Lab Framework

Text:CORD

Unit number and title: Unit 9 Using Ratios and Proportions

Short Description: Working with ratios and scale factors using airplane design specs.

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Lab Title
WING SPAN

LAB PLAN

TEACHER: Teacher Prep/ Lesson Plan

Lab Objective

Students will be able to solve problems involving ratio, scale, and proportions.

Statement of pre-requisite skills needed:

Fractions and Unit 9 vocabulary

Vocabulary

similar figures
ratio
scale
dimensions
justification
millimeter
measurement
centimeter
English units
Metric units
model (scale model)

Materials List

Paper, Pencil, Lab Handout,Calculator

State Standards addressed

Math: 6.3, 7.1, 7.2

Leadership Skills:

Cooperative group work-3 students per group:

Scribe, Reader, The DC (double-checker)

SCAN Skills/Workplace Skill:

Engineering

Industrial Technology

Set-up information:

Have extra pencils and paper handy :) Calculators too!

Lab organization:

Flexible, but suggest groups of 3. See leadership section for suggested roles.

Teacher Assessment of student learning 30 points, 5 point scale for each problem. 5-exceeds standards thru 1-not meeting standard

Summary of learning (to be finished after student completes lab)

-Students may encounter similar problems in any design field.

-Students may share how important ratio and scale is to design. What would happen if the scale was not accurate?

Optional activities: Use same activity with other forms of models, ie. cars, trucks, bridges, etc.

Career Applications:

Engineeing

Industrial Technology

LAB TITLE: **WING SPAN**

STUDENT INSTRUCTIONS:

Statement of problem addressed by lab

What are the ratios of real-world measurements vs. scale model measurements?

Grouping instructions and roles

Cooperative group work-3 students per group:

Scribe, Reader, The DC (double-checker)

Procedures – As a group complete labsheet, be sure to show all work and display evidence of meeting the standards. All members of the group must complete their own labsheet.

Outcome instructions-Assess worksheet for completion and meeting the standards, see teacher.

Assessment instructions: Complete worksheet, due upon completion of every member of the assigned group.

Lab Data Collection

Student: _____ **Date:** _____

Unit: ____9____

Lab Title: WING SPAN

Criteria: Students will be able to write ratios and convert units of measurements from analyzing a scale problem and diagram dealing with airplane construction.

Calculations: Use what you know about similar figures and the ratio of their sides to find the answers to these questions.

You're going to build a Boeing 747-400 model airplane using a scale of 1:144.

What does it mean that the model's scale is 1:144? Use **complete sentences and vocabulary** you have learned from this unit.

_____
_____
_____
_____

2. Using the dimensions below, find the measures in feet and inches, and round the inches to the nearest eighth of an inch. **Show work** to justify your answer and label each measurement with correct units.

    a. Length of the model:_____
    b. Wing span of the model:_____
    c. Height of the model:_____
    d. Tail span of the model:_____

3. Using the metric dimensions below, find the measures to the nearest millimeter (tenth of a centimeter). **Show work** to justify your answer and label each measurement with correct units.

    Length of the model:_____
    Wing span of the model:_____
    Height of the model:_____
    Tail span of the model:_____

If another model of the same plane has a length of 4'10" , what is the scale of this other model? _____ (give your answer in fraction form: 1: __?__

If yet another model of the same plane has a length of 8'6", what would the scale be for this third model?_____

Image from Drew Moore and Nancy Powell, Bloomington High School, Bloomington, IL - NCTM, 2006

Summary Statement:

If you were given a choice whether to use English units (feet and inches) or Metric units (meters and centimeters), which would you choose and why?_____

_____

_____

_____

_____

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_____

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