MASCONOMET REGIONAL SCHOOL DISTRICT
CURRICULUM GUIDE

COURSE NAME:	**Geometry Lab**	**DEPARTMENT:**	**Mathematics**		
COURSE NUMBER:	1165	**GRADE LEVEL(S):**	7		
PHASE:	N/A	**YEAR:**		**TRIMESTER**	X (half)

I. Course Description:

This course will provide students with an opportunity to investigate the concepts and skills related to Geometry and Measurement as delineated in the revised Massachusetts Curriculum Frameworks in Mathematics (© 2011).

Students will analyze the relationship between the number of sides and the sums of interior and exterior angles in polygons. They will learn to classify figures in terms of congruency and similarity and apply these relationships to problem solving situations. They will use ratio/proportion to solve problems about similar figures as well as indirect measurement.

Students will learn about parallel lines, the Pythagorean Theorem, and transformations in both unmarked planes and the coordinate plane. By the end of the course, students will be able to identify and classify two- and three-dimensional figures by physical appearance and distinguishing attributes. Students will be able to select and apply the appropriate formula to find perimeter/circumference, area, surface area and volume.

II. Purpose:

Students are responsible for this content on the grade 7 and grade 8 MCAS tests. Because the core program in mathematics in the middle school is algebra, there is not enough time in that program to cover this content in sufficient detail.

Students should use this as they prepare for the MCAS mathematics tests in grades 7 and 8.

Students are also expected to keep this as a review tool in preparation of their study of geometry in high school mathematics program.

III. Curriculum Frameworks Standards for Mathematical Practice:

The primary goal of school mathematics programs is to assist students in becoming mathematically proficient. Mathematically proficient students are able to:

- Make sense of problems and persevere in solving them.
- Reason abstractly and quantitatively.
- Construct viable arguments and critique the reasoning of others.
- Model with mathematics.
- Use appropriate tools strategically.
- Attend to precision.
- Look for and make use of structure.
- Look for and express regularity in repeated reasoning.

IV. Curriculum Frameworks Standards for Mathematical Content:

Geometry:

Students will:

- Solve problems involving scale drawings of geometric figures such as computing actual lengths and areas from scale drawings.
- Reproduce a scale drawing at a different scale.
- Draw geometric shapes that satisfy given conditions.
- Construct triangles from three measures of angles or sides, noticing when these conditions determine a unique triangle, more than one triangle or no triangle.
- Describe the two dimensional figures that result from slicing three dimensional figures such as right rectangular prisms and right rectangular pyramids.
- Know the formulas for area and circumference of a circle and apply these formulas to solve real world and mathematical problems.
- Use facts about supplementary, complementary, vertical and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure.
- Solve real world and mathematical problems involving area, volume and surface area of two and three dimensional objects composed of triangles, quadrilaterals, polygons, cubes and right prisms.
- Solve real world and mathematical problems involving the surface area of spheres.
- Verify experimentally the properties of rotations, reflections and translations.
- Understand that a two dimensional figure is congruent to another if the second can be derived from the first by a sequence of rotations, reflections and translations.
- Given two congruent two dimensional figures, describe a sequence of rotations, reflections and translations that exhibits the congruence between them.
- Describe the effects of dilations, translations, rotations and reflections on two dimensional figures using coordinates.
- Understand that a two dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations and dilations.
- Given two similar figures two dimensional figures describe a sequence that exhibits the similarity between them.
- Use informal arguments to establish facts about the angle sum and exterior angles of triangles.
- Use informal arguments to establish facts about the angles created when parallel lines are cut by a transversal.
- Use informal arguments to establish facts about the angle – angle criterion for similarity of triangles.
- Explain a proof for the Pythagorean Theorem and its converse.
- Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real world and mathematical problems.

- Apply the Pythagorean Theorem to find the distance between two points in the coordinate plane.
- Know the formulas for the volume of cones, cylinders and spheres and use them to solve real world and mathematical problems.

V. Scope and Sequence:

Unit A:
Introduction to Geometry
Students will learn and be able to apply:

- Definitions and appropriate notation for: points, lines, planes, rays, segments and angles
- Identify the sides and vertex of an angle
- Name an angle
- Classify an angle as acute, right, obtuse or straight
- Identify angle pairs as vertical, adjacent, complementary or supplementary
- Definitions of angle pairs to find unknown angle measures
- The relationships between angle pairs formed when parallel lines are cut by a transversal to find unknown angle measures
- The parts of a polygon
- Classify a polygon by the number of sides it has
- The angle sum property of triangles to find unknown angle measures
- The relationship between a polygon's interior and corresponding exterior angle to find unknown measures.

Unit B:
Transformations
Students will be able to:

- Define a translation, reflection, rotation and dilation
- Predict results of a given translation, reflection, rotation or dilation in an unmarked plane
- Predict results of a given translation, reflection, rotation or dilation in a coordinate plane
- Draw the image of a given translation, reflection, rotation or dilation
- Describe the translation, reflection, rotation or dilation from a given pre-image and image

Unit C:
Congruence and Similarity
Students will be able to:

- Distinguish between congruent and similar polygons
- Recognize the notation for congruence and similarity
- Apply the definitions of congruence and similarity to determine if two polygons are congruent, similar or neither
- Use properties of congruent or similar polygons to find unknown measures
- Use a ruler to create a scale drawing
- Use a ruler to measure scale drawings and then find the actual measurement
- Use given scales to determine unknown measures

Unit D:
Measures for Two-Dimensional Figures
Students will be able to:

- Identify the parts of a right triangle
- Use the Pythagorean Theorem to find the length of an unknown side in a right triangle
- Identify the parts of a circle
- Find the circumference or area of a circle given its radius or diameter
- Find the radius of a circle given its circumference or area
- Use the appropriate formula to find the area of triangles, parallelograms and trapezoids

Unit E:
Three-Dimensional Objects
Students will be able to:

- Identify the parts of three dimensional figures
- Calculate surface area for rectangular prisms, spheres and cylinders
- Calculate the volume for rectangular prisms, spheres and cylinders

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