Lab Framework

Text: CORD

Unit number and title: Unit 9 Using Ratios and Proportions

Short Description: Students will use a ratio and proportion to determine the size they will need to make a picture from a 8.5" x 11" sheet of paper that will be scaled to fit a 22" x 34" sheet of paper shared with the whole class. All the student flags will go on the large sheet. Students will sketch a flag which represents them on a sheet of paper. Then they will use Microsoft Paint (or other drawing program/handwritten) to create the final product. The student will and then need to scale the flag down so that it fits to the specific size.

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Lab Title

Scaling Down Your Personal Flag

LAB PLAN

TEACHER: Teacher Prep/ Lesson Plan

- **Lab Objective**
  - Read and write a ratio
  - Interpret and compare ratios
  - Solve proportions
- **Statement of pre-requisite skills needed**
  - Problem solving techniques-Unit 1
  - Calculator and computer skills
  - Working with shapes in two dimensions
  - Estimating
  - Measuring
- **Vocabulary**
  - Proportion
  - Ratio
  - Equal Ratios
  - Similar Figures
- **Materials List**
  - Computers
  - Drawing Program (Microsoft Paint or similar)
  - Lab Sheets with instructions
  - Calculator
  - Ruler
- **State Standards addressed**
  - Math: A1.1.A, A1.1.B, A1.2.A, A1.6.B
  - Reading: 2.1, 2.1.4, 2.1.6,
  - Writing: 1.1, 1.2, 2.2
- **SCAN Skills/Workplace Skills**
  - Respect for self and others;
  - Responsibility for personal actions and commitments;
  - Self-discipline and moderation;
  - Diligence and a positive work ethic

Approaches practical problems by choosing appropriately from a variety of mathematical techniques.
Uses quantitative data to construct logical explanations for real world situations.
Expresses mathematical ideas and concepts orally and in writing

Self-Management

A. Asses own knowledge, skills, and abilities accurately
B. Sets well-defines and realistic personal goals
C. Monitors progress toward goal attainment and motivates self through goal achievement
D. Exhibits self-control and responds to feedback unemotionally and non-defensively
E. Is a "self-starter"

Reasoning

A. Discovers a rule or principle underlying the relationship between two or more objects that applies it in solving a problem

- **Set-up information**
  Short paint introduction for students on how to use the program
  Explain the "flag" they will create-show samples
- **Lab organization(Timeline- One Day)**
  Each student will create their own flag and need their own computer station
  Students will need to measure their sheets of paper to verify they are 8.5" x 11"
  Students will work individually at their station

- **Teacher Assessment of student learning**
  Questioning students before, during, and after activity
  Completion of the worksheet

- **Summary of learning** (to be finished after student completes lab)
  -discuss real world application of learning from lab
  -students will discuss their findings and answers to the last two questions

- **Optional activities**
  Possible discussions and extensions:
  How would the orientation of the paper change our outcome, if at all?
  Importance of using scale drawings/rough drafts
  Creating model drawings of other items
- **Career Applications**
  Graphic arts, photography, architecture, city planner

LAB TITLE: Scaling Down Your Personal Flag
STUDENT INSTRUCTIONS: Your group will take turns Power Walking 10 meters.

- **Statement of problem addressed by lab**
  What is the ratio of height to width your flag will need to be so that everyone's fits on the 22" x 34" sheet of paper.

- **Procedures** – steps to follow/instructions
  Measure your sheet of paper
  Create a sketch of your flag (things you like, things that are important to you, family, friends, activities you enjoy, hobbies, sports, ancestry, etc.
  Determine the ratio your digital flag will need to be based on the size of the class flag, 22" X 34" and the number of students.
  Create your flag using the ratio in Microsoft Paint.

- **Outcome instructions**
  Use a proportion to determine the desired ratio
  Create a flag with the correct dimensions
  Be creative and have fun!

- **Assessment instructions** (peer-teacher)
  Show all steps and work
  Write in complete sentences when showing work
  Flag complete with correct dimensions

Lab Calculations

Student: _____ **Date:** _____

Unit: 9 Using Ratios and Proportions

Lab Title: Scaling Down Your Personal Flag

Criteria: Write the problem/objective in statement form

Use the back of this paper for your sketch.

Calculate: What is the height and width of the piece of paper in inches. Write this as a ratio first in sentence form and then in numerical form.

Calculations: Complete the given calculations to solve for an answer(s)

Determine the ratio everyone's flag will need to be in order for them all to fit on a 22" X 34" sheet of paper.

Is the ratio of your original flag proportionate to the ratio you calculated above? Show your work. Explain your answer using words.

If there were two more students in class, what would the ratio of each flag need to be to fit on the 22" X 34" sheet of paper? Is this ratio proportional with the original ratio you calculated? Show your work.