Lab Framework

Text:Cord

Unit number and title: Unit 2 Estimating Answers

  Short Description: Students are going to estimate the cost of carpeting and painting the classroom. Measurements and calculations will be rounded to find a reasonably accurate cost for the entire project.

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Lab Title
Estimating the Cost of Remodeling a Room

LAB PLAN

TEACHER: Teacher Prep/ Lesson Plan

- **Lab Objective**

    Students will use their skills of estimation and rounding to determine an approximate cost for remodeling a room with carpet, pad, and paint.

- **Statement of pre-requisite skills needed** (i.e., vocabulary, measurement techniques, formulas, etc.)

    Area measurement techniques and formula
    Vocabulary list below
    Estimation techniques

    Estimate
    Reasonably accurate
    Round
    Approximate

    Lab Worksheet
    One 6" or 12" ruler per group
    Calculator (optional)

- **GLEs (State Standards) addressed**

Math: 1.1.8   Apply estimation strategies in situations involving multi-step computations of rational numbers using addition, subtraction, multiplication, division, powers, and square roots to predict or determine reasonableness of answers. W

1.2.6   Understand and apply estimation strategies to obtain reasonable measurements at an appropriate level of precision. W

2.2.2   Apply mathematical concepts and procedures from number sense, measurement, geometric sense, probability and statistics, and/or algebraic sense to construct solutions. W

2.2.3   Apply a variety of strategies and approaches to construct solutions.

Reading: (Reading)

Writing: 2.4.1 Produces documents used in a career setting.

3.3.1 Uses legible handwriting.

- **Leadership Skills**

    Teamwork

Organizing a group

- **SCAN Skills/Workplace Skills**

- **Set-up information**
  Lab organization(-Grouping/leadership opportunities/cooperative learning expectations; -**Timeline required**)
  Teams of 4 students will use the worksheet to guide the process of estimating the measurement of the floor, walls, and finally windows/doors. This would be a good conclusion lab for Unit 2 – Estimating. Depending on the complexity of the classroom (square versus odd angles/hallways, …) the lab may take one or two class hours of 55 minutes.

- **Teacher Assessment of student learning** (scoring guide, rubric)
  Students will be assessed with teacher observation of teamwork (and individual participation), student group self-assessment of participation, and thoroughness (or the reasonably accurateness) of estimations given on worksheet.

- **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
  Each team will share their conclusion and supporting data with the class. Large group discussion on why groups have different estimates.
  The teacher will start a discussion of possible career applications for this lab.

- **Optional activities**
  1. Add sales tax to the total cost approximation.
  2. Students could next estimate the amount of time required to complete the project by speaking with a carpenter or school maintenance person and then determine the cost of paying workers to complete the job (hourly pay x hours to complete).
  3. Students could estimate the cost to remodel their own bedroom at home.

  Carpenter, home decorator, salesperson, accountant, homemaker, banker, builder, realtor

LAB TITLE: Estimating the Cost of Remodeling a Room
STUDENT INSTRUCTIONS:

- **Statement of problem addressed by lab**

    How much would it cost to buy carpet, pad, and paint to remodel a room by estimating costs and measurements?

- **Grouping instructions and roles**

    Group students in fours. One student can walk along a wall while another student counts the steps and a third student can record the information. The fourth student in this group would oversee the procedure to make sure steps are even and information is correct. After all measurements are complete, each student can start estimating the size and cost for their section (wall or floor). One student can oversee this or take a section. Finally, students need to put their information together and check for reasonableness. All students will present part of the project to the class.

- **Procedures** – steps to follow/instructions

    1. Students are given a 6" or 12" ruler.
    2. Groups are to decide how they will use this small measuring devise to measure the large surfaces (estimate with foot steps, books, floor tiles, etc…)
    3. Students record their estimate measurements for each wall, window/door space, and the floor space.
    4. Groups calculate the area for these spaces.
    5. Groups subtract the window space from their wall space (shouldn't paint windows).
    6. Groups estimate the cost for the walls with paint and then the floor for both pad and carpet. Square feet will need to be converted to square yards for the carpet & pad.
    7. The costs of each are then added together.
    8. The group evaluates the reasonableness of their answer and maybe re-measures or re-calculates certain parts.
    9. Students decide how they will present their calculations and divide up what is to be said during their presentation.
    10. Groups present their findings, compare with other groups, and discuss why the estimates are different.
    11. Finally groups assess their own group members on participation value.

- **Outcome instructions**

    Students are going to use their skills of estimation and rounding to determine an approximate cost for remodeling a room with carpet, pad, and paint. Group discussion of findings and reasons for different results will be valuable and help students understand how estimations are helpful, but not perfect.

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

    Students will be assessed on the reasonableness of their total cost, the estimation procedures they used, and their participation with their group. Students are going to use their skills of estimation and rounding to determine an approximate cost for remodeling a room with carpet, pad, and paint.

Washington Applied Math Council

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Lab Data Collection

Student: _____ **Date:** _____

Unit: 2 Estimating Answers

Lab Title: Estimating the Cost of Remodeling a Room

Criteria: Write the problem/objective in statement form
        Students are going to use their skills of estimation and rounding to determine an approximate cost for remodeling a room with carpet, pad, and paint.

Data Collection: Record the collected/given data
    Students will estimate the area for the floors, walls, and window/door areas.
    Students will use these measurements to calculate the cost for carpet, pad, and paint for these areas.
    Paint costs $20-25 per gallon. Each gallon covers 300 to 400 square feet.
    Carpet costs $12-15 per square <u>yard</u>.
    Carpet Pad costs $1 per square <u>yard</u>.

Calculations: Complete the given calculations to solve for an answer(s)
    Area = length x width (square feet)
    Square yards = square feet / 9
    Wall area = wall space – window/door space
    Cost = price x area covered
    Total Cost = total cost of carpet, pad, plus paint

Summary Statement:
        Students are going to use their skills of estimation and rounding to determine an approximate cost for remodeling a room with carpet, pad, and paint. Group discussion of findings and reasons for different results will be valuable and help students understand how estimations are helpful, but not perfect. Finally students will relate this process to careers that may use this type of estimation process.

Other Assessment(s)
    Teacher observation of individual participation within groups
    Student group self-assessment of individual participation
    Use of estimation processes learned in unit
    Reasonableness of cost total and completion of appropriate calculations