



Wolcott Public Schools

**154 Center Street
Wolcott, Connecticut 06716
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High School Curriculum Grades 10 & 11 Geometry



Children are our Future...

GEOMETRY – GRADES 10 & 11

Mission Statement:

The mission of the Wolcott Public Schools is to develop in each student the knowledge, skills, and attitudes necessary to become a productive member of the community and a contributing member of society.

Departmental Philosophy:

The philosophy of the Mathematics Department at Wolcott High School is that mathematics education should support the development of mathematical literacy in all students, prepare students for successful post-secondary endeavors, and motivate more students to pursue careers in mathematics, technology, and engineering. Students will be offered appropriately sequenced instruction which promotes the development of deep understanding of key mathematical concepts and skills, including the ability to compute, reason, communicate and solve problems. The department will set high expectations for all students to ensure earlier and more equitable opportunities to learn mathematics. Students will be actively involved with mathematics and will be required to use a variety of mathematical tools and strategies to solve problems using appropriate technology. All students will be proficient with the TI-83/84 graphing calculator where applicable, including but not limited to, evaluating expressions, graphing and using the statistic package.

Course Descriptions:

- **Geometry Level 1** is a course whose main focus is Euclidian Geometry principles. Logical reasoning using formal proofs aid the student's discovery of theorems and related concepts. Topics include the study of the properties of two and three dimensional shapes including congruence, similarity, area and volume. Trigonometry of the right triangle and its applications are explored, as well as other introductory trigonometric applications using triangles including the Law of Sines and the Law of Cosines. The Geometer's Sketch Pad is available for both teachers' and students' use on computers throughout the school.
- **Geometry Level 2** is a course whose main focus is Euclidian Geometry. The student is exposed to the concepts by exploring and using logical reasoning, formal proofs, and constructions. Concepts include the study of the properties of two and three dimensional shapes including congruence, similarity, area and volume. Trigonometry of the right triangle is introduced as well as other introductory trigonometric applications using triangles. The Geometer's Sketch Pad is available for both teachers' and students' use on computers throughout the school.
- **Geometry Level 3** is a geometry course where the concepts of Euclidian geometry are developed without the use of formal proofs. Students are exposed to the properties of two and three dimensional figures in a concrete manner. The Geometer's Sketch Pad is available for both teachers' and students' use on computers throughout the school.

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<i>Content Standards</i>	<i>Performance Standards</i>	<i>Sample Activities</i>	<i>Assessment Strategies</i>	<i>Resources</i>
<p>2.1 Understand that a variety of numerical representations can be used to describe quantitative relationships.</p>	<p>a. Extend the understanding of number to include all real numbers.</p>	<p>1. Compare, locate and order real numbers on number lines, scales, coordinate grids and measurement tools.</p>	<ol style="list-style-type: none"> 1. Tests 2. Quizzes 3. Projects 4. Homework 5. Class Work 6. Take Home Tests 7. Extra Credit Assignments 8. Rubrics 	<ol style="list-style-type: none"> 1. Text 2. Course Organizers 3. State Of CT Mathematics Curriculum Framework 4. Graphing Calculator 5. Cooperative Learning Groups 6. Geometer Sketch Pad 7. On-line supplemental text resources www.PHschool.com

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<i>Content Standards</i>	<i>Performance Standards</i>	<i>Sample Activities</i>	<i>Assessment Strategies</i>	<i>Resources</i>
<p>3.1 Use properties and characteristics of two- and three- dimensional shapes and geometric theorems to describe relationships, communicate ideas and solve problems.</p>	<p>a. Investigate relationships among plane and solid geometric figures using geometric models, constructions and tools.</p> <p>b. Develop and evaluate mathematical arguments using reasoning and proof.</p>	<p>1. Use models and constructions to make, test and summarize conjectures involving properties of geometric figures.</p> <p>2. Use geometric properties to solve problems in two and three dimensions.</p> <p>3. Determine and compare properties of classes of polygons.</p> <p>1. Recognize the validity of an argument.</p> <p>2. Create logical arguments to solve problems and determine geometric relationships.</p>	<p>1. Tests</p> <p>2. Quizzes</p> <p>3. Projects</p> <p>4. Homework</p> <p>5. Class Work</p> <p>6. Take Home Tests</p> <p>7. Extra Credit Assignments</p> <p>8. Rubrics</p>	<p>1. Text</p> <p>2. Course Organizers</p> <p>3. State Of CT Mathematics Curriculum Framework</p> <p>4. Graphing Calculator</p> <p>5. Cooperative Learning Groups</p> <p>6. Geometer Sketch Pad</p> <p>7. On-line supplemental text resources www.PHschool.com</p>

