

Math in the Kitchen

Please take a seat,
We will begin shortly.

THE MAJOR OBJECTIVES

- I. Why math is needed in the kitchen?
- II. Handouts, books, and posters.
- III. Find the amount of an item to serve to your grade mix of children.
- IV: Adjust a recipe to a new amount of portions.



LESSON 1: WHY MATH IS NEEDED IN THE KITCHEN?



WHY IS MATH NEEDED IN KITCHENS?



- ✘ Helps to control waste.
- ✘ Assures proper portion sizes.
- ✘ Helps to standardize recipes.

Very important with food cost increases.



WHERE TO START



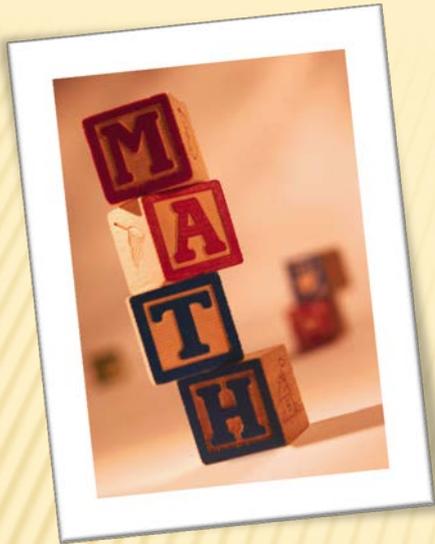
- What are the age/grade specific serving sizes that will be used?
 - (i.e. - 1.5 oz, 2 oz, etc...)
- How many servings are needed for each serving size?
- What form does the food come in?
 - (i.e. - #10 can, 48 per pan, etc...)

WORK SMARTER, NOT HARDER

- ✘ Kitchen Basics poster
- ✘ Charts & Handouts
- ✘ Food Buying Guide manual

+ <http://dese.mo.gov/divadm/food/foodbuyguideorderform.pdf>





LESSON II:

BACK TO THE BASICS.

**EVERYTHING YOU WANTED TO KNOW ABOUT FRACTIONS
AND DECIMALS BUT WERE AFRAID TO ASK.**

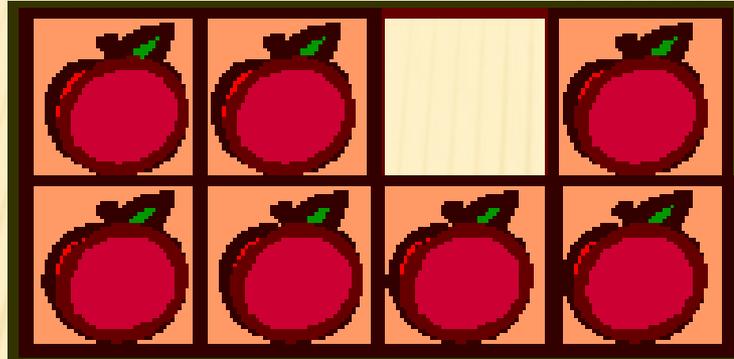
BACK TO THE BASICS

- ✘ Most kitchen numbers are in the form of a fraction.
- ✘ Fractions need to be converted to decimals to use in a calculator.



SO, WHAT IS A FRACTION?

This box holds 8 apples.



One apple is missing from the box.

There are 7 apples left in the box.

Therefore, we would write it as $7/8$.

MONEY TALKS

\$679.37

U.S. currency is written in decimals.

- ✘ 6 stands for six hundred.
- ✘ 7 stands for seventy.
- ✘ 9 stands nine dollars.
- ✘ 0.3 is three-tenths. As a fraction 0.3 is written as $\frac{3}{10}$. Using change, 0.3 might be counted out using 3 dimes.
- ✘ 0.37 is thirty-seven hundredths. As a fraction, 0.37 is written as $\frac{37}{100}$. Using change we could count it out using 3 dimes, one nickel and 2 pennies.

