

Lesson Design

Subject Area: Mathematics	Grade Level: 7-10th	
Benchmark Period DWA # 1	Duration of Lesson: 45-50 Minutes	
Standard: M & G 1.2- Choose appropriate units of measure and use ratios to convert within and between measurement systems to solve problems: Construct and read drawings and models made to scale		
Big Ideas involved in the lesson: Using proportions to solve real life problems such as using the scale factor of a scale drawing to convert to actual measurement.		
As a result of this lesson students will: Know: How to measure and convert measurements using a scale factor. Understand: That a scale drawing is a miniature representation of an actual object. Be Able To Do: Measure items in a scale drawing and convert those measurements using a scale factor.		
Assessments: What will be evidence of student knowledge, understanding & ability?	Formative: CFU Summative: Independent Practice Completion of "Go/No Go" chart	CFU: 1. What is the scale drawing scale factor? 2. What does "x" represent in the proportion? 3. How do you solve the proportion for "x"?
Lesson Plan		
Anticipatory Set: a. T. focuses students b. T. states objectives c. T. establishes purpose of the lesson d. T. activates prior knowledge	Scale Drawing and Conversion Powerpoint Student convert measurements of scale drawing to actual measurements and make comparisons. Teacher reminds students of concepts covered in the previous days' lesson (proportion) and building model plane.	
Instruction: a. Provide information <ul style="list-style-type: none"> ▪ Explain concepts ▪ State definitions ▪ Provide exs. ▪ Model b. Check for Understanding <ul style="list-style-type: none"> ▪ Pose key questions ▪ Ask students to explain concepts, definitions, attributes in their own words ▪ Have students discriminate between examples and non-examples 	Teacher explains concepts of scale drawings and scale factor. Voca: Scale Drawing, Scale Factor, Proportion, Cross Product, Variance. See Attached Teacher converts scale measurement to actual measurement Rudder #1 1. What is the scale drawing scale factor? 2. What does "x" represent in the proportion? 3. How do you solve the proportion for "x"?	

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<ul style="list-style-type: none"> ▪ Encourage students generate their own examples ▪ Use participation 	
<p>Guided Practice:</p> <ol style="list-style-type: none"> a. Initiate practice activities under direct teacher supervision – T. works problem step-by-step along w/students at the same time b. Elicit overt responses from students that demonstrate behavior in objectives c. T. slowly releases student to do more work on their own (semi-independent) d. Check for understanding that students were <i>correct at each step</i> e. Provide specific knowledge of results f. Provide close monitoring 	<p>Students and teacher complete measurements scale drawing measurements and conversions for Rudder # 2 and # 3 together. Teacher checks and confirms accuracy at each step of the process. Students asked to describe steps of the conversion process. Students complete the remaining scale drawing measurements in their groups with constant monitoring and CFU by teacher.</p>
<p>What opportunities will students have to read, write, listen & speak about mathematics?</p>	<p>Read: Students will read scale drawing, worksheet and written questions. Write: Students will answer questions and write measurements. Students will do a “quick write” and summary of activity. Listen: Students will listen to teacher instructions, definitions and process. Speak: Students will answer CFU questions.</p>
<p>Closure:</p> <ol style="list-style-type: none"> a. Students prove that they know how to do the work b. T. verifies that students can describe the what and why of the work c. Have each student perform behavior 	<p>Students will confirm that their scale drawing measurements are correct, in writing and verbally.</p>
<p>Independent Practice:</p> <ol style="list-style-type: none"> a. Have students continue to practice on their own b. Students do work by themselves with 80% accuracy c. Provide effective, timely feedback 	<p>Students will measure scale drawing items. Students will convert scale drawing measurements to actual measurements. Students will measure a model plane and determine if the actual measurements fall within the acceptable parameters of + or - .5cm. Students will complete worksheet and “Go/No Go” chart.</p>
<p>Resources: materials needed to complete the lesson</p>	<p>Model Planes, Rulers, Scale Drawings, Worksheets, Measurement Chart, “Go/No Go” Chart, Marker</p>

Scale Drawing Lesson Plan Vocabulary

Scale Drawing - A two-dimensional drawing that accurately represents an object.


Scale Factor – The ratio of a length on a scale drawing or model to the corresponding length on the actual object.









Proportion - An equation that states that two ratios are equivalent.


Cross Product – The products of numbers on the diagonal when comparing two ratios.

Variance - A difference between what is expected and what actually occurs.

Scale Drawings, Ratios, and Linear Measurement - Instructions

 Color me in when you have finished the step.

-  1. Measure each side of the scale drawing. Write this value on the scale drawing AND write the value in the data chart. (Be sure to match the number in the triangle from the scale drawing with the column number on the data sheet.)
-  2. What is the scale factor? _____ How would you calculate the actual size of the model?
-  3. Calculate each of the dimensions of the model that you expect to see according to the scale drawing. Enter these measures on the chart above (row 2).
-  4. Choose one of the planes and write the letter (shown on the wings) and weigh your plane on the gram scale. Write this information on the data sheet. Now measure the plane's dimensions, and write these on the data chart. Make sure you match the Model Letter and the triangle number to each of your data entries.
-  5. Compare your plane's measurements with those on the Row 2 (Model). Circle each dimension of your plane that matches the Model's dimensions. You can have a variance of ± 0.5 cm.
-  6. Determine which of the planes would be acceptable to the engineering department based upon the original design's dimensions. Does your plane match the Model?
If it matches, write "GO" in the last column of your data chart.
If it does NOT match, write "NO GO" in the last column of your data chart.
-  7. Record your results on the chart posted on the chalkboard. If your plane is a "NO GO," specify what part of the plane is not matching the dimensions, *tail, rudder, or wings*.
-  8. TEST FLIGHT
Using 50 turns of the propeller, fly your plane in an open field. All groups will start at the same location. Another member of your group will stand at the location where the plane lands. Which plane(s) appears to be the best design? Wait for all groups to finish, compare distances.

Increase the number of propeller turns to 100 for a second test. Compare distances.
-  9. Quick Write:
Explain how to convert a scale drawing measurement to an actual measurement using a scale factor.

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NAME _____
DATE _____
Scale Factor: 39:50