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<i>Content Standards</i>	<i>Performance Standards</i>	<i>Sample Activities</i>	<i>Assessment Strategies</i>	<i>Resources</i>
<p>3.1 Use properties and characteristics of two- and three- dimensional shapes and geometric theorems to describe relationships, communicate ideas and solve problems (continued)</p>	<p>c. Use methods of deductive and inductive reasoning to make, test, and validate geometric conjectures.</p> <p>d. Explore non-Euclidean Geometries.</p>	<p>1. Recognize the relationships between a conditional statement and its converse, inverse, and contrapositive.</p> <p>2. Test the validity of logical arguments.</p> <p>3. Use deductive arguments, including direct and indirect proofs, to develop an understanding of an axiomatic approach to geometry.</p> <p>1. Recognize that the familiar geometry of Euclid is based on a particular set of axioms and that a different set of axioms would lead to a different geometry.</p>	<p>1. Tests</p> <p>2. Quizzes</p> <p>3. Projects</p> <p>4. Homework</p> <p>5. Class Work</p> <p>6. Take Home Tests</p> <p>7. Extra Credit Assignments</p> <p>8. Rubrics</p>	<p>1. Text</p> <p>2. Course Organizers</p> <p>3. State Of CT Mathematics Curriculum Framework</p> <p>4. Graphing Calculator</p> <p>5. Cooperative Learning Groups</p> <p>6. Geometer Sketch Pad</p> <p>7. On-line supplemental text resources www.PHschool.com</p>

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<i>Content Standards</i>	<i>Performance Standards</i>	<i>Sample Activities</i>	<i>Assessment Strategies</i>	<i>Resources</i>
<p>3.2 Use spatial reasoning, location and geometric relationships to solve problems.</p>	<p>a. Verify geometric relationships using algebra, coordinate geometry, and transformations.</p>	<p>1. Interpret geometric relationships using algebraic equations and inequalities and vice versa.</p> <p>2. Describe how a change in measurement of one or more parts of a polygon or solid may affect its perimeter, area, surface area and volume and make generalizations for similar figures.</p> <p>3. Apply transformations to plane figures to determine congruence, similarity, symmetry, and tessellations.</p>	<p>1. Tests</p> <p>2. Quizzes</p> <p>3. Projects</p> <p>4. Homework</p> <p>5. Class Work</p> <p>6. Take Home Tests</p> <p>7. Extra Credit Assignments</p> <p>8. Rubrics</p>	<p>1. Text</p> <p>2. Course Organizers</p> <p>3. State Of CT Mathematics Curriculum Framework</p> <p>4. Graphing Calculator</p> <p>5. Cooperative Learning Groups</p> <p>6. Geometer Sketch Pad</p> <p>7. On-line supplemental text resources www.PHschool.com</p>

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<i>Content Standards</i>	<i>Performance Standards</i>	<i>Sample Activities</i>	<i>Assessment Strategies</i>	<i>Resources</i>
<p>3.3 Develop and apply units, systems, formula and appropriate tools to estimate and measure.</p>	<p>a. Solve a variety of problems involving one-, two- and three-dimensional measurements using geometric relationships and trigonometric ratios.</p>	<ol style="list-style-type: none"> 1. Select appropriate units, scales, degree of precision and strategies to determine length, angle measure, perimeter, circumference and area of plane geometric figures. 2. Use indirect methods including the Pythagorean Theorem, trigonometric ratios and proportions in similar figures to solve a variety of measurement problems. 3. Justify the reasonableness of answers to direct and indirect measurement problems. 4. Use two dimensional representations, formal, and informal methods to solve surface area and volume problems. 	<ol style="list-style-type: none"> 1. Tests 2. Quizzes 3. Projects 4. Homework 5. Class Work 6. Take Home Tests 7. Extra Credit Assignments 8. Rubrics 	<ol style="list-style-type: none"> 1. Text 2. Course Organizers 3. State Of CT Mathematics Curriculum Framework 4. Graphing Calculator 5. Cooperative Learning Groups 6. Geometer Sketch Pad 7. On-line supplemental text resources www.PHschool.com

