

Phoenix Christian Sr High School

MTH200 Geometry

Course Scope & Sequence

COURSE DESCRIPTION

Geometry is a continuation of the study of mathematics with opportunities to apply skills developed in Algebra to real-life situations. Topics in logic and the formal proof will be presented. Completion of Algebra with a C or better is a prerequisite for this course.

REQUIRED TEXTS AND *KEY SUPPLEMENTAL MATERIALS

Geometry, Prentice Hall

NATIONAL COUNCIL OF TEACHERS OF MATHEMATICS (NCTM) STANDARDS:

NCTM Standards are referenced at the end of each quarter.

COURSE SCOPE AND SEQUENCE

First Quarter

Tools of Geometry 3 Weeks

Key Concepts: Using Patterns, Inductive Reasoning, Points, Lines, and Planes, Segments, Rays, Parallel Lines, Measuring Angles and Segments, Good Definitions, Basic Constructions, Using Deductive Reasoning, The Coordinate Plane.

Assessments: 2 Tests, Periodic Quizzes, Homework Assignments

Investigating Geometric Figures 3 Weeks

Key Concepts: Triangles, Polygons, Parallel and Perpendicular Lines in the Coordinate Plane, Classifying Quadrilaterals, Circles, Congruent and Similar Figures, Isometric and Orthographic Drawings.

Assessments: 2 Tests, Periodic Quizzes, Homework Assignments

Transformation: Shapes in Motion 3 Weeks

Key Concepts: Reflections, Translations, Rotations, Compositions of Reflections, Symmetry, Tessellations, Dilations.

Assessments: 2 Tests, Periodic Quizzes, Homework Assignments

NCTM Standards: Recognize reasoning and proof as fundamental aspects of mathematics; analyze properties and determine attributes of two- and three-dimensional objects; understand and represent translations, reflections, rotations, and dilations of objects in the plane; explore relationships (including congruence and similarity) among classes of two- and three-dimensional geometric objects, make and test conjectures about them, and solve problems involving them.

Biblical Integration: Galileo stated that “mathematics is the alphabet with which God wrote the universe.” Students will learn in this unit that mankind uses math to quantify God’s creation. By definition, geometry means to measure the earth. Students will recognize that God is a God of order. Lessons on tessellations will specifically be used to recognize patterns that exist both in math and in nature.

Second Quarter

Triangle Relations 3 Weeks

Key Concepts: Using Logical Reasoning, Isosceles Triangles, Preparing for Proof, Mid segments of Triangles, Using Indirect Reasoning, Bisectors and Locus, Concurrent Lines.

Assessments: 2 Tests, Periodic Quizzes, Homework Assignments

Measuring in the Plane 3 Weeks

Key Concepts: Understanding Perimeter and Area, Areas of Parallelograms and Triangles, The Pythagorean Theorem and its Converse, Special Right Triangles, Areas of Trapezoids, Areas of Regular Polygons, Circles: Circumference and Arc Length, Areas of Circles, Sectors, and Segments of Circles.

Assessments: 2 Tests, Periodic Quizzes, Homework Assignments

Measuring in Space 3 Weeks

Key Concepts: Space Figures and Nets, Surface Areas of Prisms and Cylinders, Surface Areas of Pyramids and Cones, Volumes of Prisms and Cylinders, Volumes of Pyramids and Cones, Surface Areas and Volumes of Spheres, Composite Space Figures, Geometric Probability.

Assessments: 2 Tests, Periodic Quizzes, Homework Assignment.

NCTM Standards: Establish the validity of geometric conjectures using deduction, prove theorems, and critique arguments made by others; draw and construct representations of two- and three-dimensional geometric objects using a variety of tools; understand and use formulas for the area, surface area, and volume of geometric figures, including cones, spheres, and cylinders.

Biblical Integration: The infinite nature of God will be discussed in this unit on measurement. Just as our numbering system extends without end so does the universe that God created. While measuring finite objects in the environment, allusions will be made to the measurement of entities that can only be comparatively measured in light years, atomic mass units, etc.

Third Quarter

Reasoning and Parallel Lines 3 Weeks

Key Concepts: Parallel Lines and Related Angles, Proving Lines Parallel, Constructing Parallel and Perpendicular Lines, Parallel Lines in Perspective Drawing.

Assessments: 2 Tests, Periodic Quizzes, Homework Assignments

Proving Triangles Congruent 3 Weeks

Key Concepts: Proving Triangles Congruent: SSS and SAS, Proving Triangles Congruent ASA and AAS, Congruent Right Triangles, Using Congruent Triangles in Proofs, Using More Than One Pair of Congruent Triangles.

Assessments: 2 Tests, Periodic Quizzes, Homework Assignments

Quadrilaterals 3 Weeks

Key Concepts: Properties of Parallelograms, Proving that a Quadrilateral is a Parallelogram, Properties of Special Parallelograms, Trapezoids and Kites, Organizing Coordinate Proofs, Using Coordinate Geometry in Proofs.

Assessments: 2 Tests, Periodic Quizzes, Homework Assignments

NCTM Standards: Establish the validity of geometric conjectures using deduction, prove theorems, and critique arguments made by others; explore relationships (including congruence and similarity) among classes of two- and three-dimensional geometric objects, make and test conjectures about them, and solve problems involving them; use geometric ideas to solve problems in, and gain insights into, other disciplines and other areas of interest such as art and architecture.

Biblical Integration: The constant, unchanging nature of God will be addressed in this unit on proving polygons to be congruent. Students will extrapolate the constant nature of math to the constant nature of God. The properties of quadrilaterals, for instance, are constant. Students will further recognize that the unchanging nature of the universe is what makes mathematics possible.

Fourth Quarter

Similarity 3 Weeks

Key Concepts: Ratio, Proportion, and Similarity, Direct Variation, Proving Triangles Similar: AA, SAS, and SSS, Similarity in Right Triangles, Proportions and Similar Triangles, Perimeters and Areas of Similar Figures, Similar Solids, Areas and Volumes of Similar Figures.

Assessments: 2 Tests, Periodic Quizzes, Homework Assignments

Right Triangle Trigonometry 3 Weeks

Key Concepts: The Tangent Ratio, Trigonometric Ratios, Sine and Cosine Ratios, Angles of Elevation and Depression, Literal Equations, Vectors and Trigonometry, Adding Vectors, Trigonometry and Area.

Assessments: 2 Tests, Periodic Quizzes, Homework Assignments

Chords, Secants, and Tangents 3 Weeks

Key Concepts: Circles in the Coordinate Plane, Polar Coordinates, Properties of Tangents, Properties of Chords and Arcs, Inscribed Angles, Angles Formed by Chords, Secants, and Tangents, Circles and Lengths of Segments.

Assessments: 2 Tests, Periodic Quizzes, Homework Assignments

NCTM Standards: Use trigonometric relationships to determine lengths and angle measures; use Cartesian coordinates and other coordinate systems, such as navigational, polar, or spherical systems, to analyze geometric situations; understand and represent translations, reflections, rotations, and dilations of objects in the plane by using sketches, coordinates, vectors, function notation, and matrices.

Biblical Integration: Being created in God's likeness means that we are similar to God – we have many of his attributes but we are not equal (congruent) to Him. The unit on similarity illustrates that polygons can have similar characteristics such as congruent angles and proportional sides yet be distinctively different from each other. Trigonometry allows us to indirectly measure things in God's creation that would be impossible to measure otherwise, such as the distance between the earth and the sun.