WORKING WITH FRACTIONS & DECIMALS

Fractions to decimals – Divide the numerator by the denominator.

$$3/8 = 3 \div 8 =$$

$$\begin{array}{r} 0.375 \\ 8 \overline{) 3.000} \\ \underline{24} \\ 60 \\ \underline{56} \\ 40 \\ \underline{40} \\ 0 \end{array}$$

Decimals to fractions – Write a fraction using the figure of the decimal as the numerator and the power of

(10, 100, 1000, etc...) as the denominator, then reduce

to the simplest terms.

$$0.05 = 5/100 = 1/20$$



LESSON III: FINDING THE NEEDED AMOUNT OF AN ITEM.



WHERE'S THE BEEF?

You are planning to serve roast beef to 75 students of different grade levels. How many pounds of beef round roast is needed?

- ✗ 45 - 1.5 oz serving
- ✗ 30 - 2.0 oz serving



WHERE'S THE BEEF?

Food As Purchased	Purchase Unit	Servings per Purchase Unit	Serving Size per Meal Contribution	Purchase Units for 100 Servings	Additional Information
Beef Round Roast, fresh or frozen	Pound	9.76	1 oz cooked lean meat	10.3	1 lb AP = 0.61 lb cooked lean meat
	Pound	6.5	1 1/2 oz cooked lean meat	15.4	

- ✘ Locate the Beef Roast in the Food Buying Guide.
- ✘ Check the serving sizes. Note that in the Food Buying Guide there is no serving size for 2 oz.
 - + Therefore, we need to do a conversion.

WHERE'S THE BEEF?

Food As Purchased	Purchase Unit	Servings per Purchase Unit	Serving Size per Meal Contribution	Purchase Units for 100 Servings	Additional Information
Beef Round Roast, fresh or frozen	Pound	9.76	1 oz cooked lean meat	10.3	1 lb AP = 0.61 lb cooked lean meat
	Pound	6.5	1 1/2 oz cooked lean meat	15.4	

✘ Calculate the total ounces needed:

+ 45 servings x 1.5 oz = 67.5 oz

+ 30 servings x 2.0 oz = 60.0 oz

127.5 oz total cooked lean meat.



✘ Find the number of servings you get per purchase unit.

+ Refer to Column 2 for the purchase unit and column 3 for the number of servings.

+ We get 9.76 servings per pound.

WHERE'S THE BEEF?

Food As Purchased	Purchase Unit	Servings per Purchase Unit	Serving Size per Meal Contribution	Purchase Units for 100 Servings	Additional Information
Beef Round Roast, fresh or frozen	Pound	9.76	1 oz cooked lean meat	10.3	1 lb AP = 0.61 lb cooked lean meat
	Pound	6.5	1 1/2 oz cooked lean meat	15.4	

- ✘ Divide total needed by the servings per purchase unit.
 - + Number of total ounces needed = 127.5
 - + Servings per purchase unit = 9.76
 - + 127.5 divided by 9.76 = 13.06
- ✘ Round up to 13.25 lb to ensure enough food is available.

GROUP ACTIVITY ONE

Food As Purchased	Purchase Unit	Servings per Purchase Unit	Serving Size per Meal Contribution	Purchase Units for 100 Servings	Additional Information
Beef Round Roast, fresh or frozen	Pound	9.76	1 oz cooked lean meat	10.3	1 lb AP = 0.61 lb cooked lean meat
	Pound	6.5	1 1/2 oz cooked lean meat	15.4	

You are planning to serve roast beef to 100 students of different grade levels. How many pounds of raw beef round roast is needed?

- ✗ 25 - 1.5 oz serving
- ✗ 75 - 2.0 oz serving

ACTIVITY ONE ANSWERS

<u>25</u>	+	1.5	=	<u>37.5</u>
Servings		Ounces		Total Ounces

<u>75</u>	+	2	=	<u>150</u>
Servings		Ounces		Total Ounces

<u>37.5</u>	+	<u>150</u>	=	<u>187.5</u>
1.5oz Serving Total Ounces		2.0oz Serving Total Ounces		Total ounces

<u>187.5</u>	÷	<u>9.76</u>	=	<u>19.21</u>
Total ounces		Servings per purchase unit		Total pounds needed

Round up to ensure food is available. 19.25

LESSON IV: ADJUST A RECIPE TO A NEW AMOUNT OF PORTIONS



MACARONI AND CHEESE

**YOU WANT TO USE A USDA RECIPE THAT
IS FOR 100 SERVINGS.**

YOU HAVE 360 STUDENTS.