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Geometry, Levels 1 & 2 Pacing Guide

SEPTEMBER:

Chapter 1 – Tools of Geometry

<u>Section</u>	<u>Lesson</u>
1.1	Patterns and Inductive Reasoning
1.3	Points, Lines, and Planes
1.4	Segments, Rays, Parallel Lines and Planes
1.5	<i>Review solving equations</i> , Measuring Segments
1.6	Measuring Angles
1.8	The Coordinate Plane
1.9	Perimeter, Circumference, and Area

OCTOBER:

Chapter 2 – Reasoning and Proof

<u>Section</u>	<u>Lesson</u>
2.1	Conditional Statements
2.2	Biconditionals and Definitions
2.3	Deductive Reasoning

-- CAPT Pre-Test --

2.4	Reasoning in Algebra
2.5	Proving Angles Congruent

Chapter 3 – Parallel and Perpendicular Lines

3.1	Properties of Parallel Lines
3.2	Proving Lines Parallel
3.3	Parallel and Perpendicular Lines
3.4	Parallel Lines and the Triangle Angle-Sum Theorem

-- CAPT Remediation —

Continued.....

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NOVEMBER:

<u>Section</u>	<u>Lesson</u>
3.5	Polygon Angle-Sum Theorem
3.6	<i>Review Slope</i> , Lines in the Coordinate Plane
3.7	Slopes of Parallel and Perpendicular Lines

Chapter 4- Congruent Triangles

4.1	Congruent Figures (<i>Discuss rotations, translations, and reflections</i>)
4.2	Triangle Congruence by SSS and SAS
4.3	Triangle Congruence by ASA and AAS

DECEMBER:

<u>Section</u>	<u>Lesson</u>
4.4	Using Congruent Triangles: CPCTC
4.5	Isosceles and Equilateral Triangles
4.6	Congruence in Right Triangles
4.7	<i>(Honors Only)</i> Using Corresponding Parts of Congruent Triangles

Continued.....

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JANUARY:

Chapter 8- Right Triangles and Trigonometry

<u>Section</u>	<u>Lesson</u>
8.1	The Pythagorean Theorem

Chapter 10- Area

10.1	Areas of Parallelograms and Triangles
10.2	Areas of Trapezoids, Rhombi, and Kites
10.3	Areas of Regular Polygons
10.6	Circles and Arcs
10.7	Areas of Circles and Sectors
10.8	Geometric Probability

--Mid-Term Exam--

--CAPT Remediation --

FEBRUARY:

--CAPT Post-Test—

Chapter 11- Surface Area and Volume

<u>Section</u>	<u>Lesson</u>
1.2	Drawings, Nets, and other Models
11.1	Space Figures and Cross-Sections (<i>Terminology only</i>)
11.2	Surface Areas of Prisms and Cylinders
11.3	Surface Areas of Pyramids and Cones
11.4	Volumes of Prisms and Cylinders
11.5	Volumes of Pyramids and Cones
11.6	Surface Areas and Volumes of Spheres

Continued.....

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MARCH:

--CAPT Review and Testing--

Chapter 5- Relationships within Triangles

<u>Section</u>	<u>Lesson</u>
5.1	Midsegments of Triangles
5.2	Bisectors in Triangles
5.5	<i>Review Inequalities</i> , Inequalities in Triangles
6.1	Classifying Quadrilaterals
6.2	Properties of Parallelograms
6.3	Proving that a Quadrilateral is a Parallelogram
6.4	Special Parallelograms

APRIL:

Chapter 6- Quadrilaterals

<u>Section</u>	<u>Lesson</u>
6.5	Trapezoids and Kites
6.6	Placing Figures in the Coordinate Plane
6.7	<i>(Honors Only)</i> Proofs Using Coordinate Geometry
7.1	Ratios and Proportions
7.2	Similar Polygons
7.3	Proving Triangles Similar

Continued.....

