

Peddie Summer Day School

Course Syllabus: Geometry Honors

Textbook: *Geometry*, Jurgenson, McDougal Littell Publisher, 2000 edition
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Chapter 1: Points, Lines, Planes, and Angles

- Use the undefined terms: Points, Lines and Plane.
- Define Segments, Rays, angles and Distance. Use distance formula to classify triangles.
- Use postulates and theorems relating points, lines and planes.

Chapter 2: Deductive Reasoning

- Recognize the hypothesis and the conclusion of an if-then statement.
- State the converse, contrapositive and inverse of an “if and then” statement.
- Use a counterexample to disapprove an if-then statement.
- Construct Truth Tables using logics and connectives.
- Use Rules of Inference to write flow proofs.
- Use properties from Algebra and properties of congruence in flow proofs.
- Apply definition of complementary, supplementary angles, vertical angles congruent angles and midpoint.
- State and use the theorem about vertical angles, supplementary angles, complementary angles, congruent angles, midpoint and the angle bisector.
- Apply definition and theorems about Perpendicular lines.
- Plan proofs and then write them in flow proof form.

Chapter 3: Parallel Lines and Planes

- Distinguish between intersecting lines, parallel lines and skew lines.
- State and imply the theorem about the intersection of two parallel planes by a third plane.
- Identify the angles formed when two lines are cut by a transversal.
- State and apply the postulates and theorems about parallel lines.
- State and apply the theorems about a parallel and perpendicular to a given line through a point outside the line.
- Classify triangles according to sides and angles.
- State and apply the theorem and the corollaries about the sum of the measures of the angles of a triangle.
- Recognize and name convex polygons and regular polygons.
- Find the measures of interior and exterior angles of convex polygons.

Chapter 4: Congruent Triangles

- Identity by corresponding parts of congruent figures.
- Prove two triangles congruent by using the SSS postulate, the SAS postulate, and the ASA postulate.
- Deduce information about segments and angles aft proving that the two triangles are congruent.
- Apply the theorems and corollaries about isosceles triangles.

- Use the AAS theorem to prove two triangles congruent.
- Use the HL theorem to prove two right triangles congruent.
- Prove the two overlapping triangles are congruent.
- Prove two triangles congruent by first proving two other triangles congruent.
- Apply the definition of the median and the altitude of a triangle and the perpendicular bisector of a segment.
- State and apply the theorem about a point on the perpendicular bisector of a segment and the converse.
- State and apply the theorem about a point on the bisector of an angle and the converse.

Chapter 5

- Apply the definition of a parallelogram and the theorems and properties of a parallelogram.
- Prove that certain quadrilaterals are parallelogram.
- Apply theorems about parallel lines.
- Apply the midpoint theorems for the triangles.
- Apply the definitions and identify the special properties of a rectangle, a rhombus, and a square.
- Determine when a parallelogram is a rectangle, rhombus, or square.
- Apply the definitions and identify the properties of a trapezoid and an isosceles trapezoid.

Chapter 6: Inequalities in Triangle

- Write indirect proofs in flow proof form.
- Apply properties of a inequality to positive numbers, lengths of segments, and measure angles.
- State and use the exterior angle in equality theorem.
- State and apply inequality theorems and corollaries for one triangle.
- State and apply the inequality theorems for two triangles.

Chapter 7

- Express a ratio in simplest form.
- Solve for an unknown term in a given proportion.
- Express a given proportion in equivalent form.
- State and apply the properties of similar polygons.
- Apply AA similarity postulate.
- To prove triangle similar.
- Use similar triangle to deduce information about segments or angles.
- Use SAS similarity theorem and the SSS similarity theorem to prove triangles similar.
- Apply the triangle proportionality theorem and its corollary.
- State and apply the triangle angle bisector theorem.
- Recognize and define the characteristics of Fractals.

Chapter 8: Right Triangles

- Determine the geometric mean between two numbers.
- State and apply the relationships that exist when the altitude is drawn to the hypotenuse of a right triangle.
- State and apply the Pythagorean Theorem.
- State and apply the converse of the Pythagorean Theorem and related theorems about obtuse and acute triangle.
- Determine the lengths of two sides of a 45, 45, 90 or a 30, 60, 90 triangle when the length of the third side is known.
- Define tangent ratio for an acute angle.
- Solve right triangle problems by using the tangent ratio.
- Define the sine and cosine ratios for an acute angle.
- Solve right triangles problems by using the sine and cosine ratios.
- Solve right triangle problems by correct selection and use of the tangent, sine, and cosine ratios.

Chapter 9: The Circles

- Define a circle, a sphere, and terms related to them.
- Recognize inscribed polygons and circumscribed circles.
- Apply theorem that relate tangents and radii.
- Recognize circumscribed polygons and inscribed circles.
- Define and apply properties of arcs and central angles.
- Apply theorems about the chords of a circle.
- Solve problems and prove statements involving inscribed angles.
- Solve problems and prove statements involving angles formed by chords, secants and tangents.
- Solve problems and prove statements involving angles formed by chords, secants, and tangents.
- Solve problems involving lengths of chords, secant segments, and tangent segments.

Chapter 11: Areas of Plane Figures

- Understand the area postulate
- Know and use the formula for the area of a rectangle, parallelogram, triangle, rhombus trapezoid and regular polygons.
- Know and use the formulas for the circumferences and areas of the circles that are derived from the perimeter and area formulas for regular polygon.
- Know and use the formulas for arc lengths and areas of sectors of a circle.
- Find the ratio of the Areas of two triangles.
- Understand and apply the relationship between scale factors, perimeters and areas of similar figures.
- Use areas to solve problems involving geometric probability

Chapter 12: Areas and Volumes of Solids

- Identify the parts of prism
- Find the lateral areas, total areas, and volumes of right prisms.

- Identify parts of pyramids.
- Find lateral areas, total areas, and volumes of regular pyramids.
- Find the lateral areas, total areas, and volumes of right cylinders and right cones.
- Find the area and the volume of a sphere.
- State and apply properties of similar solids.

Chapter 13: Coordinate Geometry

- State and apply the distance formula.
- State and apply the general equation of a circle.
- State and apply the slope formula.
- Determine whether two lines are parallel, perpendicular or neither.
- State and apply midpoint formula.
- Write equation of a line.

Chapter 14: Transformations

- Recognize and use the terms image, preimage, mapping, one-to-one mapping, transformation, isometry, and congruence mapping.
- Recognize the properties of basic mappings.
- Locate images by reflection, translation, glide reflection, rotation, dilation and composites of mapping.