TRUMBULL PUBLIC SCHOOLS

Trumbull, Connecticut

Geometry

College-Preparatory & Advanced College-Preparatory
Mathematics Department

2018

(Last revision date: 2014)

Curriculum Writing Team

Fran Basbagill	**Department Chair**
Katie Laird	**Teacher**
Nicole Trommelen	**Teacher**
Thomas Zultowski	**Teacher**

Jonathan S. Budd, Ph.D., Assistant Superintendent of Curriculum, Instruction, & Assessments

CP & ACP Geometry
Table of Contents

CORE VALUES AND BELIEFS

The Trumbull High School community engages in an environment conducive to learning which believes that all students will **read and write effectively**, therefore communicating in an articulate and coherent manner. All students will participate in activities **that present problem-solving through critical thinking**. Students will use technology as a tool applying it to decision making. We believe that by fostering self-confidence, self-directed and student-centered activities, we will promote **independent thinkers and learners**. We believe **ethical conduct** to be paramount in sustaining the welcoming school climate that we presently enjoy.

Approved 8/26/2011

INTRODUCTION & PHILOSOPHY

Geometry is a prerequisite for all high school and college mathematics and thus provides a necessary foundation for higher-level mathematics. Students develop abstract reasoning and critical thinking skills, develop a better understanding of the world in which they live, and become better able to correctly apply mathematical knowledge when required. The focus areas of Geometry, including relationships between lines and angles, similarity, congruence, trigonometry, circles, area, surface area, and volume, help students gain strong foundations, increased visualization and reasoning skills, and support for higher achievement on standardized tests.

In this full-year course designed to help the student discover, learn, and apply geometry, technology, real-world scenarios, and investigations are used to engage students in the process of discovering the characteristics of visual-spatial relationships, and to help them appreciate the power and beauty of geometry and mathematics in the real world. The use of proof allows students to use problem-solving skills, communication, and an understanding of concepts to make mathematical conclusions. It is the hope that students will enhance their understanding of not only geometry, but also the connection between mathematics and the real world; essentially, they should view geometry concepts as tools that can be used in their daily lives.

The *Geometry* textbook by Glencoe (2018) offers a blended print and digital curriculum built on a foundation of vocabulary, problem solving, and visual learning. The pacing and sequence of the curriculum is suited to meet the content standards and mathematical practices of the 2010 Connecticut Core Standards for Mathematics. Based upon student and teacher feedback from upper-level courses, student performance, and the requirements of the redesigned SAT, Algebra topics have been added to keep students prepared for Algebra II.

Students will have completed an Algebra I course prior to Geometry. After successful completion of Geometry, most students will advance to Algebra II.

Success in mathematics depends upon active involvement in a variety of interrelated experiences. When students participate in stimulating learning opportunities, they can reach their full potential.

The Trumbull Mathematics Program embraces these goals for all students.
The successful mathematician will:

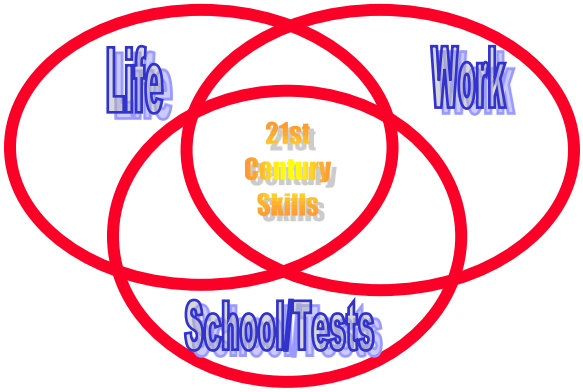
- Acquire the factual knowledge necessary to solve problems
- Gain procedural proficiency in problem solving
- Demonstrate a perceptual understanding of problems posed
- Make meaningful mathematical connections to his or her world
- Solve problems utilizing a variety of strategies
- Utilize technology to improve the quality of the problem-solving process
- Communicate effectively using mathematical terminology, both independently and collaboratively
- Use sound mathematical reasoning by utilizing the power of conjecture and proof in his or her thinking
- Become a reflective thinker through continuous self-evaluation
- Become an independent, self-motivated, lifelong learner

The Trumbull Mathematics Program promotes the empowerment of students and encourages students to embrace the skills needed to become successful in the 21st century. Students expand their mathematical abilities by investigating real-world phenomena. Through such experiences, students can access the beauty and power of mathematics and truly appreciate the impact mathematics has on the world in which they live.

Developed by Trumbull K-12 Math Committee, June 2004; revised and approved April 2011

Mathematics instruction must:

- Blend the concrete with the abstract, the practical with the theoretical, and the routine with the non-routine.
- Teach students to search for, find, and represent patterns.
- Instill in students an appreciation for the intrinsic beauty of mathematics.
- Encourge students to reason, analyze, make connections, and self-assess.
- Immerse students in the learning process through questioning, technology, manipulatives, cooperative, and individual activities.



Information, Media and Technology Skills

1. Use real-world digital and other research tools to access, evaluate, and effectively apply information appropriate for authentic tasks.

Learning and Innovation Skills

2. Work independently and collaboratively to solve problems and accomplish goals

3. Communicate information clearly and effectively using a variety of tools/media in varied contexts for a variety of purposes.
4. Demonstrate innovation, flexibility and adaptability in thinking patterns, work habits, and working/learning conditions.
5. Effectively apply the analysis, synthesis, and evaluative processes that enable productive problem solving.

Life and Career Skills

6. Value and demonstrate personal responsibility, character, cultural understanding, and ethical behavior.

COURSE GOALS

The following Course Goals derive from the 2010 Connecticut Core Standards for Mathematical Practice, which describe varieties of expertise that all teachers of mathematics will develop in their students. These practices rest on important "processes and proficiencies" that have long been valued in mathematics education.

At the completion of this course, students will:

1. Make sense of problems and persevere in solving them.

Mathematically proficient students start by explaining to themselves the meaning of a problem and looking for entry points to its solution. They analyze givens, constraints, relationships, and goals. They make conjectures about the form and meaning of the solution and plan a solution pathway rather than simply jumping into a solution attempt. They consider analogous problems, and try special cases and simpler forms of the original problem in order to gain insight into its solution. They monitor and evaluate their progress and change course if necessary.

2. Reason abstractly and quantitatively.

Mathematically proficient students make sense of quantities and their relationships in problem situations. They bring two complementary abilities to bear on problems involving quantitative relationships: the ability to decontextualize – to abstract a given situation and represent it symbolically and manipulate the representing symbols as if they have a life of their own, without necessarily attending to their referents – and the ability to contextualize, to pause as needed during the manipulation process in order to probe into the referents for the symbols involved.

Quantitative reasoning entails habits of creating a coherent representation of the problem at hand; considering the units involved; attending to the meaning of quantities, not just how to compute them; and knowing and flexibly using different properties of operations and objects.