HOW DO YOU CONVERT THE RECIPE?



MACARONI & CHEESE

Ingredients	Weight	Measure	Color of chart to use	Change mixed units to single unit	conversion factor (CF)	Multiply each ingredient by CF	Round	Convert to practical measurable amounts.
elbow macaroni	5 lb 4oz		Pink					
margarine or butter	1 lb 8 oz		Pink					
all-purpose flour	1 lb 8 oz		Pink					
salt		3 Tbsp 1 tsp	Blue					
dry mustard		2 Tbsp	Yellow					
white pepper		2 tsp	Blue					
paprika		2 Tbsp	Yellow					
lowfat milk		2 gal 2 qt	Green					
worcestershire		1 Tbsp 1 tsp	Blue					
lowfat cheddar cheese (shredded)	5 lb		Purple					
parmesan Cheese, grated		2 cups	Yellow					

MACARONI & CHEESE

Converting mixed units to a single unit

- + Weights need to be converted to decimals.
- + Use charts to find the decimal equivalent of the weights:
 - × 4 ounces in a pound (pink sheet) **0.25**
 - ★ Therefore, macaroni would be 5.25 lbs
 - × 8 ounces in a pound (pink sheet) **0.5**
 - ★ Therefore, butter and flour would be 1.5 lb



MACARONI & CHEESE

+ Measures need to be converted to smallest unit.

× How many teaspoons are in a tablespoon? **3**

× How many quarts are in a gallon? **4**

+ Convert salt or 3 Tbsp to tsp:

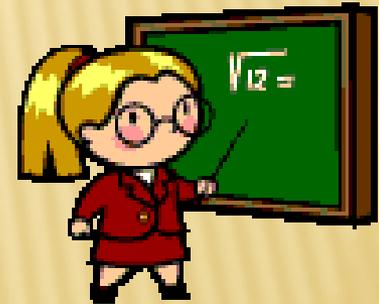
× $3 \text{ Tbsp} \times 3 \text{ tsp} = 9 \text{ teaspoons}$

+ Convert dry mustard or 2 Tbsp to tsp:

× $2 \text{ Tbsp} \times 3 \text{ tsp} = 6 \text{ teaspoons}$

+ Convert milk 2 gal to qt:

× $2 \text{ gal} \times 2 \text{ qt} = 4 \text{ quarts}$



Now, let's do the rest
on your own.

MACARONI & CHEESE

Finding and using the Conversion Factor

- + Servings needed \div recipe yield = Conversion Factor
 - × In our example $360 \div 100 = 3.6$

- + Use the single unit ingredient and multiply by CF
 - × Macaroni - $5.25 \times 3.6 = 18.9$ lbs
 - × Butter and Flour - $1.5 \times 3.6 = 5.4$ lbs
 - × Salt - $10 \times 3.6 = 36$ tsp
 - × Multiply the rest on your own
 - ★ 5 minutes

MACARONI & CHEESE

Rounding to Practical Measureable Amounts.

Use the charts and handouts provided.

- + Macaroni is 18.9 lb. We round up to 19 pounds.
 - × Works toward grain/ bread credit.
- + Butter and flour is 5.4 lb. We round down to 5.375 lb
 - × Helps to reduce the fat in the recipe.
- + Salt is 36 Tsp. Using the charts, we notice that 36 Tsp is can be rounded to 12 Tbsp
- + Dry mustard is 21.6 Tsp. We round down to 21 tsp or 7 Tbsp.
 - × Reduction is necessary because it is a strong ingredient.

MACARONI & CHEESE

Rounding to Practical Measureable Amounts.

- + White pepper is 7.2 tsp. We round down to 7 tsp. Which rounds to 2 Tbsp 1 tsp.
 - × Another strong ingredient.
- + Paprika is 21.6 tsp. We round down to 21 tsp and round to 7 Tbsp.
 - × Another strong ingredient and not a large amount.
- + Low-fat milk is 36 quarts. Dividing 36 by 4 we could convert 36 quarts to 9 gallons.
- + Worcestershire is 14.4 Tsp. We round to 14 Tsp and convert to 4 Tbsp 2 tsp.
 - × Convert to practical measurable amount to work with.

