



New York Mills High School

Curriculum Document

Curriculum Area: Math

Course Name: Geometry I

Common Course Catalog Number: 248

Length of Course: Semester

Pre-Requisite: Non-Linear Algebra (9th Grade Algebra)

Grade Level: 10

Course Description: This course includes topics such as: measuring length and area, surface area and volume of solids, essentials of geometry, reasoning and proofs, parallel and perpendicular lines, and congruent triangles.

Essential Learner Outcomes

- The students will be able to measure length and area.
- The students will calculate the volume and surface area of 2-D and 3-D objects.
- The students will know basic geometric terms
- The students will know how to construct and assess the validity of a logical argument.
- The students will know how to write proofs of theorems and topics in Geometry.
- The students will know the properties and relationships of a set of parallel lines cut by a transversal and perpendiculars.
- The students will know the topics and properties of congruent triangles.

Units of Study:

- Students develop and use formulas for the area of triangles, parallelograms, trapezoids, and other polygons. They use ratios to find areas of similar polygons, and they use ratio of areas to find missing lengths in similar figures. Students explore circles, relating arc lengths and circumferences to areas of sectors, and they develop and use a formula for the area of a regular polygon. Finally, students use lengths of segments and areas of regions to calculate probabilities.

- Students identify and name solids, including Platonic solids, and use Euler's theorem to relate the number of faces, vertices, and edges of solids. Students describe cross sections of solids, find the surface areas and lateral areas of prisms and cylinders, and use nets to find surface area. They find the surface area and volume of prisms, cylinders, cones, pyramids, spheres, and composite solids. Finally, they use scale factors in similar solids to compare the ratios of the surface areas and the ratios of the volumes of the solids.
- Students will name and sketch geometric figures, use postulates to identify congruent segments, find lengths of segments in the coordinate plane, and find the midpoint of a segment. Students also will name, measure and classify angles, identify complementary and supplementary angles, and classify polygons. Finally, they will find circumference and area of circles, and area and perimeter of rectangles.
- Students will describe patterns, including visual and number patterns, and use inductive reasoning to make and test conjectures. They will analyze conditional statements and write the converse, inverse, and contrapositive of a conditional statement. They will explore how conditional and bi-conditional statements are used to state definitions. Students will use deductive reasoning, the Law of Detachment, and the Law of Syllogism to develop simple logical arguments. Students will learn what can and cannot be assumed from a diagram. Finally, they will use properties of equality and the laws of logic to prove basic theorems about congruence, supplementary angles, complementary angles, and vertical angles.
- Students will classify angle pairs formed by three intersecting lines, study angle pairs formed by a line that intersects two parallel lines, and use angle relationships to prove lines parallel. They will investigate slopes of lines and study the relationship between slopes of parallel and perpendicular lines. Students will find equations of lines. Finally, they will prove theorems about perpendicular lines and find the distance between parallel lines in the coordinate plane.
- Students will classify triangles, find measures of angles of triangles, identify congruent figures, and prove triangles congruent. They will also use theorems about isosceles and equilateral triangles and perform transformations.