Lab Framework

Text:CORD Unit 1

Unit One Learning Problem-solving Techniques

Short Description: Using quilt patterns to identify shapes, compute area, & percent of area.

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Lab Title

Quilts, Perimeters, Areas and Percents

LAB PLAN

TEACHER: Teacher Prep/ Lesson Plan

- **Lab Objective**
  - Identify simple shapes as a part of a whole
  - Identify and describe similar shapes within the pattern
  - Compute perimeter of each shape
  - Compute area of each shape
  - Compute % of area
  - Compute combine % of area by color/pattern
- **Statement of pre-requisite skills needed** (i.e., vocabulary, measurement techniques, formulas, etc.)
  - Skill with measurement tools – ruler and protractor
  - Use a calculator
  - Unit B – naming numbers
- **Vocabulary**
  - Triangle, rectangle, square, parallelogram, trapezoid
- **Materials List**
  - Color copies of quilt blocks (ex. Attic Window - Page 2.mht ,Crossed Roads - Page 2.mht ,Echoing Diamonds.mht ,Mexican Cross - Page 2.mht ,Nine Patch - Straight Furrows - Page 2.mht
  - Rulers
  - Protractors
  - Calculators
- **State Standards addressed**
  - Math:

    G.5.D Describe the symmetries of two-dimensional figures and describe transformations, including reflections across a line and rotations about a point.

    A1.8.A Analyze a problem situation and represent it mathematically.

    A1.2.B Recognize the multiple uses of variables, determine all possible values of variables that satisfy prescribed conditions, and evaluate algebraic expressions that involve variables.

    A1.1.B Solve problems that can be represented by linear functions, equations, and inequalities.

    6.4.B Determine the perimeter and area of a composite figure that can be divided into triangles, rectangles, and parts of circles.

6.4 C Solve single- and multi-step word problems involving the relationships among radius, diameter, circumference, and area of circles, and verify the solutions.

6.6.E Communicate the answer(s) to the question(s) in a problem using appropriate representations, including symbols and informal and formal mathematical language.

Reading: *Need EALRS*
Writing: *Need EALRS*

- **Leadership Skills**

1.1 The student will demonstrate the ability to identify, organize, plan, and allocate **resources**. This means that the student is able to demonstrate allocating time, money, materials,space, and staff.

Students will be responsible for planning their work, allocating time to the tasks at hand, and monitoring their individual progress towards mastery of this process.

1.2 The student will demonstrate the ability to acquire and use **information** in a family, community, business and industry settings. This means that the student can acquire and evaluate data, organize and maintain files, interpret and communicate, and use computers to process information

The problem-solving process is all about acquiring and using information. That process is used throughout Unit 7.

1.4 The student will be involved in activities that require applying theory problem-solving and using critical thinking skills while understanding the outcomes of related decisions.

Problem-solving activities in Unit 7 involve problems requiring find answers to many related questions from real life situations.

2.1 Students communicate, participate and advocate effectively in pairs, small groups, teams, and large groups in order to reach common goals.

Students will work together in small groups and teams to solve problems during hands on lab activities.

- **SCAN Skills/Workplace Skills**
  - **Information**: Acquires and uses information
    a. Acquires and Evaluates Information
    b. Organizes and Maintains Information
    c. Interprets and Communicates Information
  - **Interpersonal**: Works with others
    a. Participates as a Member of a Team—contributes to group effort
  - **Resources**: Identifies, organizes, plans, and allocates resources.
    a. Time—Selects goal-relevant activities, ranks them, allocates time, and prepares and follows schedules.
    d. Human Resources—Assesses skills and distributes work accordingly, evaluates performance and provides feedback

- **Set-up information**

Provide formulas for calculating area of simple shapes
Triangle = 1/2bh
Rectangle = length x width
Parallelogram = bh
Trapezoid = $\frac{1}{2}(b_1 + b_2)h$

- **Lab organization**(-Grouping/leadership opportunities/cooperative learning expectations; -**Timeline required)**
    - Work in pairs for analysis of quilt block (one day)
- **Teacher Assessment of student learning** (scoring guide, rubric)
    - Oral report as team (app. 10 min)
    - Written team worksheet with calculations
- **Summary of learning** (to be finished after student completes lab)
  -discuss real world application of learning from lab
  -opportunity for students to share/present learning
- **Optional activities**
  -will use this lab a second time in Unit 7 at which time students will research history and prepare both written and oral presentations about their block.
- **Career Applications**
  Graphic Artist, Interior Designer, Seamstress, Architect, cartographer (map maker)

LAB TITLE: **Quilts, Perimeters, Areas and Percents**
STUDENT INSTRUCTIONS:

- **Statement of problem addressed by lab**
  - ✓ Working with a partner, you will identify simple shapes within a color quilt block.
  - ✓ Then, you will measure the length of the sides, and heights of these shapes. Record those measurements on your data sheet.
  - ✓ Compute the perimeter of each shape
  - ✓ Compute the area of each shape
  - ✓ Calculate the total area of your block
  - ✓ Compute the percent of the block represented by each shape

- **Grouping instructions and roles**
  Work with a partner.
  Equally share the duties of identifying, and measuring

- **Procedures** – steps to follow/instructions
  1. Together, identify each shape and assign it a number
  2. Each partner will compute ½ of the perimeters and areas of the identified shapes.
  3. Then, each partner will check your partner's calculations by recalculating. Initial your recalculation.

- **Outcome instructions**
  Hand in data sheet with calculations.

- **Assessment instructions** (peer-teacher)

Lab Data Collection

Student: _____ Date: _____

Unit: _____

Lab Title:

Criteria: Write the problem/objective in statement form

Data Collection: Record the collected/given data

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

Summary Statement:

Other Assessment(s)