



## **Geometry**

The Oklahoma *CareerTech* Geometry standard is intended as a foundation for our teachers to use as guidance and a resource. It is written at a level that will benefit all students and mirrors the Oklahoma PASS Objectives (Priority Academic Student Skills). It emphasizes fundamental mathematical concepts and skills. Through this knowledge our students will be prepared for future math study, productive citizenship, work experiences, and life-long learning. Along with the content standards, *CareerTech* math courses demonstrate the National Council of Teachers of Mathematics (NCTM) Process Standards. Students are expected to problem solve, do reasoning and proofs, demonstrate mathematical communication, connect and link mathematical ideas to real-world and other disciplines, and use mathematical representations for modeling, interpreting, and communicating.

### **Course Description:**

This course will allow students the chance to relate mathematics to real-life situations and careers. It will build logical reasoning capabilities as well as give students an opportunity to justify conclusions in a structured manner. Students will analyze characteristics and properties of two- and three-dimensional geometric shapes. They will use visualization, spatial reasoning, and geometric modeling to solve problems. Throughout the course students connect the algebra skills previously developed to the geometric concepts. The *CareerTech* Pre-AP Geometry is a rigorous course that prepares students for higher-level mathematics and AP Geometry . It was developed by a group of mathematics instructors while correlating it with NCTM Standards (National Council of Teachers of Mathematics) and the Oklahoma PASS Objectives (Priority Academic Student Skills). The prerequisite for this course is Algebra I.

### **Requirements for College Admission Status (Title 70 O.S. § 11-103.6)**

These courses are to be taught by a highly qualified teacher with an Oklahoma Intermediate or Advanced Mathematics teaching certification. The students should be in the eleventh or twelfth grade or if a sophomore, they should be in a Focused Field of Career Study program. The course will have at a minimum, but may exceed, a duration of 120 hours within a school year.



## Geometry Syllabus

Objective	NCTM Standard	Oklahoma PASS Objective
I. Inductive and Deductive Reasoning		
A. Identify the relationships of parallel lines with a transversal	Data Analysis & Probability Number & Operations	1.1a Process Standards 1.1a, 1.1b, 2.1, 2.2, 2.3,3.1, 4.1, 4.2, 4.3, 4.4, 5.1, 5.2, 5.3
B. Identify relationships between adjacent, complementary, and vertical pairs of angles	Data Analysis & Probability Algebra Number & Operations	1.1b Process Standards 1.1a, 1.1b, 2.1, 2.2, 2.3,3.1, 4.1, 4.2, 4.3, 4.4, 5.1, 5.2, 5.3
C. Determine and use the relationships of congruency and similarity to determine unknown values	Data Analysis & Probability Algebra Number & Operations	1.2 Process Standards 1.1a, 1.1b, 2.1, 2.2, 2.3,3.1, 4.1, 4.2, 4.3, 4.4, 5.1, 5.2, 5.3
D. Use inductive and deductive reasoning to make and test conjectures, formulate counter examples, follow logical arguments, judge the validity of arguments and construct simple valid arguments	Data Analysis & Probability Geometry Algebra Number & Operations	1.3 Process Standards 1.1a, 1.1b, 2.1, 2.2, 2.3,3.1, 4.1, 4.2, 4.3, 4.4, 5.1, 5.2, 5.3
II. Properties of Two & Three Dimensional Figures		
A. Identify and describe the different types of polygons	Geometry	2.1a Process Standards 1.1a, 1.1b, 2.1, 2.2, 2.3,3.1, 4.1, 4.2, 4.3, 4.4, 5.1, 5.2, 5.3

