Anoka-Hennepin Secondary Curriculum Unit Plan

Department:	Mathematics	Course:	Geometry (Honors)	Unit 4 Title:	Quadrilaterals	Grade Level(s):	8, 9, 10
Assessed Trimester:	Trimester A	Pacing:	High School: 8 - 10 Middle School: 11 - 13	Date Created:	05/22/2014	Last Revision Date:	08/20/2014

Course Understandings: *Students will understand that:*

B. Coordinate geometry can be used in order to demonstrate spatial relationships.
C. Reasoning skills are required to construct a logical argument.
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 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 (9.3.3.#):** Know and apply properties of geometric figures to solve real-world and mathematical problems and to logically justify results in geometry.
  Benchmark:
  9.3.3.7 Use properties of polygons—including quadrilaterals and regular polygons—to define them, classify them, solve problems and logically justify results.

- **Standard (9.3.4.#):** Solve mathematical geometric problems using algebraic methods.
  Benchmark:
  9.3.4.4 Use coordinate geometry to represent and analyze line segments and polygons, including lengths, midpoints and slopes of line segments.

Transfer

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

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Meaning

Unit Understanding(s):

Students will understand that:

- quadrilaterals can be classified into a "hierarchy."
- not all quadrilaterals fit into one of the categories of "special" quadrilaterals.
- the slope of a line or segment can be determined using various strategies.
- the distance between two points on a coordinate plane can be determined using various strategies.
- the midpoint of a segment, given the coordinates of the endpoints can be determined using various strategies.
- given the equation of a circle, the center and radius of the circle can be determined.
- given the center and radius (or diameter) of a circle, the equation of the circle can be determined.

Essential Question(s):

Students will keep considering:

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Acquisition

Knowledge - Students will:

- Recognize interior and exterior angles
- Know the following formulas and how they relate to quadrilaterals:
  - Slope
  - Midpoint Formula
  - Distance Formula

Reasoning - Students will:

- Distinguish between different quadrilaterals based upon given characteristics
- Distinguish the difference between the slopes of parallel and perpendicular line segments
- Classify a quadrilateral given slopes and/or side lengths and justify reasoning

Skills - Students will:

- Use characteristics of the polygon to find missing measurements, angles and values
- Use slope, midpoint and distance formula to classify a quadrilateral
- Use the distance formula to find lengths of segments

Common Misunderstandings

- Students sometimes have a hard time with the "nesting" feature of quadrilaterals, i.e., a square is nested inside parallelograms, which is nested inside quadrilaterals, which is nested inside polygons, etc.
- Students sometimes interchange properties where they shouldn't. *For example,* a parallelogram has diagonals that bisect each other, and some students will extend that to other types of quadrilaterals.
- Students sometimes confuse clockwise rotations with counterclockwise rotations.
- Students sometimes confuse a rotation of positive degree measure, which rotates a figure counterclockwise, with a rotation of negative degree measure, which rotates a figure clockwise.
- Students often mistake the formula for slope with the formula for midpoint and/or the Distance Formula.

Essential new vocabulary

- isosceles trapezoid
- kite
- midpoint
- rhombus
- trapezoid