3. Construct viable arguments and critique the reasoning of others.

Mathematically proficient students understand and use stated assumptions, definitions, and previously established results in constructing arguments. They make conjectures and build a logical progression of statements to explore the truth of their conjectures. They are able to analyze situations by breaking them into cases, and can recognize and use counterexamples. They justify their conclusions, communicate them to others, and respond to the arguments of others. They reason inductively about data, making plausible arguments that take into account the context from which the data arose. Mathematically proficient students are also able to compare the effectiveness of two plausible arguments, distinguish correct logic or reasoning from that which is flawed, and – if there is a flaw in an argument – explain what it is.

4. Model with mathematics.

Mathematically proficient students can apply the mathematics they know to solve problems arising in everyday life, society, and the workplace.

Mathematically proficient students who can apply what they know are comfortable making assumptions and approximations to simplify a complicated situation, realizing that these may need revision later. They are able to identify important quantities in a practical situation and map their relationships using such tools as diagrams, two-way tables, graphs, flowcharts and formulas. They can analyze those relationships mathematically to draw conclusions. They routinely interpret their mathematical results in the context of the situation and reflect on whether the results make sense, possibly improving the model if it has not served its purpose.

5. Use appropriate tools strategically.

Mathematically proficient students consider the available tools when solving a mathematical problem. These tools might include pencil and paper, concrete models, a ruler, a protractor, a calculator, a spreadsheet, a computer algebra system, a statistical package, or dynamic geometry software. Proficient students are sufficiently familiar with tools appropriate for their grade or course to make sound decisions about when each of these tools might be helpful, recognizing both the insight to be gained and the tools' limitations. For example, mathematically proficient high school students analyze graphs of functions and solutions generated using a graphing calculator. They detect possible errors by strategically using estimation and other mathematical knowledge. When making mathematical models, they know that technology can enable them to visualize the results of varying assumptions, explore consequences, and compare predictions with data.

They are able to use technological tools to explore and deepen their understanding of concepts.

6. Attend to precision.

Mathematically proficient students try to communicate precisely to others. They try to use clear definitions in discussion with others and in their own reasoning.

They state the meaning of the symbols they choose, including using the equal sign consistently and appropriately. They are careful about specifying units of measure, and labeling axes to clarify the correspondence with quantities in a problem. They calculate accurately and efficiently, expressing numerical answers with a degree of precision appropriate for the problem context. By the time they reach high school they have learned to examine claims and make explicit use of definitions.

7. Look for and make use of structure.

Mathematically proficient students look closely to discern a pattern or structure.

They also can step back for an overview and shift perspective. They can see complicated things, such as some algebraic expressions, as single objects or as being composed of several objects.

8. Look for and express regularity in repeated reasoning.

Mathematically proficient students notice if calculations are repeated, and look both for general methods and for shortcuts. As they work to solve a problem, mathematically proficient students maintain oversight of the process, while attending to the details. They continually evaluate the reasonableness of their intermediate results.

The following Course Goals derive from the 2016 International Society for Technology in Education Standards.

ISTE Computational Thinker (Standard 5)	Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions. 5b. Students collect data or identify relevant data sets, use digital tools to analyze them, and represent data in various ways to facilitate problem-solving and decision-making. 5c. Students break problems into component parts, extract key information, and develop descriptive models to understand complex systems or facilitate problem-solving.

COURSE ENDURING UNDERSTANDINGS

Students will understand that . . .

- applying logical reasoning is needed to justify and prove mathematical statements.
- analyzing geometric relationships develops logical reasoning skills.
- three-dimensional figures are created from two-dimensional figures; therefore, the formulas for finding the surface area of three-dimensional figures are based on the formulas for finding the area of two-dimensional figures.
- trigonometry and the Pythagorean Theorem can be used to solve right triangles.
- geometric theorems and concepts can be used to solve real-world problems.
- rigid transformations are used to preserve congruence.
- ratios and proportions can be used to decide whether two polygons are similar and to find unknown side lengths of similar figures.
- relationships exist among angles, arcs, segments, lengths, circumference, and area of circles.

COURSE ESSENTIAL QUESTIONS

- How can we use geometric theorems and properties to solve real-world problems?
- How can the concepts of similarity, congruence, and symmetry be understood from the perspective of geometric transformations?
- What properties make a circle unique as a geometric figure?
- How do the dimensions of a geometric figure affect its surface area and volume?

COURSE KNOWLEDGE & SKILLS

Students will know . . .

- the key vocabulary of geometry:
    - plane, collinear, coplanar, congruent, midpoint, bisector, angle, vertex, perpendicular (Unit 1);

- postulate, conjecture, inductive reasoning, deductive reasoning, counterexample, proof (Unit 2);
- line of reflection, center of rotation, angle of rotation, symmetry (Unit 3);
- exterior angles, corollary, included angle, included side, base angle, vertex angle, corresponding parts (Unit 4);
- diagonal, rhombus, trapezoid, kite, midsegment (Unit 5);
- similarity, dilation, scale factor (Unit 6);
- geometric mean, trigonometry, sine, cosine, tangent, Pythagorean triple, angle of elevation, angle of depression (Unit 7);
- chord, inscribed, circumscribed, central angle, inscribed angle, arc, intercepted arc, tangent (Unit 8);
- sector, apothem, composite figure, altitude, lateral area, slant height (Unit 9);
- hemisphere, density (Unit 10);
- sample space, Fundamental Counting Principle, factorial, permutation, combination (Unit 11).

Students will be able to . . .

- find distances between points and midpoints of segments.
- identify angle relationships.
- prove statements using segment and angle theorems.
- name and draw figures that have been reflected, translated, rotated, or dilated.
- apply special relationships of interior and exterior angles.
- identify corresponding parts of congruent triangles and prove triangles congruent.
- find and use the sum of the measures of interior and exterior angles of polygons.
- recognize and apply properties of quadrilaterals.
- find missing measurements within similar figures.
- use AA, SSS, and SAS postulates/theorems for similar triangles.
- use the Pythagorean Theorem.
- use properties of special right triangles.
- use trigonometry to find lengths of sides and measures of angles in right triangles.
- describe the relationships between and among arcs, chords, central angles, and inscribed angles of circles.
- define and use tangent lines.
- write the equation of a circle and graph on the coordinate plane.
- find area and perimeter of polygons.
- find lateral area, surface area, and volume of various solids.
- represent sample space.

COURSE SYLLABUS

Course Name

CP Geometry / ACP Geometry

Level

College-Preparatory / Advanced College-Preparatory

Prerequisites

for CP: Completion of Algebra I
for ACP: Grade of C or better in ACP Algebra I

Materials Required

TI-84 Plus graphing calculator

General Description of the Course

Geometry focuses on the development of inductive and deductive reasoning. It is designed to develop the eight standards of mathematical practice in students. The course includes a study of the tools of Geometry, formal proofs, parallel and perpendicular lines and the relationships between angles, triangle congruence, the relationships between the sides and the angles of similar polygons, transformations and reflections of figures in the coordinate plane. Geometry continues with the study of area of polygons, volume and surface area of three-dimensional figures with an emphasis on real-world applications, the study of relationships in triangles, quadrilaterals, right triangle trigonometry, and the study of circles.