B. Determine the measures of interior and exterior angles of convex polygons	Measurement Geometry Algebra	2.1b Process Standards 1.1a, 1.1b, 2.1, 2.2, 2.3,3.1, 3.2, 3.3, 3.4, 4.1, 4.2, 4.3, 4.4, 5.1, 5.2, 5.3
C. Investigate the characteristics of quadrilaterals	Geometry Algebra	2.1c Process Standards 1.1a, 1.1b, 2.1, 2.2, 2.3,3.1, 3.2, 3.3, 3.4, 4.1, 4.2, 4.3, 4.4, 5.1, 5.2, 5.3
D. Draw and analyze two and three dimensional figures	Measurement Geometry Algebra Number & Operations	2.2 Process Standards 1.1a, 1.1b, 2.1, 2.2, 2.3,3.1, 3.2, 3.3, 3.4, 4.1, 4.2, 4.3, 4.4, 5.1, 5.2, 5.3
E. Use knowledge of two and three dimensional figures along with problem-solving skills to determine unknown values	Measurement Geometry Algebra Number & Operations	2.3 Process Standards 1.1a, 1.1b, 2.1, 2.2, 2.3,3.1, 3.2, 3.3, 3.4, 4.1, 4.2, 4.3, 4.4, 5.1, 5.2, 5.3
F. Be able to correctly identify the appropriate unit of measure for problems involving two and three dimensional figures	Measurement Geometry Number & Operations	2.4 Process Standards 1.1a, 1.1b, 2.1, 2.2, 2.3,3.1, 3.2, 3.3, 3.4, 4.1, 4.2, 4.3, 4.4, 5.1, 5.2, 5.3
E. Demonstrate the correct use of geometric tools. (e.g., protractor, compass, straight edge)	Measurement Geometry	2.5 Process Standards 1.1a, 1.1b, 2.1, 2.2, 2.3,3.1, 3.2, 3.3, 3.4, 4.1, 4.2, 4.3, 4.4, 5.1, 5.2, 5.3
F. Find angle and arc measures related to circles	Measurement Geometry Algebra	2.6 Process Standards 1.1a, 1.1b, 2.1, 2.2, 2.3,3.1, 3.2, 3.3, 3.4, 4.1, 4.2, 4.3, 4.4, 5.1, 5.2, 5.3
G. Identify and	Geometry	2.7a

describe the relationship between two chords that intersect in the interior of a circle	Algebra	Process Standards 1.1a, 1.1b, 2.1, 2.2, 2.3,3.1, 3.2, 3.3, 3.4, 4.1, 4.2, 4.3, 4.4, 5.1, 5.2, 5.3
H. Identify and describe the relationship between two secants that intersect in the exterior of a circle	Geometry Algebra	2.7b Process Standards 1.1a, 1.1b, 2.1, 2.2, 2.3,3.1, 3.2, 3.3, 3.4, 4.1, 4.2, 4.3, 4.4, 5.1, 5.2, 5.3
I. Identify and describe the relationship between a secant and a tangent that intersect in the exterior of a circle	Geometry Algebra	2.7c Process Standards 1.1a, 1.1b, 2.1, 2.2, 2.3,3.1, 3.2, 3.3, 3.4, 4.1, 4.2, 4.3, 4.4, 5.1, 5.2, 5.3
III. Coordinate Geometry		
A. Find distances and midpoints between two points in the coordinate plane	Measurement Geometry Algebra Number & Operations	3.2 Process Standards 1.1a, 1.1b, 2.1, 2.2, 2.3,3.1, 3.2, 3.3, 3.4, 4.1, 4.2, 4.3, 4.4, 5.1, 5.2, 5.3
B. Investigate the properties of vectors in the coordinate plane	Measurement Geometry Algebra Number & Operations	3.2 Process Standards 1.1a, 1.1b, 2.1, 2.2, 2.3,3.1, 3.2, 3.3, 3.4, 4.1, 4.2, 4.3, 4.4, 5.1, 5.2, 5.3
C. Calculate the slopes of parallel, perpendicular, horizontal, and vertical lines	Data Analysis & Probability Measurement Geometry Algebra Number & Operations	3.2 Process Standards 1.1a, 1.1b, 2.1, 2.2, 2.3,3.1, 3.2, 3.3, 3.4, 4.1, 4.2, 4.3, 4.4, 5.1, 5.2, 5.3
D. Use reflection, rotation, translation within coordinate geometry	Geometry Algebra Number & Operations	3.1 Process Standards 1.1a, 1.1b, 2.1, 2.2, 2.3,3.1, 3.2, 3.3, 3.4, 4.1, 4.2, 4.3, 4.4, 5.1, 5.2, 5.3
E. Given a set of	Geometry	3.3

