



SAMPLE MATERIAL

Build a Cafe: PowerPoint and Report

Howard County Public Schools, Maryland

Topic: Developing Effective Fractions Instruction for K-8

Practice: Ratio, Rate, Proportion

Designed as a culminating experience to be completed over several class sessions, this unit from Howard County's Elkridge Middle School presents a real-world application of what students have learned about ratio, rate, and proportion. Students work through a PowerPoint on laptops, following the instructions to solve problems related to building a café—from purchasing property at the best rate to scaling recipes. The separate recording sheet is used to report out on their answers and their thinking about solutions.

Note: There are various types of math problems embedded in addition to those directly related to ratio.

Building a café
from the ground up....



The Lot

To build and construct your own café, we first need to purchase a plot of land to build upon. The Romen Company is selling this 1,200 square foot area for a total of \$150,000. Another land owner, the Pricey Corporation, is selling another plot of land for \$130 per square foot. You need to make a decision as to which company you will go with. Explain why!



When laying down bricks, we need to create a mortar to hold the bricks together. The recommended ratio of sand to cement for mortar is 1:3

We need just about 9 tons of cement to build our café. Determine how many tons of sand we need.

The Bricks



[Image courtesy of the project on the ground at the Howard County Public Schools, Maryland](#)

Challenge*

- 1) If there are 2,000 lbs in one ton, how many total tons of mortar will we have?
(Remember mortar is a combination of the sand and cement)
- 2) If 1 lb of sand is used for every 1000 bricks, approximately how many bricks will we use for our construction?



Driving to the store



On the map you have, the scale is 3 cm = 7 miles.

If the distance on the map to the store is 16 cm, how far is the distance in miles?

Driving to the store

Your volvo can hold 16
gallons of gas.

Given the reading on the fuel guage, about how much fuel do you have left?

*If your volvo uses 17 miles per gallon, how much will be left after you drive to the store and back?



<http://www.treehugger.com/files/2010/08/man-waste-fuel-because-they-wont-ask-for-directions-study.php>

<http://www.scribd.com/501870492/mba-ex-60-wr1.html>
<http://www.banbhifreechina.com/2015/05/06/service.htm>

Windows and Paint



<http://mc.manuscriptcentral.com/01446707>

Windows



<http://www.findaninexpensive.com/blog/windows/>

For your store, you want it to be bright with lots of natural light.

The largest size window you can have is 4 ft x 8 ft.

If you approximately have about 420 square feet to use on windows, how many large windows can you install?

Windows

In the window section, there are two kinds of windows you can purchase.

The C-Through Window is selling for \$136/40 square feet of window

The Reflex Window is selling for \$240/80 square feet of window

Double the Pain Window is selling for \$88/25 square feet of window

Sometimes the cheapest window is not the best quality....and sometimes the most expensive window is too pricey.

Settling on the middle price, which window should you purchase?

Windows

How much will you pay for your windows you came to purchase?

Painting



- Each can of paint costs \$3.50 and you have budgeted \$70 for paint.
- How many paint cans can you buy?

Paint

Your vision for your wall color in your café requires a mix ratio of 3 yellow: 2 tan.

Given the number of cans you can buy, how many of each paint color will you buy?



<http://www.imagemanipulation.com/6/6images/6images.html>

Hmmm

As you drive back from the hardware store, you think about hiring workers to paint your café...



<http://onepepys.com/links.htm>

Mario Bros Painting charges their customers by the area in square feet.
They charge \$36 for 90 sq. ft.

Bowers Wows You charges their customers by labor time.
They charge \$265 per hour, and claim that they can paint 233 sq. ft. in 20 minutes.

YOU NEED A TOTAL of 2,340 SQ. FT. PAINTED....
WHICH PAINTING COMPANY SHOULD YOU HIRE?
And HOW MUCH WILL IT COST?



Recipes



<http://www.diybakers.com/recipes.html>

Iced Coffee



<http://dorecipes.com/Recipe/Tangy-Sweet-Coffee/Recipe.aspx>

You estimate that on opening day, you will serve at least 18 drinks of iced coffee. USING THE RECIPE BELOW, figure out how much of each ingredient you will at need at the minimum!

The recipe below makes 3 drinks.

- 6 teaspoons instant coffee
- 3 teaspoon sugar
- 9 tablespoon water
- 18 fl. Oz of cold milk

Your Specialty...

Apple fritters have been a popular hit with anyone you've made them for. Friends, families, and co-workers have been clamoring for them.

You decide to make apple fritters the center of your attention at the bakery and the food item you will be giving free samples of when opening your new café and bakery!

With the number of apple fritters known,
rewrite the recipe for the amount you will need!

Recipe makes 20 Fritters

2 cups flour
¼ cup white sugar
1 tablespoon baking powder
½ teaspoon ground nutmeg
1 teaspoon salt
2 eggs
1 cup milk
2 quarts oil for deep frying
4 large apples
½ cup confectioners' sugar

APPLE FRITTERS



<http://thefoodies.com/recipe/Enveloped-Coffee/Print.aspx>

Scaling Recipes

For that opening day, you're expecting at the most 200 customers to come walking through that door.

And you want to have them try one fritter for sample. If you estimate that about 30% of those customers will then buy an average of a dozen fritters, how many fritters are you aiming to make?

****How many of each ingredient will you need?**