Assured Assessments

Formative Assessments:
Formative assessments can include, but are not limited to:

- Warm-up problems (Units 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11)
- H.O.T. problems (Units 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11)
- Exit slips (Units 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11)
- Group problem sets (Units 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11)
- Homework (Units 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11)
- Checkpoint quizzes (Units 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11)
- Vocabulary activity (Unit 1)
- Justification practice activity (Units 2, 4)
- Stations activity (Units 3, 9, 10)

Summative Assessments:

- Common assessments (Units 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11)
- "Choosing a Pool" performance-based assessment (Unit 10)

Core Text

- Carter, John, Gilbert Cuevas, and Roger Day. *Geometry*. New York: Glencoe, 2018. Print.

UNIT 1
Tools of Geometry

Unit Goals

At the completion of this unit, students will:

The following Unit Goals align with the 2010 Connecticut Core Standards for Mathematics.

G-CO Congruence

Experiment with transformations in the plane.

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-GPE Expressing Geometric Properties with Equations

Use coordinates to prove simple geometric theorems algebraically.

6. Find the point on a directed line segment between two given points that partitions the segment in a given ratio.

The following Unit Goal aligns with the 2016 International Society for Technology in Education Standards.

ISTE Computational Thinker (Standard 5)	Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions.

Unit Essential Questions

- What are the essential tools of geometry, and how are they used in the twenty-first century?
- Why do we measure?
- What kinds of pairs can angles make with each other?

Scope and Sequence

1. Identifying and modeling points, lines, and planes
2. Identifying intersecting lines and planes
3. Finding the distance between two points
4. Finding the midpoint of a segment
5. Measuring and classifying angles and their parts
6. Explaining the relationships between different types of angle pairs

Assured Assessments

Formative Assessment:
Students will participate in various warm-up problems, H.O.T. problems, exit slips, group problem sets, and homework throughout the unit. Checkpoint quizzes will also be administered

to assess students' understanding of essential concepts and skills. A vocabulary activity will be included in this unit.

Summative Assessment:
Students will take a common end-of-unit assessment scored via a common scoring guide.

Resources

Core

- Carter, John, Gilbert Cuevas, and Roger Day. *Geometry*. New York: Glencoe, 2018. Print.

Supplemental

- Online resources including video presentations and self-checks
- Geometer's Sketchpad discovery activities from ConnectED website
- Worksheets created with Kuta Software, a free online resource
- LEARNSMART & other SAT/ACT preparation tools

Time Allotment

- CP: Approximately 17 school days, including initial common formative assessment and summer packet review
- ACP: Approximately 17 school days, including initial common formative assessment and summer packet review

UNIT 2
Logical Arguments and Line Relationships

Unit Goals

At the completion of this unit, students will:

The following Unit Goals align with the 2010 Connecticut Core Standards for Mathematics.

G-CO Congruence

Experiment with transformations in the plane.

2. 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.

Prove geometric theorems.

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.
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-MG Modeling with Geometry

Apply geometric concepts in modeling situations.

3. Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios).

G-GPE Expressing Geometric Properties with Equations

Use coordinates to prove simple geometric theorems algebraically.

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).

The following Unit Goal aligns with the 2016 International Society for Technology in Education Standards.

ISTE Computational Thinker (Standard 5)	Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions.

Unit Essential Questions

- How is inductive reasoning used to justify logical statements?
- Why is it important to be able to think logically?

- What are the relationships involving congruent angles, parallel lines, perpendicular lines, and polygons?

Scope and Sequence

1. Writing and analyzing conjectures by using inductive reasoning
2. Analyzing figures to identify and use postulates about points, lines, and planes
3. Analyzing and constructing viable arguments in any proof format
4. Proving statements involving segment addition and segment congruence
5. Solving problems involving supplementary, complementary, congruent, and right angles
6. Using angle pair relationships formed by lines and transversals to solve problems
7. Writing the equations of lines and using slope to determine if lines are parallel or perpendicular

Assured Assessments

Formative Assessment:
Students will participate in various warm-up problems, H.O.T. problems, exit slips, group problem sets, and homework throughout the unit. Checkpoint quizzes will also be administered to assess students' understanding of essential concepts and skills. A justification practice activity will be included in this unit.

Summative Assessment:
Students will take a common end-of-unit assessment scored via a common scoring guide.

Resources

Core

- Carter, John, Gilbert Cuevas, and Roger Day. *Geometry*. New York: Glencoe, 2018. Print.

Supplemental

- Online resources including video presentations and self-checks
- Geometer's Sketchpad discovery activities from ConnectED website
- Worksheets created with Kuta Software, a free online resource
- LEARNSMART & other SAT/ACT preparation tools
- Factoring practice worksheets with congruent and supplementary angles

Time Allotment

- CP: Approximately 12 school days
- ACP: Approximately 15 school days

UNIT 3
Rigid Transformations and Symmetry

Unit Goals

At the completion of this unit, students will:

The following Unit Goals align with the 2010 Connecticut Core Standards for Mathematics.

G-CO Congruence

Experiment with transformations in the plane.

2. Represent transformations in the plane using, e.g., transparencies and geometry software; describe transformations as functions that take points in the plane as inputs and give other points as outputs. Compare transformations that preserve distance and angle to those that do not (e.g., translation versus horizontal stretch).
3. Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry it onto itself.
4. Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.
5. Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure using, e.g., graph paper, tracing paper, or geometry software. Specify a sequence of transformations that will carry a given figure onto another.

Understand congruence in terms of rigid motions.

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.

The following Unit Goal aligns with the 2016 International Society for Technology in Education Standards.

ISTE Computational Thinker (Standard 5)	Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions.

Unit Essential Questions

- Where can transformations be found?
- How can we change a figure's positions without changing its size and shape?
- How are transformations used to identify relationships among geometric figures?
- How can we recognize symmetry in a figure, and why is it desirable?

Scope and Sequence

1. Given a geometric figure and a reflection, drawing the transformed figure on a coordinate plane
2. Drawing and identifying translations on a coordinate plane

3. Given a geometric figure and a rotation, drawing the transformed figure on a coordinate plan
4. Using line symmetry to describe the reflections that carry a figure onto itself
5. Using rotational symmetry to describe the rotations that carry a figure onto itself

Assured Assessments

Formative Assessment:
Students will participate in various warm-up problems, H.O.T. problems, exit slips, group problem sets, and homework throughout the unit. Checkpoint quizzes will also be administered to assess students' understanding of essential concepts and skills. A stations activity will be included in this unit; students will need to graph a transformed figure given the original and a transformation as well as identify lines of symmetry and rotational symmetry.

Summative Assessment:
Students will take a common end-of-unit assessment scored via a common scoring guide.

Resources

Core

- Carter, John, Gilbert Cuevas, and Roger Day. *Geometry*. New York: Glencoe, 2018. Print.

Supplemental

- Online resources including video presentations and self-checks
- Geometer's Sketchpad discovery activities from ConnectED website
- Worksheets created with Kuta Software, a free online resource
- LEARNSMART & other SAT/ACT preparation tools

Time Allotment

- CP: Approximately 11 school days
- ACP: Approximately 10 school days

UNIT 4
Triangles and Congruence

Unit Goals

At the completion of this unit, students will:

The following Unit Goals align with the 2010 Connecticut Core Standards for Mathematics.