points determine the type of figure based on its properties	Algebra Number & Operations	Process Standards 1.1a, 1.1b, 2.1, 2.2, 2.3,3.1, 3.2, 3.3, 3.4, 4.1, 4.2, 4.3, 4.4, 5.1, 5.2, 5.3
VI Similar Triangles		
A. Solve problems using properties of angles (e.g., interior, exterior, complementary, vertical, angle sums, 30-60-90)	Data Analysis & Probability Measurement Geometry Algebra Number & Operations	4.1 Process Standards 1.1a, 1.1b, 2.1, 2.2, 2.3,3.1, 3.2, 3.3, 3.4, 4.1, 4.2, 4.3, 4.4, 5.1, 5.2, 5.3
B. Use the Pythagorean Theorem and its converse to find missing side lengths and to determine acute, right, and obtuse triangles	Geometry Algebra Number & Operations	4.2 Process Standards 1.1a, 1.1b, 2.1, 2.2, 2.3,3.1, 3.2, 3.3, 3.4, 4.1, 4.2, 4.3, 4.4, 5.1, 5.2, 5.3
C. Be able to identify and use special right triangle relationships to solve problems	Measurement Geometry Algebra Number & Operations	4.3 Process Standards 1.1a, 1.1b, 2.1, 2.2, 2.3,3.1, 3.2, 3.3, 3.4, 4.1, 4.2, 4.3, 4.4, 5.1, 5.2, 5.3
D. Express the trigonometric functions as ratios and derive the relationship between sine, cosine, and tangent ratios, and use to solve real-world problems	Data Analysis & Probability Measurement Geometry Algebra Number & Operations	4.4 Process Standards 1.1a, 1.1b, 2.1, 2.2, 2.3,3.1, 3.2, 3.3, 3.4, 4.1, 4.2, 4.3, 4.4, 5.1, 5.2, 5.3
E. Use similar figures to construct ratios and proportions to solve problems	Data Analysis & Probability Measurement Geometry Algebra Number & Operations	4.5a Process Standards 1.1a, 1.1b, 2.1, 2.2, 2.3,3.1, 3.2, 3.3, 3.4, 4.1, 4.2, 4.3, 4.4, 5.1, 5.2, 5.3
F. When using similar polygons use ratios of similar figures to find linear distance, perimeter, area, and	Measurement Geometry Algebra Number & Operations	4.5b Process Standards 1.1a, 1.1b, 2.1, 2.2, 2.3,3.1, 3.2, 3.3, 3.4, 4.1, 4.2, 4.3, 4.4, 5.1,

volume	5.2, 5.3
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## References and Resources

### Referenced Standards

*Principles and Standards for School Mathematics* (4<sup>th</sup> ed.). (2005).  
National Council of Teachers of Mathematics, Reston, VA

*Oklahoma Priority Academic Student Skills* (2003). Oklahoma State  
Department of Education-PASS-[www.sde.state.ok.us](http://www.sde.state.ok.us)

### Suggested Text and Supplemental Materials

Larson, Ron, Boswell, Laurie, Kanold, Timothy, & Stiff, Lee. (2006).  
*Geometry*. Boston: McDougal Littell.

Larson, Ron, Boswell, Laurie, Kanold, Timothy, & Stiff, Lee. (2006).  
*Geometry-Resource Manager*. Boston: McDougal Littell.

Larson, Ron, Boswell, Laurie, Kanold, Timothy, & Stiff, Lee. (2006).  
*Geometry-Best Practices Toolkit*, Boston: McDougal Littell.

Larson, Ron, Boswell, Laurie, Kanold, Timothy, & Stiff, Lee. (2006).  
*Geometry-Practice Workbook*, Boston: McDougal Littell.

Larson, Ron, Boswell, Laurie, Kanold, Timothy, & Stiff, Lee. (2006).  
*Geometry-eEdition DVD-ROM*, Boston: McDougal Littell.

Larson, Ron, Boswell, Laurie, Kanold, Timothy, & Stiff, Lee. (2006).  
*Geometry-Power Presentations: The Electronic Classroom CD-ROM*,  
Boston: McDougal Littell.

Larson, Ron, Boswell, Laurie, Kanold, Timothy, & Stiff, Lee. (2006).  
*Geometry-Test Generator CD-ROM*, Boston: McDougal Littell.

*Teaching Mathematics Using Technology*, (2006). Boston: McDougal  
Littell