Mathematics
Unit 3: Geometry and Measurement

Essential Understandings	Basic properties about lines, angles, and two- and three-dimensional figures can be used to solve a variety of theoretical and practical problems.
Essential Questions	- How can cubes, prisms, and square-based or triangular-based pyramids be represented in two-dimensions? - How are solids classified? - How does one sketch three-dimensional figures and capture the important characteristics? - How are triangles and quadrilaterals classified? - How are angles named and classified? - What is a straight angle? - How is the perimeter of triangles, quadrilaterals, and circles determined? - How is the area of triangles, quadrilaterals, and circles determined? - How does one find the volume and surface area of right prisms with triangular or quadrilateral bases? - How can transformations be used to identify congruent plane figures? - How can a distance be found without directly measuring? - How can one draw a picture of a real object that is proportionally smaller or larger than the real object? - How are metric measurements converted within the metric system? - How are measurements converted within the customary system? - How does one convert measures of time? - How does one choose the correct unit for measurement? - How does one estimate before making measurements or conversions? - How does one accurately measure with a ruler? - How does one apply conversion skills to solving word problems?

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Essential Knowledge	- Cubes, prisms, and square-based and triangular-based pyramids can be represented using two-dimensional nets. - Solids are classified based on the number of faces, edges, and vertices, and the shape of the bases. - Three dimensional figures can be sketched to show the number of faces, edges, and vertices. - Triangles and quadrilaterals are classified according to their angles and sides. - Angle measurements are determined through the use of a protractor. - Angles are classified according to their measures and named (labeled) with vertices and other points on the angle sides. - Straight angles have a measure of 180 degrees. - The perimeter of quadrilaterals and triangles is found by adding all of the sides of a single polygon, while finding the perimeter (circumference) of a circle requires a formula. - The area of triangles, quadrilaterals, and circles is measured in square units and is found using formulas. - The volume of right prisms with triangular or quadrilateral bases is found using a formula with three dimensions. - The surface area of a right prism with quadrilateral bases is the sum of the areas of all the faces. - Transformations can be used to identify congruent plane figures. - Distances can be found using proportions which do not require direct measurements. - Proportions can be used in making accurate scale drawings. - Within the metric system measures can be converted to smaller and larger units using division and multiplication by powers of ten. - Within the customary system measures can be converted to smaller and larger units using whole numbers and fractions. - Measures of time can be converted to larger or smaller units using multiplication and division. - Use a ruler to measure lengths in the customary (to 8ths) and metric (to 10ths) systems. - Solve word problems requiring conversions within measurement systems. - Use compatible numbers to estimate the measure before directly measuring and before making any conversions.

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Vocabulary	- Terms: - similar figures, corresponding angles and sides, congruent figures, scale factor, scale drawing, indirect measurement, proportion, metric prefixes (kilo, hecto, deka, deci, centi, milli), straight angle, line symmetry, translation, transformation, adjacent angles, complements, supplements, tessellation, skew lines, plane, center of a circle, radius, diameter, circumference, arc, chord, semi-circle, Pi, polyhedron, cone
Essential Skills	- Represent cubes, prisms, and square-based **or** triangular based pyramids using nets. (I, R, A) - Recognize and classify solids (cubes, prisms, pyramids, cylinders, spheres, cones) presented in picture views. (R, A) - Sketch and build three dimensional figures. (R, A) - Use properties of angles or sides with concepts of congruency, parallels, and perpendiculars to sort and identify different types of triangles and quadrilaterals. (I, R, A) - Measure with a protractor, and classify, and name angles. (R, A) - Identify straight angles. (I, R, A) - Find the perimeter and area of quadrilaterals, triangles, and circles. (I, R, A) - Use formulas to find the volume (R, A) and surface areas (I) of right prisms with triangular or quadrilateral bases. - Use translations, reflections and rotations to identify congruent plane figures. - Use proportional relationships to make indirect linear measurements (I) and use scale drawings to make linear measurements (I, R). - Convert measures of capacity, length, mass, and temperature using decimal values of kilo, hecto, deka, deci, centi, and milli within the metric system. (I, R, A) - Convert measures of capacity, length, weight, and temperature using whole numbers and fractions within the customary system. - Convert measures of time. (I, R, A) - Make direct linear measurements using both systems (to 8ths in customary system and 10th in metric system). (I, R, A) - Solve problems where different units are used requiring conversions within one system (in metric and in customary). (I, R, A) - Use estimates to determine appropriate units of measure in each system (I, R, A)

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Related Maine Learning Results	C. Geometry 　C1.Students represent solid figures in two dimensions. 　　　a.　Represent cubes, prisms, and square-based or triangular-based pyramids using nets. 　　　b.　Recognize and classify solids presented in picture views. 　　　c.　Sketch three-dimensional figures. 　C2. Students find the perimeters and areas of geometric figures. 　　　a.　Triangles 　　　b.　Quadrilaterals 　　　c.　Circles 　C3.Students find the volume and surface areas of right prisms with bases that are right triangles and quadrilaterals. 　Transformations 　C4. Students understand and use reflections, rotations, and translations to define and identify congruent plane figures. 　　　a.　Apply the understanding that if a plane figure can be laid on top of another plane figure by rotations, translations, or reflections, then the figures are congruent. 　C5.Students understand how to use proportional relationships to make indirect linear measurements and use scale drawings to make linear measurements. B. Data 　Measurement and Approximation 　B1.Students convert within measurement systems. 　　　Solve problems where different units are used within the metric and traditional systems of measurement.
NECAP	NECAP 　Geometry and Measurement 　M (G & M) 6-2 　M (G & M) 6-3 　　　Use properties of angles or sides to identify…different types of triangles or quadrilaterals. 　M (G & M) 6-5 　　　...understanding of similarity by describing the proportional effect on the linear dimensions of polygons…while preserving the angles of polygons.