G-CO Congruence

Understand congruence in terms of rigid motions.

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.
8. Explain how the criteria for triangle congruence (ASA, SAS, and SSS) follow from the definition of congruence in terms of rigid motions.

Prove geometric theorems.

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-SRT Similarity, Right Triangles, and Trigonometry

Prove theorems involving similarity.

5. Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.

G-GPE Expressing Geometric Properties with Equations

Use coordinates to prove simple geometric theorems algebraically.

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 $(1, \sqrt{3})$ lies on the circle centered at the origin and containing the point $(0, 2)$.

The following Unit Goal aligns with the 2016 International Society for Technology in Education Standards.

ISTE Computational Thinker (Standard 5)	Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions.

Unit Essential Questions

- How can we compare two objects?
- How can we tell if two objects are congruent?
- How can we tell if two triangles are congruent?

Scope and Sequence

1. Applying the Triangle-Angle Sum Theorem to solve problems
2. Naming and using corresponding parts of congruent polygons to solve problems
3. Proving triangles congruent using the definition of congruence
4. Using the SSS, SAS, ASA, AAS, and HL Theorems to check for congruence
5. Using properties of isosceles and equilateral triangles to solve algebraic problems and to prove triangles are congruent

Assured Assessments

Formative Assessment:
Students will participate in various warm-up problems, H.O.T. problems, exit slips, group problem sets, and homework throughout the unit. Checkpoint quizzes will also be administered to assess students' understanding of essential concepts and skills. A justification practice activity will be included in this unit.

Summative Assessment:
Students will take a common end-of-unit assessment scored via a common scoring guide.

Resources

Core

- Carter, John, Gilbert Cuevas, and Roger Day. *Geometry*. New York: Glencoe, 2018. Print.

Supplemental

- Online resources including video presentations and self-checks
- Geometer's Sketchpad discovery activities from ConnectED website
- Worksheets created with Kuta Software, a free online resource
- LEARNSMART & other SAT/ACT preparation tools

Time Allotment

- CP: Approximately 19 school days
- ACP: Approximately 16 school days

UNIT 5
Quadrilaterals

Unit Goals

At the completion of this unit, students will:

The following Unit Goals align with the 2010 Connecticut Core Standards for Mathematics.

G-MG Modeling with Geometry

Apply geometric concepts in modeling situations.

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 Congruence

Prove geometric theorems.

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 Expressing Geometric Properties with Equations

Use coordinates to prove simple geometric theorems algebraically.

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 $(1, \sqrt{3})$ lies on the circle centered at the origin and containing the point (0, 2).

The following Unit Goal aligns with the 2016 International Society for Technology in Education Standards.

ISTE Computational Thinker (Standard 5)	Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions.

Unit Essential Questions

- What are the similarities and differences between and among the properties of quadrilaterals?
- How can we prove a quadrilateral is a parallelogram?

Scope and Sequence

1. Finding and using the sum of the measures of the interior and exterior angles of a polygon
2. Recognizing and applying properties of the sides and angles of parallelograms
3. Recognizing and applying properties of diagonals of parallelograms
4. Recognizing the conditions that ensure a quadrilateral is a parallelogram
5. Determining whether a parallelogram is a rectangle, rhombus, or square

6. Applying properties of kites and trapezoids to solve problems

Assured Assessments

Formative Assessment:
Students will participate in various warm-up problems, H.O.T. problems, exit slips, group problem sets, and homework throughout the unit. Checkpoint quizzes will also be administered to assess students' understanding of essential concepts and skills. If time permits, vocabulary foldables for each chapter leading up to the midterm examination will be included in this unit, and will be scored via a common scoring guide.

Summative Assessment:
Students will take a common end-of-unit assessment scored via a common scoring guide.

Resources

Core

- Carter, John, Gilbert Cuevas, and Roger Day. *Geometry*. New York: Glencoe, 2018. Print.

Supplemental

- Online resources including video presentations and self-checks
- Geometer's Sketchpad discovery activities from ConnectED website
- Worksheets created with Kuta Software, a free online resource
- LEARNSMART & other SAT/ACT preparation tools
- Systems of equations practice worksheets with diagonals, perhaps factoring

Time Allotment

- CP: Approximately 17 school days
- ACP: Approximately 15 school days

UNIT 6
Similarity

Unit Goals

At the completion of this unit, students will:

The following Unit Goals align with the 2010 Connecticut Core Standards for Mathematics.

G-SRT Similarity, Right Triangles, and Trigonometry

Understand similarity in terms of similarity transformations.

1. Verify experimentally the properties of dilations given by a center and a scale factor:
    a. A dilation takes a line not passing through the center of the dilation to a parallel line, and leaves a line passing through the center unchanged.
2. Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar; explain using similarity transformations the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides.
3. Use the properties of similarity transformations to establish the AA criterion for two triangles to be similar.

Prove theorems involving similarity.

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.
5. Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.

G-GPE Expressing Geometric Properties with Equations

Use coordinates to prove simple geometric theorems algebraically.

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).

G-CO Congruence

Experiment with transformations in the plane.

2. Represent transformations in the plan using, e.g., transparencies and geometry software; describe transformations as functions that take points in the plane as inputs and give other points as outputs. Compare transformations that preserve distance and angle to those that do not (e.g., translation versus horizontal stretch).

Prove geometric theorems.

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.

The following Unit Goal aligns with the 2016 International Society for Technology in Education Standards.

ISTE Computational Thinker (Standard 5)	Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions.

Unit Essential Questions

- How is the meaning of similarity used to prove relationships in geometric figures?
- How can two objects be similar?
- How do we use proportions to find side lengths in similar polygons?
- How does similarity in math compare to similarity in everyday life?
- How do perimeters and areas of similar polygons compare?

Scope and Sequence

1. Drawing dilations and determining the scale factor between two similar figures
2. Using the definition of similarity to identify similar polygons and solve problems by using their properties
3. Using the AA, SSS, and SAS criteria to determine if triangles are similar
4. Using proportional parts within triangles

Assured Assessments

Formative Assessment:
Students will participate in various warm-up problems, H.O.T. problems, exit slips, group problem sets, and homework throughout the unit. Checkpoint quizzes will also be administered to assess students' understanding of essential concepts and skills.

Summative Assessment:
Students will take a common end-of-unit assessment scored via a common scoring guide.

Resources

Core

- Carter, John, Gilbert Cuevas, and Roger Day. *Geometry*. New York: Glencoe, 2018. Print.

Supplemental

- Online resources including video presentations and self-checks
- Geometer's Sketchpad discovery activities from ConnectED website
- Worksheets created with Kuta Software, a free online resource
- LEARNSMART & other SAT/ACT preparation tools
- FOILing and factoring practice worksheets with proportions, systems

Time Allotment

- CP: Approximately 15 school days
- ACP: Approximately 13 school days

UNIT 7
Right Triangles and Trigonometry

Unit Goals

At the completion of this unit, students will:

The following Unit Goals align with the 2010 Connecticut Core Standards for Mathematics.

