Anoka-Hennepin Secondary Curriculum Unit Plan

Department:	Mathematics	Course:	Intermediate PreAlgebra	Unit 7 Title:	Geometric and Proportional Reasoning	Grade Level(s):	7
Assessed Trimester:	Trimester 3	Pacing:	9-13 Days	Date Created:	5/31/2014	Last Revision Date:	6/17/2014

Course Understandings: *Students will understand that:*

A. There are multiple strategies and representations that can be used to solve real world problems involving rational numbers.

C. Proportional reasoning and percents can be used to solve real world problems.

- D. The characteristics of geometric figures are used in the real world.
- G. There are appropriate uses for various technologies and that limitations may exist with them.

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

Estab	Established Goals			
Minnesota State/Local/Technology Standard(s) addressed (2007):				
 Standard (7.3.2.#): Analyze the effect of change of scale, translations and reflections on the attribute Benchmark: 7.3.2.1 Describe the properties of similarity, compare geometric figures for similarity, and det 7.3.2.2 Apply scale factors, length ratios and area ratios to determine side lengths and areas 7.3.2.3 Use proportions and ratios to solve problems involving scale drawings and conversion 7.3.2.4 Graph and describe translations and reflections of figures on a coordinate grid and determine 	s of two-dimensional figures. ermine scale factors. of similar geometric figures. s of measurements of units. termine the coordinates of the vertices of the figure after the t			
т	ransfer			
 Students will be able to independently use their learning to: (product, high order reasoning) Apply properties of proportional reasoning to two and three dimensional real world situations. 				
N	Meaning			
Unit Understanding(s): Students will understand that: Side lengths of similar figures are proportional. Indirect measurement is used to measure things that are not easily measurable. Unit measurements are proportionally related (inches, feet, yards, etc.). Scale factors, length ratios, and area ratios are used to determine side lengths and areas of similar geometric figures. Proportions and ratios can be used to solve problems involving scale drawings and conversions of measurement units. The translation and reflection of similar figures can be represented on the coordinate plane.	Essential Qu Students will keep considering: • How do geometric models describe spatial relatio • How does what I measure influence how we measure • What does a picture look like when enlarged or reace • What strategies can I use to determine missing side • How can setting up a proportion help you determine • How do scale drawings and models relate to rates • What are the similarities and differences between • How can coordinate planes help me understand pro- • quisition			
 Knowledge - Students will: Understand how to use the coordinate plane/grid 	 Skills - Students will: Apply length ratios and area ratios to determine matrix 			

transformation.

uestion(s):

onships? ure? educed proportionally? de lengths and areas of similar figures? ne if figures are similar? and ratios? an image and its pre-image?

roperties of reflection and translations?

• Apply length ratios and area ratios to determine missing side lengths.

Common Misunderstandings	Escontial now vocabulary
 Explain scale factors, length allos and area factos Explain why proportions and ratios are needed to solve real-world problems with scale drawings and metric conversions. Compare, contrast, and distinguish the transformations Predict what the transformed image will look like. 	
 Explain how to set up a proportion given real-world context. Identify the unknown and the relationship between it and the given information. Explain peaks factors, length ratios, and area ratios. 	
 Explain and describe reliections and translations Estimate a reasonable answer and/or evaluate reasonableness of results. Determine when real-world data can be represented by a proportion. 	
Reasoning - Students will:	
 Identify reflections and translations using a coordinate grid 	translate from one representation to another.
 Understand how to read a coordinate grid, including origin 	 Represent proportional relationships with tables, v
 Onderstand now to convert between measurement units Know standard conversion rates (12 inches = 1 foot 4 quarts = 1 gallon) 	 Demonstrate/model reflections and translations
Know how to set up a proportion, scale factor or ratio	Use ratios and proportions to solve problems with
 Identify shapes as congruent, similar or not related 	Set up and solve proportions
 Understand/recognize proportional situations. 	 Solve multi-step problems involving proportional re
 Identify corresponding parts 	 Use proportional reasoning to solve real-world pro
Inderstand and describe two dimensional figures	

Common Misunderstandings

• Students sometimes set up proportions incorrectly. When setting up a proportion that uses corresponding sides of two similar figures, suggest that students point to the corresponding sides as they include them in a proportion.

- Students confuse congruence with similarity.
- \cong and Students sometimes confuse the different kinds of notation used with similarity, such as and • \sim .
- A common misconception is that when the dimensions of an object are doubled, the area is doubled, too.
- Students may confuse additive thinking vs. multiplicative thinking. For example, suppose there were two similar rectangles with a pair of corresponding side lengths of 4 and 7 cm. The smaller similar rectangle has a width of 3 cm. A student may think the other corresponding side should have a length of 6 cm, because the first set of corresponding side lengths changed by 3 cm, so they might think that the other should also change by adding 3 cm.
- Students may confuse specific math vocabulary (reflection, rotation, translation) with the more casual math vocabulary for these terms (flip, turn, slide) that they learned in elementary grades.
- Students may identify the incorrect line of symmetry (x-axis vs. y-axis) when reflecting.
- When labeling transformed images, students sometimes mistakenly apply the wrong label. Either they use the wrong letter, forget the prime notation (e.g., $A \rightarrow A$ instead of $A \rightarrow A'$), or do the wrong number of primes if there is more than one transformation on the graph (ex. $A \rightarrow A'$ instead of $A \rightarrow A''$).
- In translations, students can sometimes count to their points incorrectly or switch the order of the coordinates when writing the point down.
- Students often forget to verify that their answer makes sense in the original context of the problem.

Essential new vocabulary

- Conversion
- Corresponding
- Notation: $(x,y) \rightarrow (x+3, y-2)$
- Notation: J, J'

• Notation:
$$\stackrel{\simeq}{=}$$
 and \sim

- Similar
- Scale Factor

reas.

blems elationships in numerous context

scale drawings/models. surement units

verbal descriptions, symbols, graphs and equations;