MACARONI & CHEESE

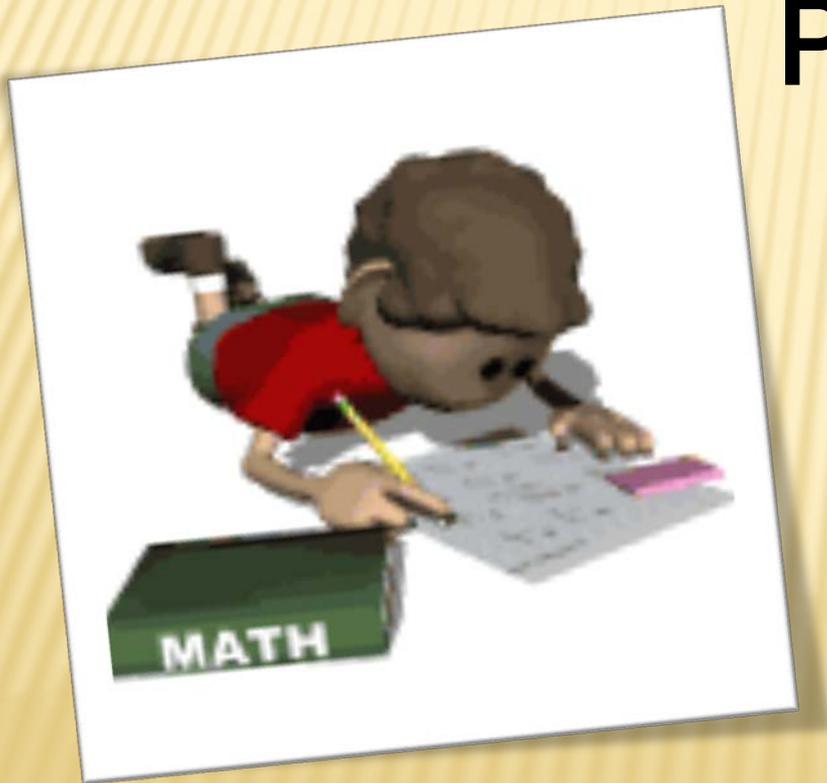
Rounding to Practical Measureable Amounts.

- + Low-fat cheddar cheese (shredded) is at 18 lbs, so no conversion is necessary.
- + Parmesan cheese is 7.2 cups. We round up to 7.25 or 7 and $\frac{1}{4}$ cups.

MACARONI & CHEESE

Ingredients	Weight	Measure	Color of chart to use	Change mixed units to single unit	conversion factor (CF)	Multiply each ingredient by CF	Round	Convert to practical measurable amounts.
elbow macaroni	5 lb 4oz		Pink	5.25 lbs	3.6	18.9 lbs	19 lbs	19 lbs
margarine or butter	1 lb 8 oz		Pink	1.5 lb		5.4 lbs	5.375 lbs	5 lb 6 oz
all-purpose flour	1 lb 8 oz		Pink	1.5 lb		5.4lbs	5.375 lbs	5 lb 6 oz
salt		3 Tbsp 1 tsp	Blue	10 tsp		36 Tsp	12 Tbsp	3/4 cup
dry mustard		2 Tbsp	Yellow	6 tsp		21.6 tsp	21 tsp	7 Tbsp
white pepper		2 tsp	Blue	2 tsp		7.2 tsp	7 tsp	2 Tbsp + 1 tsp
paprika		2 Tbsp	Yellow	6 tsp		21.6 tsp	21 tsp	7 Tbsp
lowfat milk		2 gal 2 qt	Green	10 qts		36 qts		9 gallons
worcestershire		1 Tbsp 1 tsp	Blue	4 tsp		14.4 tsp	14 tsp	4 Tbsp + 2 tsp
lowfat cheddar cheese (shredded)	5 lb		Purple	5 lbs		18 lbs		18 lbs
parmesan Cheese, grated		2 cups	Yellow	2 cups	7.2 cups	7.25 cups	7 1/4 cups	

The only thing left to do is...



Practice

Practice

Practice



Contact information

Josh Winters

573-526-1850

josh.winters@dese.mo.gov

Website: [Http://www.dese.mo.gov](http://www.dese.mo.gov)

Main office: 573-751-3526