

Williamsville C.U.S.D. #15 Mathematics Curriculum

Program Title: Geometry 101

Program Description: Geometry 101 is a full-year course and is open to any student who has successfully completed Algebra I. This course contains all the topics of Geometry, but it is taught at a slower pace. Students will be instructed on the use of a calculator and allowed to use them when appropriate.

Program Content: Geometry 101 focuses on application of geometric concepts.

Program Guide

Month	Content	Skills	Learning Standards
August and September	<p><u>Basics</u> Points, lines, planes Angles Angles congruence Angle bisectors Special angle pairs Angle addition</p> <p><u>Intro to Geometer's Sketch Pad</u> Laptop Labs on: 1. Angle bisectors 2. Angle Pairs formed with Parallel Lines</p> <p><u>Parallel Lines</u> Parallel, perpendicular, and skew lines</p> <p>Angle pairs classifications</p> <p>Relationships of angle pairs when lines are parallel</p>	<p>Identify and apply terms Computation</p> <p>Constructing models, make perspective drawings with technology, measure and compare with tech.</p> <p>Recognize, identify, and apply ideas about angles formed with intersecting lines – relationship of angles when lines are parallel as opposed to not</p>	<p>9 7.5 9.3</p> <p>9.4 7.5 7.3 7.1 9.2</p> <p>9.3 8 9.2</p>

Month	Content	Skills	Learning Standards
<p>October</p>	<p><u>Introduction to Triangles</u> Types of triangles Isosceles triangles & properties Exterior angles in triangle altitudes and medians Inequalities within a triangle Inequalities between two triangles</p>	<p>Classify triangles according to sides and angles Find measures of angles in a triangle Find measures of exterior angles Determine longest side of triangle with angles measured Compare two triangles, determine relation between sides (angles) given some data</p>	<p>6 9.3 7.2</p>
<p>November</p>	<p><u>Transformations</u> To aid triangle congruence later, we study: Translations (slides) Rotations (spin) Dilation (shrink or enlarge)</p>	<p>Use technology to demonstrate various changes that can be made to figures Identify types, classify as isometric or not Use scale factor to dilate image</p>	<p>8 9.4 9.2</p>

Month	Content	Skills	Learning Standards
December	<p><u>Congruent Triangles</u> Concept of corresponding parts Congruence “shortcuts” for triangles Proving triangles congruent using 5 methods Using congruent triangles to show parts of triangles congruent Overlapping triangles</p> <p><u>Intro Polygons</u> Names of polygons Regular polygons Interior/exterior angle measures</p>	<p>Identify corresponding parts of congruent figures. Determine method for congruent, using SSS,SAS,ASA,AAS, or HL Emphasis on orientation, perspective to determine correspondence</p> <p>Recognize /name polygons Calculate measures of angles in polygons using formulas Determine interior/exterior angle measure</p>	<p>8 9.6 9.2</p> <p>6 7.2 9.3</p>
January	<p><u>Special Quadrilaterals</u> Parallelograms Rhombus Rectangle Trapezoids Kites (LABS)</p>	<p>Learn characteristics of each in order to solve for missing information in given conditions</p> <p>Explore qualities of each figure on laptop lab</p>	<p>9.3 9.2 9.4</p>

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<p>February</p>	<p><u>Radicals/Pythagorean Theorem</u> Radical expressions Simplification techniques Computation with radicals Pythagorean theorem applied to find missing side and applied to determine if a triangle is a right triangle.</p> <p><u>Special Right Triangles</u> Converse of Pythagorean theorem 45-45-90 degree triangles</p>	<p>Working with square roots, perfect squares, “rationalizing denominators”, multiplication with square roots, division with square roots</p> <p>Add/subtract square roots</p> <p>Applying Pythagorean theorem when appropriate Algebra</p> <p>Using $a^2 + b^2 = c^2$ to determine if triangle is acute, right or obtuse</p> <p>Use isosceles triangle concepts to build, formulas for solving special right triangles</p>	<p>6.1</p> <p>8</p> <p>9.3</p> <p>6.1</p> <p>6.1</p> <p>7.2</p>

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<p>March</p>	<p><u>Special Right Triangles</u> 45-45-90 Relationships between sides 30-60-90 Ration of sides in special right triangles</p> <p><u>Trigonometry</u> Right triangle – ratios, sine, cosine, tangent Use trig tables or scientific calculator to find values Find missing angles or sides Applying right triangle to word problems</p>	<p>Equilateral triangle relationship yields formulas for missing sides</p> <p>Define sine, cosine, and tangent ratios Apply to any right triangle Use tools to evaluate trig values Find missing values in triangles Apply ideas to word problems described Approximate answer</p>	<p>6.1 6.3 7.2 9.3</p> <p>7.1 7.4 7.2 9.2 9.3 9.7</p>
<p>April</p>	<p><u>Areas of Polygons</u> Learn and use formulas for : Rectangles Squares Parallelograms Triangles Rhombus Trapezoids Any regular polygon</p> <p><u>Circles</u> Circumference and area Introduces Pi</p> <p><u>Prisms & Pyramids</u> Concept of solid figures Three dimensional Classify type Identify parts of each</p>	<p>Concept of area – Understand units for area Apply formulas Algebra</p> <p>Calculate approximate and exact values for circumference and area</p> <p>Build models from poster board Recognize and identify type of geometric solid Identify base, height, slant height</p>	<p>7.1 7.2 8</p> <p>7.2 6.1 7.1</p> <p>9.1 9.2 7.5</p>

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May	<p><u>Prisms & Pyramids</u> Surface areas – Lateral area Total area</p> <p>Volume Cubic units – concept</p> <p><u>Cones & Cylinders & Spheres</u> Recognize types of solid All circular –based Pi Identify parts of each Solve for missing measure</p> <p><u>Similarity</u> Ratios Proportions</p>	<p>Learn formulas to calculate LA/TA/VOL of prisms and pyramids Solve for missing measures Assign appropriate units to answers</p> <p>Building models of each Classify figures Identify parts of figures Use formulas for LA/TA and Volume</p> <p>Simplify ratios – use of units Write and solve proportions</p>	<p>7.2 7.5 6 8</p> <p>9.1 7.5 7.2 9.7</p> <p>7.1 6.3</p>

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 (e.g., bid a job, determine gas mileage for trip).
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.

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. Construct a model of a three-dimensional figure from a two-dimensional pattern.
2. Make perspective drawings, tessellations, and scale drawings, with and without the use of technology.
3. Recognize and apply relationships within and among geometric figures.

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4. Construct and test logical arguments for geometric situations using technology where appropriate.
5. Construct and communicate convincing arguments for geometric situations.

6. Develop and communicate mathematical proofs (e.g., two-column, paragraph, indirect) and counter examples for geometric statements.
7. 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: Worksheets

Teaching Resources: *Geometry Teaching Resources* (Houghton-Mifflin, 1997)
Informal Geometry (Prentice Hall, 1992)

Readings:

Films and Videotapes:

Audiotapes and CDS:

Computer Software: Geometry Sketchpad

Internet Sites:

Equipment: Straight Edge
 Geometric Models
 Ruler
 Protractor
 Compass
 Calculator
 Computer

Field Trips:

Assessment: Daily Assignments
 Section Quizzes
 Chapter Tests
 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.