G-SRT Similarity, Right Triangles, and Trigonometry

Prove theorems involving similarity.

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.
5. Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.

Define trigonometric ratios and solve problems involving right triangles.

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.
7. Explain and use the relationship between the sine and cosine of complementary angles.
8. Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.

G-CO Congruence

Prove geometric theorems.

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-MG Modeling with Geometry

Apply geometric concepts in modeling situations.

3. Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios).

The following Unit Goal aligns with the 2016 International Society for Technology in Education Standards.

ISTE Computational Thinker (Standard 5)	Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions.

Unit Essential Questions

- Why do we use mathematics to model real-world situations?
- What is the Pythagorean Theorem and how can it be used?

- What is trigonometry and why is it useful?

Scope and Sequence

1. Using geometric mean to solve problems involving relationships between parts of a right triangle and the altitude to the hypotenuse (ACP only)
2. Using the Pythagorean Theorem and its converse
3. Using the properties of 45-45-90 and 30-60-90 triangles to solve problems
4. Finding and using trigonometric ratios within right triangles
5. Solving problems using angles of elevation and depression
6. Converting angle measures in degrees to radians and radians to degrees

Assured Assessments

Formative Assessment:
Students will participate in various warm-up problems, H.O.T. problems, exit slips, group problem sets, and homework throughout the unit. Checkpoint quizzes will also be administered to assess students' understanding of essential concepts and skills.

Summative Assessment:
Students will take a common end-of-unit assessment scored via a common scoring guide.

Resources

Core

- Carter, John, Gilbert Cuevas, and Roger Day. *Geometry*. New York: Glencoe, 2018. Print.

Supplemental

- Online resources including video presentations and self-checks
- Geometer's Sketchpad discovery activities from ConnectED website
- Worksheets created with Kuta Software, a free online resource
- LEARNSMART & other SAT/ACT preparation tools
- Converting angle measures in degrees to radians, and vice versa, practice worksheets

Time Allotment

- CP: Approximately 18 school days
- ACP: Approximately 20 school days

UNIT 8
Circles

Unit Goals

At the completion of this unit, students will:

The following Unit Goals align with the 2010 Connecticut Core Standards for Mathematics.

G-CO Congruence

Experiment with transformations in the plane.

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.

Make geometric constructions.

13. Construct an equilateral triangle, a square, and a regular hexagon inscribed in a circle.

G-C Circles

Understand and apply theorems about circles.

1. Prove that all circles are similar.
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.
3. Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle.
4. Construct a tangent line from a point outside a given circle to the circle.

Find arc lengths and areas of sectors of circles.

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 Geometric Measurement and Dimension

Explain volume formulas and use them to solve problems.

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-MG Modeling with Geometry

Apply geometric concepts in modeling situations.

3. Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios).

G-GPE Expressing Geometric Properties with Equations

Translate between the geometric description and the equation for a conic section.

1. Derive the equation of a circle of given center and radius using the Pythagorean Theorem; complete the square to find the center and radius of a circle given by an equation.

Use coordinates to prove simple geometric theorems algebraically.

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 $(1, \sqrt{3})$ lies on the circle centered at the origin and containing the point (0, 2).

The following Unit Goal aligns with the 2016 International Society for Technology in Education Standards.

ISTE Computational Thinker (Standard 5)	Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions.

Unit Essential Questions

- How can circles be used to model geometric concepts and theorems?
- How do we find the equation of a circle on a coordinate plane?

Scope and Sequence

1. Identifying and using parts of circles
2. Solving problems involving the circumference of a circle
3. Identifying central angles, major arcs, minor arcs, and semicircles, and finding their lengths
4. Finding arc length
5. Recognizing and applying relationships between arcs and chords
6. Using properties of tangents
7. Writing equations of circles and graphing them on a coordinate plane

Assured Assessments

Formative Assessment:
Students will participate in various warm-up problems, H.O.T. problems, exit slips, group problem sets, and homework throughout the unit. Checkpoint quizzes will also be administered to assess students' understanding of essential concepts and skills.

Summative Assessment:
Students will take a common end-of-unit assessment scored via a common scoring guide.

Resources

Core

- Carter, John, Gilbert Cuevas, and Roger Day. *Geometry*. New York: Glencoe, 2018. Print.

Supplemental

- Online resources including video presentations and self-checks
- Geometer's Sketchpad discovery activities from ConnectED website
- Worksheets created with Kuta Software, a free online resource
- LEARNSMART & other SAT/ACT preparation tools

Time Allotment

- CP: Approximately 22 school days
- ACP: Approximately 16 school days

UNIT 9
Extending Area

Unit Goals

At the completion of this unit, students will:

The following Unit Goals align with the 2010 Connecticut Core Standards for Mathematics.

G-CO Congruence

Find arc lengths and areas of sectors of circles.

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 Geometric Measurement and Dimension

Explain volume formulas and use them to solve problems.

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-MG Modeling with Geometry

Apply geometric concepts in modeling situations.

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).
3. Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios).

G-GPE Expressing Geometric Properties with Equations

Use coordinates to prove simple geometric theorems algebraically.

7. Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula.

The following Unit Goal aligns with the 2016 International Society for Technology in Education Standards.

ISTE Computational Thinker (Standard 5)	Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions.

Unit Essential Questions

- What is the relationship between finding the surface area of a three-dimensional figure and a two-dimensional figure?
- How are the area formulas for polygons related?
- What is the difference between the surface area of a prism, cylinder, pyramid, and cone?

Scope and Sequence

1. Finding perimeters and areas of parallelograms and triangles
2. Finding areas of trapezoids, rhombi, and kites
3. Finding areas of circles and sectors of circles
4. Finding areas of regular polygons and composite figures
5. Finding surface area of prisms, cylinders, pyramids, and cones

Assured Assessments

Formative Assessment:
Students will participate in various warm-up problems, H.O.T. problems, exit slips, group problem sets, and homework throughout the unit. Checkpoint quizzes will also be administered to assess students' understanding of essential concepts and skills. A stations activity will be included in this unit.

Summative Assessment:
Students will take a common end-of-unit assessment scored via a common scoring guide.

Resources

Core

- Carter, John, Gilbert Cuevas, and Roger Day. *Geometry*. New York: Glencoe, 2018. Print.

Supplemental

- Online resources including video presentations and self-checks
- Geometer's Sketchpad discovery activities from ConnectED website
- Worksheets created with Kuta Software, a free online resource
- LEARNSMART & other SAT/ACT preparation tools
- Practice worksheets on solving formulas for a specific variable (literal equations)

Time Allotment

- CP: Approximately 11 school days for Scope & Sequence Items 1-4, plus 7 additional days on surface area with formative assessments but no summative assessment
- ACP: Approximately 13 school days for Scope & Sequence Items 1-4, plus 6 additional days on surface area with formative assessments but no summative assessment

UNIT 10
Extending Volume

Unit Goals

At the completion of this unit, students will:

The following Unit Goals align with the 2010 Connecticut Core Standards for Mathematics.

G-GMD Geometric Measurement and Dimension

Explain volume formulas and use them to solve problems.

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.
3. Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.

