PETERS TOWNSHIP SCHOOL DISTRICT

CORE BODY OF KNOWLEDGE (CBK)

GEOMETRY ACADEMIC

GRADE 9-10

For each of the sections that follow, students may be required to understand, apply, analyze, evaluate or create the particular concepts being taught.

COURSE DESCRIPTION

This course is a study of language, concepts and techniques of geometry that will prepare students to critically analyze and logically solve problems. This course is the foundation for students' ability to recognize spatial relations and apply logical reasoning skills. Topics include parallel and perpendicular lines, triangle congruence and properties, polygons, similarity, trigonometry, circles and spatial reasoning. Many real world application questions are studied in each unit.

STUDY SKILLS

- Students will take notes during class discussions and maintain notes and assignments in an organized binder/notebook
- Students will complete assigned problem sets and readings in accordance with deadlines
- Students will work individually and in peer groups as a means to learn and develop problem solving skills relevant to the course and life
- Students will collect, analyze and reflect on data collected during group work to obtain a deeper understanding of content discussed in class and covered in problem sets

MAJOR UNIT THEMES:

1. FOUNDATIONS FOR GEOMETRY

- Identify and describe points, lines and planes
- Measure and construct segments
- Measure and construct angles
- Identify and apply angle relationships
- Use formulas in geometry
- Find midpoint and distance in the coordinate plane

2. GEOMETRIC REASONING

- Use inductive reasoning to make conjectures
- Identify and write conditional statements
- Use deductive reasoning to verify conjectures
- Identify and write biconditional statements and definitions

- Construct algebraic proofs

3. PARALLEL AND PERPENDICULAR LINES

- Identify and apply angle relationships formed by lines
- Identify and apply angles formed by parallel lines and transversals
- Prove lines parallel
- Identify and apply properties of perpendicular lines
- Differentiate between slopes of lines
- Graph parallel and perpendicular lines in the coordinate plane

4. TRIANGLE CONGRUENCE

- Classify triangles
- Identify and apply angle relationships in triangles
- Identify and apply properties of congruent triangles
- Use triangle congruence theorems: SSS and SAS
- Use triangle congruence theorems: ASA, AAS, and HL
- Identify and apply properties of isosceles and equilateral triangles

5. PROPERTIES AND ATTRIBUTES OF TRIANGLES

- Identify and apply properties of perpendicular and angle bisectors
- Identify and apply properties of bisectors of triangles
- Identify and apply properties of medians and altitudes of triangles
- Apply the triangle midsegment theorem
- Construct an indirect proof and identify inequalities in one triangle
- Identify inequalities in two triangles
- Apply the Pythagorean Theorem
- Apply Special Right Triangles

6. POLYGONS AND QUADRILATERALS

- Identify and apply properties and attributes of polygons
- Identify and apply properties of parallelograms
- Apply conditions for parallelograms
- Identify and apply properties of special parallelograms
- Apply conditions for special parallelograms
- Identify and apply properties of kites and trapezoids

7. SIMILARITY

- Define and set-up ratios and define and solve proportions
- Set-up and solve ratio in similar polygons
- Identify and apply triangle similarity theorems: AA, SSS, and SAS
- Apply properties of similar triangles
- Use proportional relationships

8. RIGHT TRIANGLES AND TRIGONOMETRY

- Identify and apply similarity in right triangles
- Identify and apply trigonometric ratios
- Solve for missing angles and side lengths in right triangles
- Identify and solve for angles of elevation and angles of depression

9. EXTENDING PERIMETER, CIRCUMFERENCE, AND AREA

- Develop formulas for triangles and quadrilaterals
- Develop formulas for circles and regular polygons
- Calculate perimeter and area of composite figures
- Calculate perimeter and area in the coordinate plane
- Investigate the effects of changing dimensions proportionally
- Solve problem situations involving geometric probability

10. SPATIAL REASONING

- Identify, construct, and represent three-dimensional figures
- Apply formulas in three dimensions
- Calculate the surface area of prisms and cylinders
- Calculate the surface area of pyramids and cones
- Calculate the volume of prisms and cylinders
- Calculate the volume of pyramids and cones
- Calculate the surface area and volume of spheres

11. CIRCLES

- Identify and apply properties of lines that intersect circles
- Define, identify, construct and calculate the measure of arcs and chords
- Apply formulas for sector area and arc length
- Define, identify, construct and calculate the measure of inscribed angles
- Identify and apply angle relationships in circles
- Identify and apply segment relationships in circles

12. EXTENDING TRANSFORMATIONAL GEOMETRY

- Perform transformations in the coordinate plane
- Identify and draw reflections, translations, rotations, and dilations
- Identify and draw compositions of transformations

MATERIALS (and Supplemental materials used in course):

- Geometry (Burger, Chard, Kennedy, Leinwand, Renfro, Roby, Seymour, Waits): Holt McDougal, Copyright 2011, Orlando, Florida, ISBN 978-0-030-99575-0

Revised September 2014