Anoka-Hennepin Secondary Curriculum Unit Plan

Department:	Mathematics	Course:	Geometry (Honors)	Unit 7 Title:	Area (2D)	Grade Level(s):	8, 9, 10
Assessed Trimester:	Trimester B	Pacing:	High School: 9 - 12 Middle School: 9 - 14	Date Created:	05/22/2014	Last Revision Date:	08/20/2014

Course Understandings: *Students will understand that:*

A. Some problems require proportional thinking in order to be solved.
D. Transformations are performed to affect the figure.
E. Known geometric measurements are used to derive formulas of two- and three- dimensional figures in order to be used in real world situations.
F. Properties of two- and three-dimensional figures can be used in classification and problem solving.
G. Visualization, spatial reasoning and geometric modeling can be used to solve geometric problems.
H. Algebraic models can be used to solve geometric problems.

DESIRED RESULTS (Stage 1) - WHAT WE WANT STUDENT TO KNOW AND BE ABLE TO DO?

Established Goals

Minnesota State/Local/Technology Standard(s) addressed (2007):

- **Standard (9.3.1.#):** Calculate measurements of plane and solid geometric figures; know that physical measurements depend on the choice of a unit and that they are approximations.
  Benchmark:
  9.3.1.1 Determine the surface area and volume of pyramids, cones and spheres. Use measuring devices or formulas as appropriate.
  9.3.1.3 Understand that quantities associated with physical measurements must be assigned units; apply such units correctly in expressions, equations and problem solutions that involve measurements; and convert between measurement systems.
  9.3.1.4 Understand and apply the fact that the effect of a scale factor k on length, area and volume is to multiply each by k, k2and *k3,* respectively.

Transfer

Students will be able to independently use their learning to: (product, high order reasoning)

-

Meaning

Unit Understanding(s):	Essential Question(s):
Students will understand that: • they can determine the surface area and volume of pyramids with a variety of bases, including both right and oblique. Computations should be made using both physical models with measurement tools and diagrams or descriptions with appropriate formulas. • they can determine the surface area and volume of cones, including both right and oblique. Computations should be made using both physical models with measurement tools and diagrams or descriptions with appropriate formulas. • they can relate the slant height, height and radius of a cone using the Pythagorean Theorem. • they can determine the surface area and volume of spheres and hemispheres. Computations should be made using both physical models with measurement tools and diagrams or descriptions with	**Students will keep considering:** •

appropriate formulas. ● they can compose individual 3-dimensional shapes into compound shapes to model real objects. ● compound figures can be decomposed into single figures by breaking them apart along appropriate faces. Use appropriate formulas to calculate their perimeters, areas, surface areas and volumes of the needed portions of the single figures. ● correct units must be used when expressing solutions to length, area and volume problems. ● conversion between measurement systems might be necessary to generate solutions to length, area and volume problems between . ● solutions can be estimated for length, area and volume problems. ● methods to calculate lengths, areas and volumes of similar figures exist ● scale factors exist and should be able to identify them. ● they [students] should be able to square ratios (take them to the second power) and cube ratios (take them to the third power). ● they [students] should be able to take the square root of ratios and the cube root of ratios. ● there is a need to recognize which scale ratio is needed to solve the given problem (length, area, or volume).	

Acquisition

Knowledge - Students will:	**Reasoning - Students will:**

● Know the properties of each polygon by number of sides, diagonals, and angles
● Recognize regular polygons
● Understand the difference between convex and concave polygons
● Identify the quadrilateral types (prior knowledge) and their area formulas:
  ○ Rectangle
  ○ Square
  ○ Rhombus
  ○ Trapezoid
  ○ Kite
● Know formulas related to circles:
  ○ Arc length
● Understand that qualities associated with physical measurements must be assigned units
● Understand basic conversion facts
● Understand that the choices made regarding units and/or forms of the number (fractions, decimals, radicals) regarding dimensions/ measurement affect the accuracy of the final calculation
● Understand effect of scale factor on length, perimeter, area and volume
	● Classify polygons as equilateral, equiangular or regular
	● Distinguish the effects of scale factor on perimeter and area
	
	Skills - Students will:
	● Calculate the sum of interior and exterior angles of polygons
	● Find the measure of one interior and one exterior angle of a regular polygon
	● Find the number of sides of the polygon given the sum of its interior angles

Common Misunderstandings	**Essential new vocabulary**
● Students believe that the volumes of pyramids and cones are one-half the volumes of their associated prisms and cylinders. ● Students include areas of faces where composed figures adjoin when computing surface area. ● Students get confused about which type of units should be used to label their solutions.	● area ● concave ● cone ● convex

• Students invert conversion fractions when changing units. • Students believe all dimensions have the same similarity ratio. • Students confuse squaring ratios and using the square root of ratios when converting between linear and area ratios. • Students confuse cubing ratios and using the cube root of ratios when converting between linear and volume and ratios.	• perimeter • polygon • pyramid • regular • regular polygon • scale factor • sector • sphere