

MEDFORD HIGH SCHOOL COURSE SYLLABUS

Department:	Mathematics
Course Title:	MCAS Mathematics Mini Course 2-Period
Level and/or Grade:	Standard; Grades 9-12
Prerequisite:	Placement based on previous MCAS performance and/or student selection

Course Description:

Students will develop depth of understanding of prealgebra, algebra, and geometry concepts and procedures through communication, representation, reasoning, making connections, problem solving, and technology integration where appropriate. Topics include the study of properties of operations on real numbers; linear and non-linear (e.g. quadratic, exponential) functions; systems of linear equations and inequalities; patterns; polynomials; data analysis and probability; properties of geometric shapes; and measurement topics such as angle measures, area, perimeter, surface area and volume. The study of specific topics will also be based on students' prior performance on MCAS as specified in their Individual Student Success Plans that include detailed Item Analyses and/or performance on a pretest given at the start of the course.

Learning Standards: *Through communication, representation, reasoning, making connections, and problem solving, students will be able to...*

Number Sense and Operations:

- Use the properties of operations on real numbers; identify and compute within the real number system and the subsets of real numbers.
- Use estimation to judge reasonableness of results of computations and of solutions to problems.
- Simplify expressions and solve problems involving absolute value, square and cube roots, and exponents.
- Apply operations with powers, roots, and absolute value to the solution of problems; simplify radicals.

Patterns, Relations and Algebra:

- Describe, analyze, generalize, and create a variety of numeric and geometric patterns.
- Simplify and evaluate expressions; solve linear equations and inequalities; find the linear equation describing a line from a graph or geometric description (e.g. point-slope, slope y-intercept, parallel, perpendicular); apply formulas for a rectangular coordinate system (e.g. distance, midpoint, point-slope, slope-intercept); apply the results to the solution of problems.
- Recognize and describe functions translating among tables, graphs, rules, and words; use technology as appropriate.
- Model (with tiles and diagrams) and demonstrate facility in symbolic manipulation of polynomial and rational expressions to simplify expressions and solve equations.
- Find solutions to quadratic equations with real roots by factoring.
- Solve everyday problems that can be modeled using linear and non-linear functions.
- Solve everyday problems that can be modeled using systems of equations and inequalities.

Geometry:

- Recognize polygons; apply properties of sides, angles, and diagonals; detect symmetries.
- Use logical processes to test mathematical conjectures and write simple proofs.
- Apply congruence and similarity correspondences; draw congruent and similar figures using a compass, straightedge, protractor and/or technology.
- Apply properties of angles, parallel lines, arcs, radii, chords, tangents, and secants to solve problems.

- Use properties of special triangles to solve problems; apply Pythagorean Theorem, triangle inequality and other inequalities associated with triangles.
- Draw the results and interpret transformations on figures in the coordinate plane.
- Visualize solid figures and recognize their projections, cross sections, and 2-D nets.

Measurement:

- Calculate perimeter, circumference and area of plane figures.
- Given the formula, find the lateral area, surface area, and volume of prisms, pyramids, spheres, cylinders, and cones.
- Relate changes in measurement of attribute of an object to changes in other attributes.

Data Analysis, Statistics, and Probability:

- Select, create, and interpret an appropriate graphical representation for a set of data and use the appropriate statistics to communicate information, develop and evaluate inferences and make predictions that are based on data.
- Approximate the line of best fit; solve problems involving the line of best fit.
- Apply basic probability concepts.

Course Alignment with High School Expectations for Student Learning:

Students will...

1. Analyze, interpret, evaluate and use logical reasoning to solve problems using a variety of resources and strategies.
 - Build new mathematical knowledge through problem solving.
 - Adapt and apply a variety of appropriate strategies to solve problems; reflect on the process of mathematical problem solving.
 - Monitor and reflect on the process of mathematical problems solving.
 - Recognize reasoning and proof as fundamental aspects of mathematics.
 - Make and investigate mathematical conjectures.
 - Solve problems that arise in mathematics and other contexts; use connections among mathematical ideas.
2. Communicate effectively to a variety of audiences.
 - Communicate mathematical thinking coherently and clearly to peers, teachers, and others - orally and through written work.
 - Use the language of mathematics to express ideas precisely.
3. Create works using a variety of communication forms.
 - Present arguments through writing; solve problems through projects homework, tests, and quizzes; use technology; make oral presentations.
4. Develop skills and knowledge to reach personal and career goals.
 - Develop 'habits of mind': work beyond center of competence; gain attitude of persistence; seek feedback; develop confidence.
5. Work cooperatively to achieve objectives.
 - Work in pairs, small groups, and part of the whole class to solve problems.
 - Analyze and evaluate the mathematical thinking and strategies of others.

Assessment:

- Students enrolled in the 2-period MCAS mini course will receive letter grades.
- See teachers' grading policy.