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MAY:

Chapter 7- Similarity

<u>Section</u>	<u>Lesson</u>
7.4	Similarity in Right Triangles
7.5	Proportions in Triangles
10.4 *	<i>(Honors Only)</i> Perimeters and Areas of Similar Figures
11.7 *	<i>(Honors Only)</i> Areas and Volumes of Similar Figures
* (10.4 and 11.7 can be done together as a lab)	

Chapter 8- Right Triangles and Trigonometry

8.2	Special Right Triangles
8.3	Tangent Ratio
8.4	Sine and Cosine Ratios
8.5	Angles of Elevation and Depression
10.5	Trigonometry and Area

JUNE:

Chapter 12- Circles

<u>Section</u>	<u>Lesson</u>
12.1	Tangent Lines
12.2	Chords and Arcs
12.3	Inscribed Angles
12.4	Angle Measurement and Segment Lengths
If Time:	
5.3	Concurrent Lines, Medians, and Altitudes <i>(Concentration is on medians, altitudes, “circumscribed about” and “inscribed in”)</i>
5.4	<i>(Honors only)</i> Inverses, Contra Positives, and Indirect Reasoning
1.7	Basic Constructions
3.8	Constructing Parallel and Perpendicular Lines

--Final Exam--

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Geometry, Level 3 PACING GUIDE

September: 1.1-1.6; 2.1-2.3

October: 2.4-2.5; 3.1-3.7; CAPT Pre-Test

November: 4.1-4.6

December: 5.1-5.6

January: 6.5-6.7; 10.1-10.5

February: 12.1-12.6; CAPT Post-Test

March: CAPT Review/CAPT Testing 9.1; 6.1-6.4; 7.1-7.4

April: 8.1-8.5; 9.2-9.3

May: 9.4-9.7; 13.2-13.5

June: 11.1-11.6

If time: 10.6; 10.7; 12.7; Ch. 14

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Essential Questions

- 1.) If an altitude is drawn to the hypotenuse of a right triangle, how many methods can be used to find the length of a missing side?
- 2.) Are all rhombi squares? Are all isosceles triangles equilateral?
- 3.) What special quadrilateral is formed when the midpoints of parallelogram are joined?
- 4.) Can you give a counterexample that proves the statement is false?
- 5.) If a cone and a cylinder have the same height and radii, what is the ratio of their volumes? What is the ratio of their surface areas?
- 6.) If 3 or more parallel lines are cut by 2 transversals, are the transversals cut proportionally?
- 7.) If a conditional statement is true, is the inverse of the statement also true?
- 8.) If 2 tangent segments originate from the same point outside a circle and radii are drawn to the points of tangency, can you describe the relationships between pairs of angles and sides? Can you classify the quadrilateral that is formed?
- 9.) How do you use algebra to prove a quadrilateral in the coordinate plane is or is not a rectangle?
- 10.) Why is the sum of the external angles of a polygon equal to 360 degrees?
- 11.) Can you classify the triangle whose medians are also altitudes?
- 12.) What is the probability that a dart will land in the shaded region of a circle?

Geometry – Grades 10 & 11

Skills Objectives

- 1) Students will be able to distinguish between basic geometric terms.
- 2) Students will be able to use deductive reasoning in order to prove conjectures.
- 3) Students will be able to apply algebra to geometry problems involving parallel and perpendicular lines.
- 4) Students will be able to recognize special angle pairs associated with parallel lines and transversals.
- 5) Students will be able to prove triangles congruent using SSS, SAS, ASA, HL, and AAS.
- 6) Students will be able to write an inequality statement relating angle measures and side lengths of a triangle.
- 7) Students will be able to apply the Pythagorean Theorem to problems involving right triangles and 3-dimensional figures.
- 8) Students will be able to calculate the areas, surface areas, and volumes of several geometric figures.
- 9) Students will be able to apply the concept of proportionality to similar figures.
- 10) Students will be able to apply right triangle trigonometry and properties of special right triangles to real-world problems.
- 11) Students will discover relationships between chords, secants, tangents, radii, and the angles they form.

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Assessments

[That are aligned to the curriculum – this will be done through the data teams throughout the year – no need to do them now, I just wanted to let you know where they will go in the curriculum, as we complete them.
Thank.]