

Kitchen Nightmares

6.Geometry:

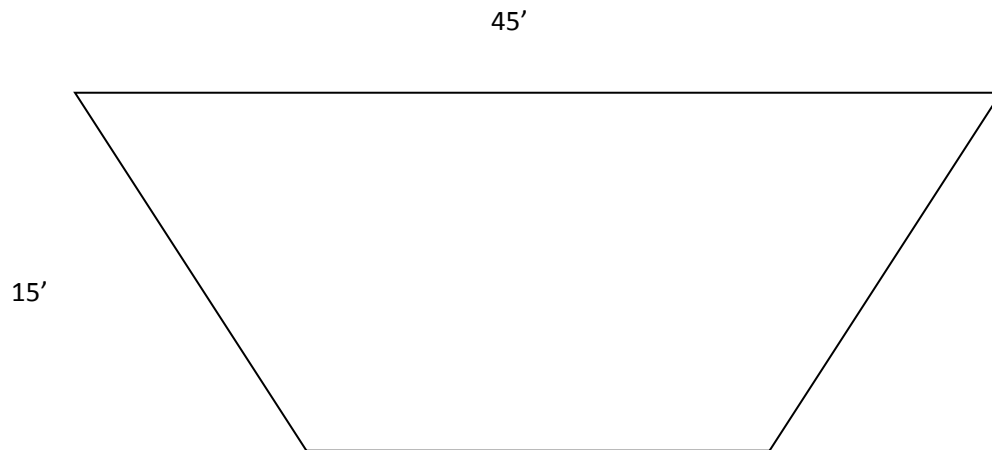
Introduction: This lesson is designed to come in the middle of a unit on area; Beginning with allowing the students to construct the information and formulas that apply to regular shapes; quadrilaterals and triangles. Moving to comparing special case shapes like parallelograms and trapezoids. It is best of the teacher use examples of deconstruction of parallelograms and then discuss how that shape is similar to (but different from) a trapezoid.

Standard 1: Solve real world and mathematical problems involving area, surface area, and volume.

Math Objective: Find the area of special quadrilaterals by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems.

Language Objective: Use the geometric vocabulary verbally and in written format appropriately when giving instructions to the workers helping you on the job.

Problem: You have decided to remodel your house, beginning with the kitchen-dining room. After measuring the dimensions, you've found that it is shaped like a trapezoid (pictured below), with the long side measuring 45 ft and one short side measuring 15 ft.



The floor must be installed before cabinets and or appliances. There are two windows on the North wall as well as a set of French Doors (double doors). There is an archway at the center point of the south wall giving access to the rest of the house via the living room. Your task is to determine the amount of flooring you'll need to order from Home Depot. You are going to put the floor in place from wall-to-wall and THEN put in the equipment and cabinetry. How much linoleum will you have to order to cover the entire floor if the linoleum rolls are 15' wide?

1. What would the length of the linoleum be if the Home Depot only stocked rolls that were 12' wide? What is the length if the rolls are 10' wide?
2. You are trying to decide which flooring would be least expensive. If you use linoleum to cover the floor your cost will be \$2.49 per square foot. If you use tile your cost will be about \$20 per box (a box will cover 9 square feet of floor). Justify your choice in flooring.
3. Can you make a model of your answer(s)? Be prepared to show your models to the class.
4. You decide to change to look of the room by separating it into three parts. Each part has to have its own function and flooring. Will the area(s) change? Justify your results.



Expectations:

1. Students will work in pairs complete the main problem and individually for sub tasks 1 & 2.
2. Students will be able to construct cardboard or paper models to visualize the kitchen/dining room floor.
3. Students will compare and modify (if necessary) answers, discussing possible solution pathways in groups of four or greater.
4. Students will construct models to justify their answers.
5. The class will do a room wander to evaluate the constructed models.



Exploration

1. Inciting questions:

- (resource) How can you break this room into shapes so that we can figure out the area of the room? What shapes could we use? Is there a formula that we have seen that could help us figure out the area of the room?
- (on-level) How did you come to the conclusion you did about the area of the room?
- (Gifted) What if you decide to separate the room into two spaces, a kitchen area and a dining area? Would the overall area change? Why or why not?

Discussions:

- What is area and how does it apply to this problem?
- What part of the problem is design and what part is computation?
- Are your decisions changed by the additions to the problem (like amount of money to be spent, change in shape(s) of room)?