G-MG Modeling with Geometry

Apply geometric concepts in modeling situations.

2. Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile, BTUs per cubic foot).
3. Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios).

The following Unit Goal aligns with the 2016 International Society for Technology in Education Standards.

ISTE Computational Thinker (Standard 5)	Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions.

Unit Essential Questions

- How are two-dimensional and three-dimensional figures related?
- What are the differences between applications of surface area and volume?
- How do the surface areas and volumes of similar solids compare?

Scope and Sequence

1. Finding volume of prisms and cylinders
2. Finding volume of pyramids and cones
3. Finding surface area and volume of spheres
4. Solving real-world problems involving density using area and volume

Assured Assessments

Formative Assessment:
Students will participate in various warm-up problems, H.O.T. problems, exit slips, group problem sets, and homework throughout the unit. Checkpoint quizzes will also be administered to assess students' understanding of essential concepts and skills. A stations activity will be included in this unit.

Summative Assessment:
Students will take a common end-of-unit assessment scored via a common scoring guide. ACP students will also participate in a performance-based assessment entitled "Choosing a Pool."

Resources

Core

- Carter, John, Gilbert Cuevas, and Roger Day. *Geometry*. New York: Glencoe, 2018. Print.

Supplemental

- Online resources including video presentations and self-checks
- Geometer's Sketchpad discovery activities from ConnectED website
- Worksheets created with Kuta Software, a free online resource
- LEARNSMART & other SAT/ACT preparation tools
- Practice worksheets on solving formulas for a specific variable (literal equations)

Time Allotment

- CP: Approximately 5 school days, omitting scale factor for area and volume
- ACP: Approximately 10 school days

UNIT 11
Probability (ACP only)

Unit Goals

At the completion of this unit, students will:

The following Unit Goals align with the 2010 Connecticut Core Standards for Mathematics.

S-CP Conditional Probability and the Rules of Probability

Understand independence and conditional probability and use them to interpret data.

1. Describe events as subsets of a sample space (the set of outcomes) using characteristics (or categories) of the outcomes, or as unions, intersections, or complements of other events ("or," "and," "not").
2. Understand that two events *A* and *B* are independent if the probability of *A* and *B* occurring together is the product of their probabilities, and use this characterization to determine if they are independent.
3. Understand the conditional probability of *A* given *B* as $^{P(A \text{ and } B)}/_{P(B)}$, and interpret independence of *A* and *B* as saying that the conditional probability of *A* given *B* is the same as the probability of *A*, and the conditional probability of *B* given *A* is the same as the probability of *B*.
5. Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations. For example, compare the chance of having lung cancer if you are a smoker with the chance of being a smoker if you have lung cancer.

Use the rules of probability to compute probabilities of compound events in a uniform probability model.

7. Apply the Addition Rule, P(A or B) = P(A) + P(B) - P(A and B), and interpret the answer in terms of the model.
8. Apply the Multiplication Rule in a uniform probability model, P(A and B) = P(A)P(B|A) = P(B)P(A|B), and interpret the answer in terms of the model.
9. Use permutations and combinations to compute probabilities of compound events and solve problems.

S-MD Using Probability to Make Decisions

Use probability to evaluate outcomes of decisions.

7. Analyze decisions and strategies using probability concepts (e.g., product testing, medical testing, pulling a hockey goalie at the end of a game).

The following Unit Goal aligns with the 2016 International Society for Technology in Education Standards.

ISTE Computational Thinker (Standard 5)	Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions.

Unit Essential Questions

- How can we predict the outcomes of events?
- How can we quantify predictions?
- How can we use geometric concepts and formulas to solve problems involving probability?
- What is the difference between independent and dependent events?
- What is the difference between mutually exclusive and not mutually exclusive events?

Scope and Sequence

1. Using lists, tables, and tree diagrams to represent sample spaces
2. Using the Fundamental Counting Principle to count outcomes
3. Describing events as subsets of sample spaces by using intersections and unions
4. Finding probabilities of complements
5. Finding probability using length and area
6. Using the multiplication rule to find probability involving dependent and independent events
7. Applying the addition rule to situations involving mutually exclusive and not mutually exclusive events
8. Finding the probability of events given the occurrence of other events

Assured Assessments

Formative Assessment:
Students will participate in various warm-up problems, H.O.T. problems, exit slips, group problem sets, and homework throughout the unit. Checkpoint quizzes will also be administered to assess students' understanding of essential concepts and skills.

Summative Assessment:
Students will take a common end-of-unit assessment scored via a common scoring guide.

Resources

Core

- Carter, John, Gilbert Cuevas, and Roger Day. *Geometry*. New York: Glencoe, 2018. Print.

Supplemental

- Online resources including video presentations and self-checks
- Geometer's Sketchpad discovery activities from ConnectED website
- Worksheets created with Kuta Software, a free online resource
- LEARNSMART & other SAT/ACT preparation tools
- SAT-like questions focused on probability from the College Board and Khan Academy

Time Allotment

- ACP: Approximately 5 school days

TEACHER GUIDE – ACP

Unit One: Tools of Geometry

Sections:

1.1 Points, Lines, and Planes
1.2 Line Segments and Distance
1.3 Locating Points and Midpoints (emphasis on algebra)
1.4 Angle Measure
1.5 Angle Relationships (emphasis on using algebra to solve equations)
1.6 Two-Dimensional Figures

Unit Two: Logical Arguments and Line Relationships

2.4 Writing Proofs (emphasis on theorems, not writing proofs)
2.6 Proving Angle Relationships (emphasis on justifying each step, not writing proofs)
2.7 Parallel Lines and Transversals (emphasis on algebra: systems of equations and factoring, not writing proofs)
2.8 Slope and Equations of Lines (emphasis on algebra)
2.9 Proving Lines Parallel (emphasis on algebra)

Unit Three: Rigid Transformations and Symmetry

Note: Transformations on the coordinate plane only.

1.7 Transformations in the Plane
3.1 Reflections
3.2 Translations
3.3 Rotations
3.5 Symmetry

Unit Four: Triangles and Congruence

4.1 Angles of Triangles (emphasis on algebra)
4.2 Congruent Triangles
4.3 Proving Triangles Congruent – SSS, SAS (two-column proofs)
4.4 Proving Triangles Congruent – ASA, AAS (two-column proofs)
4.5 Proving Right Triangles Congruent (HL only)
4.6 Isosceles and Equilateral Triangles (emphasis on algebra)

Unit Five: Quadrilaterals

6.1 Angles of Polygons
6.2 Parallelograms
6.3 Tests for Parallelograms
6.4 Special Parallelograms: Rectangles (emphasis on systems of equations and factoring)
6.5 Special Parallelograms: Rhombi, Squares (emphasis on systems of equations and factoring
6.6 Trapezoids and Kites

Unit Six: Similarity (may be completed before or after midterm)

7.1 Dilations

***Midterm exam**

Unit Six: Similarity

7.1 Dilations (if not completed before midterm)
7.2 Similar Polygons (review solving proportions; emphasis on FOIL and factoring)
7.3 Similar Triangles: AA
7.4 Similar Triangles: SSS and SAS
7.5 Parallel Lines and Proportional Parts

Unit Seven: Right Triangles and Trigonometry

8.1 Geometric Mean
8.2 The Pythagorean Theorem and Its Converse
8.3 Special Right Triangles
8.4 Trigonometry
8.5 Angles of Elevation and Depression
Converting Degrees to Radians and vice versa (supplemental to textbook)

Unit Eight: Circles

9.1 Circles and Circumference
9.2 Measuring Angles and Arcs
9.3 Arcs and Chords
9.4 Inscribed Angles
9.5 Tangents (emphasis on algebra)
9.7 Equations of Circles (including completing the square)

Unit Nine: Extending Area

Note: Supplement trigonometry and special rights into each lesson.

