# The "Flip This Room" Challenge: A Practical Math Project

**Subject:** Practical Mathematics (Geometry, Financial Literacy)

**Grade Level:** High School (Age 15)

**Student:** Elijah

**Estimated Time:** 3-4 hours (can be split over multiple days)

## Materials Needed

- Measuring tape
- Graph paper (1/4 inch scale is ideal)
- Pencil and eraser
- Ruler
- Calculator
- Computer with internet access
- A notebook or word processing document for tracking findings

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## Learning Objectives

By the end of this lesson, Elijah will be able to:

- Accurately measure a room and calculate its perimeter and area.
- Create a precise two-dimensional scale drawing of a room.
- Develop a detailed budget for a project with a fixed spending limit.
- Research products, calculate unit costs (e.g., price per square foot), and factor in additional costs like sales tax.
- Use mathematical reasoning to make practical design and financial decisions.

## Lesson Activities

### Part 1: The Hook & The Blueprint (60 minutes)

#### Introduction:

Imagine you have a budget of **$750** to completely redesign your bedroom (or another room in the house). You are the project manager, designer, and accountant. Your job is to create a plan that looks great, is functional, and, most importantly, stays within budget. This challenge will use your math skills to bring a creative vision to life.

#### Activity Steps:

1. **Measure the Space:** Using the measuring tape, measure the length and width of the room you've chosen to "flip." Don't forget to measure the locations and sizes of windows and doors. Record all these measurements in your notebook.
2. **Calculate Area and Perimeter:**
    - Calculate the total square footage (area) of the floor (Length x Width). This will be crucial for flooring or a new rug.

    - Calculate the perimeter of the room (2 x Length + 2 x Width). This helps you think about things like trim or lights that go around the room.
    - Calculate the wall area for painting. A simple way is to multiply the perimeter by the ceiling height. Don't worry about subtracting doors/windows for now, as it's good to have extra paint.
3. **Create a Scale Drawing:**
    - On your graph paper, decide on a scale. A good, simple scale is **1 square = 6 inches** (or 2 squares = 1 foot).
    - Draw the outline of the room to scale. For example, if a wall is 12 feet long, your line on the graph paper would be 24 squares long.
    - Add the doors (show which way they swing open) and windows to your drawing, also to scale. This is your master blueprint!

## Part 2: The Budget & The Shopping Spree (90-120 minutes)

**Introduction:**

Now that you have your blueprint, it's time to go shopping—virtually! Your budget is a firm **$750**. You must decide what the most important changes are. Do you need new paint? A new desk? Better lighting? Let's make a plan.

**Activity Steps:**

1. **Set Your Priorities:** In your notebook, create a simple budget table with three columns: *Item*, *Estimated Cost*, and *Actual Cost*. List the main categories you want to spend money on. Examples:
    - Paint
    - Furniture (desk, chair, bookshelf)
    - Lighting (lamp, LED strips)
    - Flooring (area rug)
    - Decor (posters, plants, pillows)
    - Storage (bins, shelves)
2. **Go Virtual Shopping:** Use websites like IKEA, Amazon, Target, Wayfair, or Home Depot to find items for your room. For each potential item, record the link and the price in your budget table.
3. **Do the Practical Math:**
    - **Paint:** A gallon of paint covers about 350-400 square feet. Based on your wall area calculation from Part 1, how many gallons of paint do you need? Calculate the cost. (e.g., If your wall area is 380 sq ft, you'll need two gallons to be safe for two coats).
    - **Flooring:** If you're looking at an area rug, will its dimensions fit nicely in your scale drawing?
    - **Furniture:** Before you "buy" a desk or a bed, check its dimensions. Draw it to scale on a separate piece of graph paper, cut it out, and see how it fits in your scale drawing. Does it block a door? Is there enough space to walk around it? This is what real designers do!
    - **Sales Tax:** This is a crucial real-world cost! Assume a local sales tax of **7%**. After you have your subtotal for all items, calculate the tax (Subtotal x 0.07) and add it to the total. Does your final cost still fit within the $750 budget? If not, you'll have to make some tough decisions and "return" an item or find a cheaper alternative.

## Part 3: The Final Proposal (30-45 minutes)

**Introduction:**

You've done the math and made your choices. Now it's time to present your final plan for the room flip. This proposal will show off all your hard work and creative decisions.

**Activity Steps:**

Organize your findings into a final project. This can be a simple document, a slideshow, or a short verbal presentation. It must include:

1. **The Blueprint:** Your final, neat scale drawing of the room, with the new furniture items drawn in their correct places.
2. **The Budget Sheet:** Your completed budget table, showing every item, its cost, the subtotal, the 7% sales tax, and the grand total (which must be under $750).
3. **The "Mood Board":** A collection of pictures or links to your chosen items. This helps visualize the final look.
4. **A "Designer's Statement":** A short paragraph explaining your choices. Why did you pick that desk? Why did you decide to spend more on a chair and less on a rug? This shows your reasoning.

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# Assessment & Evaluation

This project will be evaluated based on the following criteria:

- **Mathematical Accuracy:** Are the area/perimeter calculations correct? Is the scale drawing accurate? Is the budget calculated correctly, including tax?
- **Staying on Budget:** Is the final proposed cost at or below the $750 limit?
- **Thoughtful Planning:** Does the furniture fit logically in the room layout? Are the choices practical and well-justified in the designer's statement?
- **Completion:** Are all four parts of the final proposal (Blueprint, Budget, Mood Board, Statement) included?

# Differentiation & Extension

- **For Extra Support:** Work on the calculations together. Use a pre-made spreadsheet template for the budget that automatically calculates tax and totals. Focus on a room with a simple rectangular shape.
- **For an Extra Challenge:**
    - Choose a room with a complex shape, like an L-shaped room, requiring you to calculate the area of compound shapes.
    - Add a "labor" cost to the budget. If painting takes 5 hours and you "charge" $15/hour, how does that impact the total?
    - Factor in shipping costs for online items.
    - Compare the cost-effectiveness of different options, e.g., "Is it cheaper to buy a pre-made bookshelf or buy the wood and build it yourself?" Research the material costs.