**2015-2016 Sophomore Geometry**

**Course Description**

In this course students will formalize their reasoning skills and solidify their understanding of what it means to prove a geometric statement mathematically. Students will study the properties of lines, angles and two- and three-dimensional figures including geometry within the coordinate plane. The students will continue their study of geometric transformations and geometric formulas. Students will also apply their developing skills to solve a more diverse set of real-world problems as outlined in the Common Core State Standards. Taking Geometry helps develop spatial reasoning ability, and, with it, the capacity to represent shapes and figures in powerful ways.

**Course Outline**

**Semester 1**

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| Chapter 1  Tools of Geometry | This topic introduces students to various topics in the study of geometry. Students will define basic geometric figures; use visual representations to show undefined terms such as point, line and plane; be introduced to postulates; measure segments with and without a coordinate grid; use the midpoint and distance formulas; and use protractors to measure angles. |
| Chapter 2  Reasoning and Proof | This topic introduces reasoning. Students will observe patterns leading to making conjectures; solve equations giving their reasons for each step and connect his to simple proofs; and prove geometric relationships using given information, definitions, properties, postulates and theorems. |
| Chapter 3  Parallel and Perpendicular Lines | This topic expands the students’ understandings and skills related to parallel and perpendicular lines. Students will use postulates and theorems to explore lines in a plane; use coordinate geometry to examine the lopes of parallel and perpendicular lines; use the Triangle-Angle Sum Theorem; and write equations using slope-intercept and point-slope forms. |
| Chapter 4  Congruent Triangles | This topic builds on the student’s understanding and skills related to angles and triangles. Students will visualize the triangles placed on top of each other; use tick marks and angle marks to label corresponding angles; use SSS, SAS, ASA postulates, and AAS and HL theorems; and use definitions to categorize triangles. |
| Chapter 5  Relationships Within Triangles | This topic expands on the skills learned in the previous chapter. Students will use the Distance Formula to examine relationships in triangles; examine inequalities in one triangle and two triangles; and begin with the negation of the statement to be proved and will show a counterexample. |
| Chapter 6  Polygons and Quadrilaterals | This topic explores the properties of quadrilaterals and use of the properties to prove special types of quadrilaterals. Students will derive the formula for the angle measures of a polygon using diagonals; use properties of parallel and perpendicular lines and diagonals to classify quadrilaterals; use coordinate geometry to classify special parallelograms; examine slope and segment length in the coordinate plane; and use the Distance Formula in the coordinate plane. |

**Semester 2**

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| Chapter 7  Similarity | This topic explores similarity. Students will form proportions based on known lengths of corresponding sides; and use AA, SAS, and SSS similarity postulate and theorems. |
| Chapter 8  Right Triangles and Trigonometry | This topic focuses on concepts related to right triangles, including trigonometry. Students will use the Pythagorean theorem; concepts 30-60-90 and 45-45-90 triangles; and examine the sine, cosine, and tangent ratios. |
| Chapter 9  Transformations | This topic focuses on transformations. Students will explore translations, reflections, rotations, and dilations; perform transformations on and off a coordinate plane; determine the new coordinates of a polygon after any given transformation; identify congruence transformations and prove congruence using isometries; and identify similarity transformations and verify properties of similarity. |
| Chapter 10  Area | This topic focuses on areas of circles and polygons. Students will use formulas to find areas of parallelograms, triangles, trapezoids, rhombuses and kites; explore area concepts related to regular polygons; use trigonometry to find areas; find circumferences and areas of circles; examine ratios among similar figures; and given a figure and its area, find the area of a figure similar to the original figure. |
| Chapter 11  Surface Area and Volume | This topic focuses on volumes of solid figures. Students will examine cross sections; use formulas to find volumes of prisms, cylinders, pyramids, cones and spheres; examine ratios among similar solids; and find the volume of a solid similar to a given figure. |
| Chapter 12  Circles | This topic focuses on concepts related to circles. Students will examine angles formed by lines that intersect inside and outside a circle; how arcs and angles are related; use of the properties of tangent lines; how chords, arcs and central angles are related; problem solve with angles formed by secants and tangents; and find the equation of a circle in a coordinate plane. |

**100% Weights/3,000 Points**

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| Tests | 35% | 1,050 Points |
| Midterm/Final | 5%/10% | 150 Points/300 Points |
| Classwork | 20% | 600 Points |
| Performance | 15% | 450 Points |
| Homework | 15% | 450 Points |