

Lab Framework

Text:CORD Classic

Unit number and title:Unit 23 - Factoring

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So you want to tile your bathroom floor

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Short Description: Given a worksheet with four separate geometric models of a tiled bathroom floor, the students will determine the polynomial represented by each of the models and the overall cost of creating each display to decide which is most likely to fit in their price range. The students will be asked to make estimations, calculations, and recommendations based on what they find.

LAB PLAN

TEACHER: Teacher Prep/ Lesson Plan

- **Lab Objective**

To help students recognize geometric factors based on a picture they are given. Also, to help them understand how they might be able to use the factored information to obtain information that can help them in building/creating a project such as to tile a bathroom floor or table top design.

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

Creating equations, recognizing different geometric shapes, organizing information, basic addition and multiplication

- **New Vocabulary**

Monomials, Polynomials, Combining Like Terms

- **Materials List**

Classroom set of worksheets, Pencils, One pattern sheet per group, Calculators and Crayons/Pens if possible

- **GLEs addressed**

Math:

1.1.1 Understand the concept and symbolic representation of rational numbers

1.1.2 Understand the relative values of rational numbers.

1.1.3 Understand and use the distributive property and the properties of addition and multiplication on rational numbers.

1.1.6 Complete multi step computations with combinations of rational numbers using order of operations and addition, subtraction, multiplication, division, powers, and square roots.

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.

1.5.4 Use variables to write expressions, linear equations and inequalities that represent situations involving rational numbers, whole number powers, and square roots.

2.1.1 Formulate questions to be answered to solve a problem.

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

2.2.4 Determine whether a solution is viable, is mathematically correct, and answers the question(s).

3.2.1 Draw and support conclusions, using inductive or deductive reasoning.

3.3.3 Validate thinking about mathematical ideas.

4.2.1 Organize, clarify, and refine mathematical information relevant to a given purpose.

5.1.1 Apply concepts and procedures from two or more content strands, including number sense, measurement, geometric sense, probability and statistics, and/or algebraic sense, in a given problem or situation.

5.3.1 Understand that mathematics is used extensively in daily life outside the classroom.

5.3.2 Understand that mathematics is used in many occupations or careers.

Reading:

1.2.2 Apply strategies to comprehend words and ideas.

3.2.2 Apply understanding of complex information, including functional documents, to perform a task.

Writing:

2.2.1 Demonstrates understanding of different purposes for writing.

2.3.1 Uses a variety of forms/genres

3.3.2 Spells accurately in final draft.

3.3.3 Applies capitalization rules.

3.3.4 Applies punctuation rules.

3.3.6 Uses complete sentences in writing.

- **Leadership Skills**

Group Skills

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

- **SCAN Skills**

Arithmetic

A. Performs basic computations

B. Uses basic numerical concepts such as whole numbers and percentages in practical situations

C. Makes reasonable estimates of arithmetic results without a calculator

Mathematic

A. Approaches practical problems by choosing appropriately from a variety of mathematical techniques.

B. Uses quantitative data to construct logical explanations for real world situations

C. Expresses mathematical ideas and concepts orally and in writing

Speaking

A. Organizes ideas and communicates oral messages appropriate to listeners and situations

B. Participates in conversation, discussion, and group presentations

G. And asks questions when needed

Thinking Skills

Creative Thinking, Decision Making, Problem Solving

- **Set-up information**

Divide students into groups of 2-4

Show on the screen the size of a 10 by 10 bathroom floor plan diagram.

Demonstrate that each of the graphs provided for students are of equal size to the 10 by 10 you are showing them.

Ask the students to estimate how much they think it would cost to tile each of the floorplan designs shown based on the pricing information given.

Have students complete the first exercise (totalling each of the geometric factors of each display) and create appropriate polynomials for each item.

Given the pricing sheets, have the students work as a group to determine the total cost of creating each bathroom floor design based on the floorplan diagrams.

Have students discuss which item they would recommend creating and explain any outside factors that may influence their decision.

After the students have completed their group work and responses, have them proceed to the Extension Questions and Challenge Activity. (These can be worked on individually or in groups.

- **Lab organization**(-Grouping/leadership opportunities/cooperative learning expectations; -**Timeline required**)

One 55 minute class period

Group leader
Group mathematician (person with calculator)
Group recorder

- **Teacher Assessment of student learning** (scoring guide, rubric)
Teacher observation
Rubric
Grading of lab sheets
- **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**
Extension Questions and Challenge Activity
Ask them to add one or two more outer rows to each of the floorplans and determine what would be the cheapest option.
- **Career Applications**
Artist, Carpenter, Decorator, Home Renovator, Arts Supplier, etc.
--Determining how much is needed of each type of material.

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LAB TITLE: Unit 23 - Factoring Geometric Models

STUDENT INSTRUCTIONS:

- **Statement of problem addressed by lab**

Given a selection of tile bathroom floorplan designs, determine how much of each tile type is needed and the overall cost of each floor creation.
- **Grouping instructions and roles**
 - Group Leader - Collects the information and handouts for his/her group
 - Group Recorder - Records group totals on final group sheet
 - Group Mathematician - Has a calculator to determine overall cost
 - Group Members - Each person is responsible for creating the polynomial to represent at least two of the floorplan designs.
 - Group Presenter - Presents groups recommendation and discussion points on other factors that might influence the decision.
- **Procedures – steps to follow/instructions**
 - Divide into groups of 2-4 people
 - Listen actively as the instructor demonstrates that each of the items is the same size as all others.
 - Complete the first part of the lab sheet on estimation.
 - Begin totalling the Geometric model shapes and create polynomials (each person is responsible for a minimum of two so there is a means of double-checking to verify correct totals).
 - Proceed with second part of the lab - determining overall cost.
 - Once you have completed this option, as a group discuss which you would recommend based on price of tiles alone and what other factors might influence your decision.
 - Record your group discussion, and present out to class.
 - Proceed to Extension Questions and Challenge Piece if time permits.
- **Outcome instructions**
 - Once you have completed individual data recording and double checked with your partner, share your information with the group recorder.
 - After the calculations have been made and your discussion on recommendations and influencing factors has been completed, record your overall response on your worksheet in the space provided.
 - Turn in your completed worksheets, clean up your workstation and begin work on the Extension Questions and Challenge Piece.
- **Assessment instructions (peer-teacher)**
 - Teacher observation - Follows directions, participates in all group work and discussions.
 - Completed data recording sheets and Extension Questions.
 - Student is able to identify their group participation.
 - Work area is clean.

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)

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