

**Bud Carlson Academy  
Geometry and Measurement**

Geometry and the related area of measurement help students represent, describe, and make sense of the world in which they live. Geometry is also a natural place for students to develop their reasoning and justification skills.

We live in a three-dimensional world. To interpret, understand, and appreciate that world, students need to develop an understanding of space. In addition, success in mathematics depends, in part, on the development of spatial abilities. Spatial skills include making and interpreting drawings, forming mental images, and visualizing changes.

Measurement is the process of assigning a numerical value to an attribute of an object. The study of measurement provides students with techniques and tools they will need to describe and analyze their world. It also provides an opportunity to make connections within mathematics and between mathematics and other curricular areas. High school students must develop more mature insights into the essential role of measurement as a link between the abstractness of mathematics and the concreteness of the real-world.

In both areas, geometry and measurement, students need to investigate, experiment, and explore geometric properties using both technology and hands-on materials.

- Lines and angles
- Parallel lines and planes
- Congruent triangles
- Similar triangles
- Right triangles
- Circles
- Area of plane figures
- Area volume of solids and construction
- Pythagorean Theorem

**Geometry COURSE CONTENT COMPETENCIES**

1. Students will understand properties of angles.
2. Students will apply the Pythagorean Theorem.
3. Students will understand problems involving perimeter, circumference, area, surface area and volume.
4. Students will use units of measure appropriately and consistently when solving problems and use measurement conversion strategies.
5. Students will demonstrate and solve problems on and off the coordinate plane.

### Geometry COURSE PROCESS COMPETENCIES

1. Students will understand that a variety of problem-solving strategies can be used to investigate everyday as well as increasingly complex mathematical situations.
2. Students will understand that exploring, justifying, and synthesizing mathematical conjectures are part of systemic reasoning which is common to all content areas and a defining feature of mathematics.
3. Students will understand that actively exploring, investigating, describing, and explaining mathematical ideas promotes communication which leads to a greater comprehension of mathematical concepts.
4. Students will understand that mathematical connections will help them become aware of the usefulness of mathematics, serve to bridge the concrete and the abstract, and enable deeper understanding of important ideas.
5. Students will understand that representing ideas and connecting the representations lies at the heart of understanding mathematics.
6. [Students will understand that progress is made by asking relevant questions, conducting careful investigations evaluating the validity of results and developing models to explain what has been found.]
7. [Students will understand that when analyzing data to draw conclusions about the questions or hypotheses being tested, limitations of the data must be considered that could affect interpretations.]
8. [Students will understand that appropriate representations and mathematical language is used to present ideas clearly and logically for a given situation.]

#### Topics

- Lines and angles
- Parallel lines and planes
- Congruent triangles
- Similar triangles
- Right triangles
- Circles
- Area of plane figures
- Area volume of solids and construction

<b>Competencies</b>	<p>Makes and defends conjectures, constructs geometric arguments, uses geometric properties, or uses theorems to solve problems involving angles, lines, polygons, circles, or right triangle ratios (sine, cosine, tangent) within mathematics or across disciplines or contexts (e.g., Pythagorean Theorem, Triangle Inequality Theorem).</p> <p>Applies the concepts of congruency by solving problems on or off a coordinate plane involving reflections, translations, or rotations; or solves problems using congruency involving problems within mathematics or across disciplines or contexts.</p> <p>Applies concepts of similarity by solving problems within mathematics or across disciplines or contexts.</p> <p>Solves problems involving perimeter, circumference, or area of two-dimensional figures (including composite figures) or surface area or volume of three-dimensional figures (including composite figures) within mathematics or across disciplines or contexts.</p> <p>Uses units of measure appropriately and consistently when solving problems across content strands; makes conversions within or across systems and makes decisions concerning an appropriate degree of accuracy in problem situations involving measurement in other GSEs.</p> <p>Solves problems on and off the coordinate plane involving distance, midpoint, perpendicular and parallel lines, or slope.</p>
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<b>Knowledge/Skills</b>	<p>M:G&amp;M:10:2 Makes and defends conjectures, constructs geometric arguments, uses geometric properties, or uses theorems to solve problems involving angles, lines, polygons, circles, or right triangle ratios (sine, cosine, tangent) within mathematics or across disciplines or contexts (e.g., Pythagorean Theorem, Triangle Inequality Theorem).</p> <p>M:G&amp;M:10:4 Applies the concepts of congruency by solving problems on or off a coordinate plane involving reflections, translations, or rotations; or solves problems using congruency involving problems within mathematics or across disciplines or contexts.</p> <p>M:G&amp;M:10:5 Applies concepts of similarity by solving problems within mathematics or across disciplines or contexts.</p> <p>M:G&amp;M:10:6 Solves problems involving perimeter, circumference, or area of two-dimensional figures (including composite figures) or surface area or volume of three-dimensional figures (including composite figures) within mathematics or across disciplines or contexts.</p> <p>M:G&amp;M:10:7 Uses units of measure appropriately and consistently when solving problems across content strands; makes conversions within or across systems and makes decisions concerning an appropriate degree of accuracy in problem situations involving measurement in other GSEs.</p> <p>M:G&amp;M:10:9 Solves problems on and off the coordinate plane involving distance, midpoint, perpendicular and parallel lines, or slope.</p>
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<p><b>Process Skills</b></p>	<p>Students will understand that a variety of problem-solving strategies can be used to investigate everyday as well as increasingly complex mathematical situations.</p> <p>Students will understand that exploring, justifying, and synthesizing mathematical conjectures are part of systemic reasoning which is common to all content areas and a defining feature of mathematics.</p> <p>Students will understand that actively exploring, investigating, describing, and explaining mathematical ideas promotes communication which leads to a greater comprehension of mathematical concepts.</p> <p>Students will understand that mathematical connections will help them become aware of the usefulness of mathematics, serve to bridge the concrete and the abstract, and enable deeper understanding of important ideas.</p> <p>Students will understand that representing ideas and connecting the representations lies at the heart of understanding mathematics.</p>
<p><b>Performance Assessment</b></p>	<p>Student evidence will demonstrate mastery of concepts, broad themes, and individual proficiency standards. Student assessment is based on progress of individual mastery of set lesson objectives, research projects, and power point presentations and in depth student response journals and student portfolios.</p>