10.1 Areas of Parallelograms and Triangles
10.2 Area of Trapezoids, Rhombi, and Kites
10.3 Areas of Circles and Sectors
10.4 Areas of Regular Polygons and Composite Figures
10.5 Area of Nonrigid Transformations (if time permits)
1.8 Three-Dimensional Figures: Surface Area (only)
10.6 Surface Area

Unit Ten: Extending Volume

11.2 Volumes of Prisms and Cylinders
11.3 Volumes of Pyramids and Cones
11.4 Spheres
11.6 Volume and Nonrigid Transformations (if time permits)
Word-Problem Applications (supplemental to textbook)
"Choosing a Pool" Performance-Based Assessment (supplemental to textbook)

Unit Eleven (if time permits)

12.4 Geometric Probability
SAT-like questions focused on probability

***Final exam**

TEACHER GUIDE *continued* – ACP

Timeline	Unit of Study	Alternative Pacing	
1st Marking Period			
Unit 1 (17 days)	Initial Common Formative Assessment & Summer Packet Review Chapter 1: 1.1, 1.2, 1.3, 1.4, 1.5, 1.6		
Unit 2 (15 days)	Chapter 2: 2.4, 2.6, 2.7, 2.8, 2.9		
Unit 3 (10 days)	Chapter 1: 1.7 Chapter 3: 3.1, 3.2, 3.3, 3.5		
2nd Marking Period			
Unit 4 (16 days)	Chapter 4: 4.1, 4.2, 4.3, 4.4, 4.5, 4.6		
Unit 5 (15 days)	Chapter 6: 6.1, 6.2, 6.3, 6.4, 6.5, 6.6		
Unit 6 Part 1 (3 days)	Chapter 7: 7.1 (including dilations assessment)		
3 days	Midterm Review Project		
3rd Marking Period			
Unit 6 Part 2 (10 days)	Chapter 7: 7.2, 7.3, 7.4, 7.5	Unit 6 (13 days)	Chapter 7: 7.1, 7.2, 7.3, 7.4, 7.5 (including dilations assessment)
Unit 7 (20 days)	Chapter 8: 8.1, 8.2, 8.3, 8.4, 8.5, converting degrees to radians and vice versa (supplemental to textbook)		
Unit 8 (16 days)	Chapter 9: 9.1, 9.2, 9.3, 9.4, 9.5, 9.7	Unit 8 Part 1 (6 days)	Chapter 9: 9.7
4th Marking Period			
		Unit 8 Part 2 (10 days)	Chapter 9: 9.1, 9.2, 9.3, 9.4, 9.5

Unit 9 (13 days)	Chapter 10: 10.1, 10.2, 10.3, 10.4, 10.5	
Mini-Unit on Surface Area (6 days)	Chapter 1: 1.8 Chapter 10: 10.6	
Unit 10 (10 days)	Chapter 11: 11.2, 11.3, 11.4, 11.6, word-problem applications, "Choosing a Pool" performance-based assessment	
Unit 11 (5 days if time permits)	Chapter 12: 12.4, SAT-like questions focused on probability	
4 days	Final Exam Review	

TEACHER GUIDE – CP

Unit One: Tools of Geometry

Sections:

1.1 Points, Lines, and Planes
1.2 Line Segments and Distance
1.3 Locating Points and Midpoints
1.4 Angle Measure
1.5 Angle Relationships (emphasis on using algebra to solve equations)
1.6 Two-Dimensional Figures

Unit Two: Logical Arguments and Line Relationships

2.4 Writing Proofs (emphasis on theorems, not writing proofs)
2.6 Proving Angle Relationships (emphasis on justifying each step, not writing proofs)
2.7 Parallel Lines and Transversals (emphasis on algebra, not writing proofs)
2.8 Slope and Equations of Lines (emphasis on algebra)
2.9 Proving Lines Parallel (emphasis on algebra)

Unit Three: Rigid Transformations and Symmetry

Note: Transformations on the coordinate plane only.

1.7 Transformations in the Plane
3.1 Reflections
3.2 Translations
3.3 Rotations
3.5 Symmetry

Unit Four: Triangles and Congruence

4.1 Angles of Triangles (emphasis on algebra)
4.2 Congruent Triangles
4.3 Proving Triangles Congruent – SSS, SAS (two-column proofs with bank of reasons)
4.4 Proving Triangles Congruent – ASA, AAS (two-column proofs with bank of reasons)
4.6 Isosceles and Equilateral Triangles (emphasis on algebra)

Unit Five: Quadrilaterals

6.1 Angles of Polygons
6.2 Parallelograms
6.3 Tests for Parallelograms
6.4 Special Parallelograms: Rectangles (supplement systems of equations with diagonals)
6.5 Special Parallelograms: Rhombi, Squares
6.6 Trapezoids and Kites

***Midterm exam**

Unit Six: Similarity

7.1 Dilations
7.2 Similar Polygons (emphasis on FOIL and factoring)
7.3 Similar Triangles: AA
7.4 Similar Triangles: SSS and SAS
7.5 Parallel Lines and Proportional Parts

Unit Seven: Right Triangles and Trigonometry

8.2 The Pythagorean Theorem and Its Converse
8.3 Special Right Triangles
8.4 Trigonometry
8.5 Angles of Elevation and Depression
Converting Degrees to Radians and vice versa (supplemental to textbook)

Unit Eight: Circles

9.7 Equations of Circles (focus on graphing, writing equations)
9.1 Circles and Circumference
9.2 Measuring Angles and Arcs
9.3 Arcs and Chords
9.4 Inscribed Angles
9.5 Tangents

Unit Nine: Extending Area

Note: Supplement trigonometry and special rights into each lesson.

