

Geometry

CREDIT 1 **GRADE** 10-12 **PREREQUISITE** ALGEBRA I

This course is designed to explore the basic elements of geometry, formal proofs, and coordinate geometry. It also deals with the properties, measurement and relationships of points, lines, planes, and solids.

NOTE: This course is required for graduation.

State Standards for Geometry may be found here:

<https://www.tn.gov/education/article/mathematics-standards>

First Nine Weeks

- Know precise definition 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.
- Represent transformations in the plane; 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.
- Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.
- Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure. Specify a sequence of transformations that will carry the figure onto itself.
- 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.
- 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.
- Explain how the criteria for triangle congruence follow from the definition of congruence in terms of rigid motion.
- Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.
- Prove theorems about lines and angles.
- Prove theorems about triangles.
- Prove theorems about parallelograms.
- Make formal geometric constructions.
- Verify experimentally the properties of a dilation given by a center and scale factor.
- Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar.
- Use the properties of similarity transformations to establish the AA criterion for two triangles to be similar.
- Prove theorems about triangles.

***Common Formative Assessment #1**

***Common Formative Assessment #2**

Second Nine Weeks

- Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle leading to the definition of trigonometric ratios.
- Explain and use the relationship between the sine and cosine of complementary angles.
- Use trigonometric ratios and the Pythagorean theorem to solve right triangles in applied problems.
- Find the point on a directed line segment between two given points that partitions the segment into a given ratio.
- Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems.
- Use coordinates to prove simple geometric theorems algebraically.
- Use coordinates to compute perimeters of polygons and areas of triangles and rectangles.
- Identify shapes of two-dimensional cross-sections of three-dimensional objects, and identify three-dimensional objects generated by rotations of two-dimensional objects.
- Give an informal argument for the formulas for the circumference of a circle, area of a circle, and volume of a prism, cylinder, cone, pyramid, and sphere.
- Use geometric shapes, their measures, and their properties to describe objects.
- Apply concepts of density based on area and volume in modeling situations.
- Apply geometric methods to solve design problems.
- Prove that all circles are similar.
- Identify and describe relationships among inscribed angles, radii, and chords.
- Construct the inscribed and circumscribed circles of a triangle and prove properties of angles for a quadrilateral inscribed in a circle.
- Derive using similarity the fact that the length of an arc intercepted by an angle is proportional to the radius, and define the radian measure of the angle as the constant proportionality; derive the formula for the area of a sector.

***Common Formative Assessment #3**

***Common Formative Assessment #4**

For information regarding instructional objectives and materials, please contact the school principal.

* Common assessments are scheduled within the nine weeks. Each school may adjust the week and/or day of the week to meet the individual school's schedule.

*Common assessments may be rescheduled due to inclement weather.