



Curriculum Document for Mathematics

Course Title: geometry

Grade: 9-12

Learner Objective #1: Students will use correct vocabulary, logical reasoning skills, and appropriate technology and methods to solve problems.

- Identify the hypothesis and conclusion in logical statements.
- Rewrite a conditional statement in if-then form
- Create the converse of a conditional statement.
- Demonstrate that a conditional statement is false with the use of a counterexample
- Distinguish between postulates, theorems, definitions, and undefined terms.
- Make logical deductions using the laws of detachment and syllogism.
- Write proofs of theorems.
- Create and evaluate indirect arguments.
- Use inductive reasoning to generalize patterns.
- Compare inductive and deductive reasoning.
- Use the properties of the real number system in deductive proofs.
- Recognize the position of geometry in the historical development of mathematics.
- Use correct mathematical terminology and notation for communicating proofs and problem solutions.
- Prove geometry facts based upon the congruence and similarity relations.
- Explore the historical background of the Pythagorean Theorem.
- Solve logic puzzles.

Learner Objective #2: Students will effectively use numbers for, measuring, estimating, and problem solving.

- Solve geometry problems set in numerical contexts.
- Count ways to arrange members in a set.
- Choose appropriate computational procedures to solve problems.
- When problem solving, check for reasonableness of results.

- Simplify square roots.
- Use proportions to solve geometry problems.
- Use sine, cosine, and tangent ratios to solve for missing parts of right triangles.

Learner Objective #3: Students will use geometric concepts and relationships to interpret, represent, and solve problems.

- Sketch pictures of verbally described geometry problems.
- Be aware of examples of symmetry, sequences, and demonstrations of geometry truths in nature.
- Memorize definitions and properties of angles, triangles, parallel lines, quadrilaterals (parallelogram, rhombus, rectangle, square, trapezoid), circles, and regular polygons.
- Calculate area and perimeter of triangles, quadrilaterals, circles, and sectors.
- Calculate volume and surface area of cones, cylinders, prisms, pyramids, and spheres.
- Discover and prove the properties of congruence and similarity relations. Use these properties to solve problems.
- Organize facts about angles, triangles, quadrilaterals, solids, and circles into orderly, logical collections.
- Use the Pythagorean Theorem, 30-60-90 triangles, and 45-45-90 triangles to solve problems.

Learner Objective #4: Students will use appropriate tools to measure accurately. Students will use measurements in problem-solving situations.

- Use a ruler to measure length, accurate to the nearest tenth of a centimeter and the nearest 16^{th} of an inch.
- Use a protractor to measure angles, accurate to the nearest degree.
- Use a MIRA to bisect angles and segments, make perpendiculars, find the center of a circle, and inscribe and circumscribe circles about a triangle.
- Use proportional reasoning and knowledge of area and volume to convert and compare square inches to square feet, etc.
- Build models of regular polyhedra - Platonic and Archimedean

Learner Objective #5: Students will use data, statistics, and appropriate technology in problem-solving situations.

- Use probability to solve area problems.
- Use LOGO to draw quadrilaterals. Make generalizations about quadrilaterals based upon LOGO results.
- Use LOGO to review basic concepts of angles and parallel lines.

Learner Objective #6: Students will use algebraic techniques to define and solve problems.

- Use linear equations, systems of equations, and quadratic equations to solve geometry problems.
- Calculate segment length and midpoint location using the Cartesian coordinate system.