity theorems, use similarity and proportion to solve for sides and angles Algebra-(SOV), SE</p>	<p>6.A.4 6.D.4 7.C.4a 8.B.4b 8.C.4a 8.D.4 9.B.4 9.C.4a 9.C.4b 9.C.4c</p>
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<p>February</p>	<p>Right Triangles, similarity in right triangles, special right triangles.</p> <p>Tangent, cosine, sine, applications.</p>	<p>Determine geometric mean , state and apply right triangle theorem- Pythagorean esp., determine sides of special triangles Algebra-(SOV), SE</p>	<p>6.A.4 8.C.4a 9.B.4 9.C.4a 9.C.4b 9.C.4c 9.D.4</p>
	<p>Circles, tangents, terms.</p>	<p>Define trig functions. Solve for right triangles using sine. Cosine, and tangent Algebra- (SOV), SE</p>	
	<p>Arcs, central angles, chords.</p>	<p>Use PI to find circumference and area, define terms and apply and relate them, apply theorems to solve for segments Algebra- (SOV), SE</p>	
<p>March</p>	<p>Inscribed angles, other angles, length of segments.</p>	<p>Define and apply properties of arcs and angles and chords Algebra-(SOV), SE Solve and prove statements using chords, secants, tangents Algebra-(SOV), SE</p>	<p>6.A.4 7.A.3b 7.C.4b 9.B.4 9.C.4a 9.C.4b 9.C.4c</p>
	<p>Area of plane figures, area of rectangles, parallelograms, trapezoids, area of regular polygons, circles, and circumference.</p>	<p>Use formulas to solve for area of polygons, Algebra-(SOV), SE</p>	

April	Solids, pyramids, cones, etc. Coordinate geometry, Distance formula, slope, parallel and perpendicular lines, midpoint formula, standard form, linear equations.	LA, TA and volume of solids State and apply formulas for distance, midpoint, equations, and slope Algebra_ (SOV), SE	6.A.4 7.B.4 8.D.4 9.B.4 9.C.4a 9.C.4b 9.C.4c
May	Photography project, constructions with compass and straight edge, locus of points.	Recognize polygons in the real world, compare polygons, surface and volume of 3D figures prisms, pyramids, cylinders, cones, spheres Algebra- (SOV), SE	6.A.4 7.B.4 8.D.4 9.B.4 9.C.4a 9.C.4b 9.C.4c

Mathematics Learning Standards

(By the end of the course, students should be able to . . .)

State Goal 6: Demonstrate and apply a knowledge and sense of numbers, including numeration and operations (addition, subtraction, multiplication, division), patterns, ratios, and proportions.

1. Identify and apply the associative, commutative, distributive, and identity properties of real numbers, including special numbers such as pi and square roots.
2. Determine whether exact values or approximations are appropriate.
3. Solve problems involving geometric similarity using ratios, proportions, and percents.

State Goal 7: Estimate, make and use measurements of objects, quantities and relationships and determine acceptable levels of accuracy.

1. Apply units and scales to describe and compare numerical data and physical objects.
2. Apply formulas in a wide variety of theoretical and practical real-world measurement applications involving perimeter, area, volume,

angle, time, temperature, mass, speed, distance, density, and monetary values.

3. Estimate and measure the magnitude and directions of physical quantities (e.g., velocity, force, slope) using rulers, protractors, and other scientific instruments including timers, calculators, and computers.
4. Make indirect measurements, including heights and distances, using proportions (e.g., finding the height of a tower by its shadow).
5. Interpret scale drawings and models using maps and blueprints.

State Goal 8: Use algebraic and analytical methods to identify and describe patterns and relationships in data, solve problems and predict results.

State Goal 9: Use geometric methods to analyze, categorize and draw conclusions about points, lines, planes, and space.

1. Make perspective drawings, tessellations, and scale drawings, with and without the use of technology.
2. Recognize and apply relationships within and among geometric figures.
3. Construct and test logical arguments for geometric situations using technology where appropriate.
4. Construct and communicate convincing arguments for geometric situations.
5. Develop and communicate mathematical proofs (e.g., two-column, paragraph, indirect) and counter examples for geometric statements.
6. Analyze and solve problems involving triangles (e.g., distances which cannot be measured directly) using trigonometric ratios.

State Goal 10: Collect, organize and analyze data using statistical methods; predict results; and interpret uncertainty using concepts of probability.

Selected References and Other Materials*

Textbook: *Geometry* (Houghton Mifflin, 1997)

Teaching Resources: *Geometry Teaching Resources* (Houghton Mifflin, 1997)

Readings:

Films and Videotapes:

Audiotapes and CDS:

Computer Software: Geometer's Sketchpad
Geometry Grapher
Math Blasters Geometry

Internet Sites:

Equipment: Straight Edge
Rulers
Protractors
Compass
Scissors
Geometric Forms
Calculator

Field Trips:

Assessment: Daily Homework
Worksheets
Homework Quizzes
Section Quizzes
Chapter Tests
Projects (monthly)
Semester Exams

*Key to Symbols Used: C = County Cooperative Film Library; S = Williamsville C.U.S.D. #15 libraries; and P = teacher's personal library.