10.1 Areas of Parallelograms and Triangles
10.2 Area of Trapezoids, Rhombi, and Kites
10.3 Areas of Circles and Sectors
10.4 Areas of Regular Polygons and Composite Figures
10.5 Area of Nonrigid Transformations (if time permits)
1.8 Three-Dimensional Figures: Surface Area (only)
10.6 Surface Area

Unit Ten: Extending Volume

11.2 Volumes of Prisms and Cylinders
11.3 Volumes of Pyramids and Cones
11.4 Spheres
11.6 Volume and Nonrigid Transformations (if time permits)
Word-Problem Applications (supplemental to textbook)

***Final exam**

TEACHER GUIDE *continued* – CP

Timeline	Unit of Study
Unit 1 (17 days)	Initial Common Formative Assessment & Summer Packet Review Chapter 1: 1.1, 1.2, 1.3, 1.4, 1.5, 1.6
Unit 2 (12 days)	Chapter 2: 2.4, 2.6, 2.7, 2.8, 2.9
Unit 3 (11 days)	Chapter 1: 1.7 Chapter 3: 3.1, 3.2, 3.3, 3.5
Unit 4 (19 days)	Chapter 4: 4.1, 4.2, 4.3, 4.4, 4.6
Unit 5 (17 days)	Chapter 6: 6.1, 6.2, 6.3, 6.4, 6.5, 6.6
3 days	Midterm Review Project
Unit 6 (15 days)	Chapter 7: 7.1, 7.2, 7.3, 7.4, 7.5
Unit 7 (18 days)	Chapter 8: 8.2, 8.3, 8.4, 8.5, converting degrees to radians and vice versa (supplemental to textbook)
Unit 8 Part 1 (6 days)	Chapter 9: 9.7
Unit 8 Part 2 (16 days)	Chapter 9: 9.1, 9.2, 9.3, 9.4, 9.5
Unit 9 (11 days)	Chapter 10: 10.1, 10.2, 10.3, 10.4, 10.5
Mini-Unit on Surface Area (7 days)	Chapter 1: 1.8 Chapter 10: 10.6
Unit 10 (5 days)	Chapter 11: 11.2, 11.3, 11.4, 11.6, word-problem applications
4 days	Final Exam Review

COURSE CREDIT

One credit in Mathematics
One class period daily for a full year

PREREQUISITES

for CP: Completion of Algebra I.
for ACP: Grade of C or better in ACP Algebra I.

SUPPLEMENTARY MATERIALS/RESOURCES/TECHNOLOGY

Department- and teacher-prepared materials

TI-84 Plus graphing calculators

CURRENT REFERENCES

2010 Connecticut Core Standards for Mathematics
http://www.corestandards.org/assets/CCSSI_Math%20Standards.pdf

ASSURED STUDENT PERFORMANCE RUBRICS

- Trumbull High School School-Wide Writing Rubric (attached)
- Trumbull High School School-Wide Problem-Solving Rubric (attached)
- Trumbull High School School-Wide Independent Learning and Thinking Rubric (attached)

Trumbull High School School-Wide Writing Rubric

Category/ Weight	Exemplary 4 Student work:	Goal 3 Student work:	Working Toward Goal 2 Student work:	Needs Support 1-0 Student work:
Purpose X_____	• Establishes and maintains a clear purpose • Demonstrates an insightful understanding of audience and task	• Establishes and maintains a purpose • Demonstrates an accurate awareness of audience and task	• Establishes a purpose • Demonstrates an awareness of audience and task	• Does not establish a clear purpose • Demonstrates limited/no awareness of audience and task
Organization X_____	• Reflects sophisticated organization throughout • Demonstrates logical progression of ideas • Maintains a clear focus • Utilizes effective transitions	• Reflects organization throughout • Demonstrates logical progression of ideas • Maintains a focus • Utilizes transitions	• Reflects some organization throughout • Demonstrates logical progression of ideas at times • Maintains a vague focus • May utilize some ineffective transitions	• Reflects little/no organization • Lacks logical progression of ideas • Maintains little/no focus • Utilizes ineffective or no transitions
Content X_____	• Is accurate, explicit, and vivid • Exhibits ideas that are highly developed and enhanced by specific details and examples	• Is accurate and relevant • Exhibits ideas that are developed and supported by details and examples	• May contain some inaccuracies • Exhibits ideas that are partially supported by details and examples	• Is inaccurate and unclear • Exhibits limited/no ideas supported by specific details and examples
Use of Language X_____	• Demonstrates excellent use of language • Demonstrates a highly effective use of standard writing that enhances communication • Contains few or no errors. Errors do not detract from meaning	• Demonstrates competent use of language • Demonstrates effective use of standard writing conventions • Contains few errors Most errors do not detract from meaning	• Demonstrates use of language • Demonstrates use of standard writing conventions • Contains errors that detract from meaning	• Demonstrates limited competency in use of language • Demonstrates limited use of standard writing conventions • Contains errors that make it difficult to determine meaning

Trumbull High School School-Wide Problem-Solving Rubric

Category/ Weight	Exemplary 4	Goal 3	Working Toward Goal 2	Needs Support 1-0
Understanding X_____	• Student demonstrates clear understanding of the problem and the complexities of the task	• Student demonstrates sufficient understanding of the problem and most of the complexities of the task	• Student demonstrates some understanding of the problem but requires assistance to complete the task	• Student demonstrates limited or no understanding of the fundamental problem after assistance with the task
Research X_____	• Student gathers compelling information from multiple sources including digital, print, and interpersonal	• Student gathers sufficient information from multiple sources including digital, print, and interpersonal	• Student gathers some information from few sources including digital, print, and interpersonal	• Student gathers limited or no information
Reasoning and Strategies X_____	• Student demonstrates strong critical thinking skills to develop a comprehensive plan integrating multiple strategies	• Student demonstrates sufficient critical thinking skills to develop a cohesive plan integrating strategies	• Student demonstrates some critical thinking skills to develop a plan integrating some strategies	• Student demonstrates limited or no critical thinking skills and no plan
Final Product and/or Presentation X_____	• Solution shows deep understanding of the problem and its components • Solution shows extensive use of 21st-century technology skills	• Solution shows sufficient understanding of the problem and its components • Solution shows sufficient use of 21st-century technology skills	• Solution shows some understanding of the problem and its components • Solution shows some use of 21st-century technology skills	• Solution shows limited or no understanding of the problem and its components • Solution shows limited or no use of 21st-century technology skills

Trumbull High School School-Wide
Independent Learning and Thinking Rubric

Category/ Weight	Exemplary 4	Goal 3	Working Toward Goal 2	Needs Support 1-0
Proposal X_____	• Student demonstrates a strong sense of initiative by generating compelling questions, creating uniquely original projects/work	• Student demonstrates initiative by generating appropriate questions, creating original projects/work	• Student demonstrates some initiative by generating questions, creating appropriate projects/work	• Student demonstrates limited or no initiative by generating few questions and creating projects/work
Independent Research & Development X_____	• Student is analytical, insightful, and works independently to reach a solution	• Student is analytical, and works productively to reach a solution	• Student reaches a solution with direction	• Student is unable to reach a solution without consistent assistance
Presentation of Final Product X_____	• Presentation shows compelling evidence of an independent learner and thinker • Solution shows deep understanding of the problem and its components • Solution shows extensive and appropriate application of 21st-century skills	• Presentation shows clear evidence of an independent learner and thinker • Solution shows adequate understanding of the problem and its components • Solution shows adequate application of 21st-century skills	• Presentation shows some evidence of an independent learner and thinker • Solution shows some understanding of the problem and its components • Solution shows some application of 21st-century skills	• Presentation shows limited or no evidence of an independent learner and thinker • Solution shows limited or no understanding of the problem and its components • Solution shows limited or no application of 21st-century skills