

## **Cooking Lab**

### **Math Lab Instructor Notes**

- Course Level/Topic: Pre-algebra/Fractions
- Materials: None
- Time Required: 30 minutes if the activity is completed in class
- Brief Description: Students will make the necessary conversions using basic equivalency tables for standard measurements used in cooking. The problems in this activity are from the San Diego Mesa College Culinary Arts department and are examples of real world situations.
- Prerequisite knowledge
  - Arithmetic operations with fractions
  - Dimensional analysis
  - Familiarity with standard and metric units of measure (the actual conversions needed are given in the lab).
- General Notes:
  - This activity is intended to serve two purposes:
    - Strengthen students' fraction skill base.
    - Strengthen students' dimensional analysis skill base.
  - In most Pre-algebra classes unit conversion comes toward the end of the course and is taught in the context of ratios and proportions. This lab does not rely on any knowledge of proportions; it is done completely using the dimensional analysis method illustrated in the example.
- Follow Up/ Discussion Questions:
  - Students can be asked to use a favorite family recipe and increase it to feed a large group of people.
  - Students can be asked to plan a dinner party, banquet or special event. They will plan the menu to determine the amount of ingredients needed, and the cost.

# Cooking Lab

Name(s): KEY

Chefs are often required to convert the amount needed in a recipe to units corresponding to the measuring tools available or the units in the packaging. Similarly, recipes that feed only 6 may need to be increase to accommodate larger numbers of people. In both cases, the use of fractions is often necessary.

## Standard Volume Equivalents:

1 tablespoon = 3 teaspoons =  $\frac{1}{2}$  fluid oz  
1 cup = 16 Tablespoons = 8 fluid oz.

1 pint = 2 cups

1 quart = 2 pints

1 gallon = 4 quarts

## Standard Weight Equivalents:

16 oz. = 1 lb

## Metric Conversions:

1 gram = 1,000 milligrams  
1 kilogram = 1,000 grams  
1 liter = 1,000 milliliters

## English to Metric Conversions\*:

1 ounce =  $28\frac{3}{10}$  grams  
1 liter =  $33\frac{4}{5}$  fluid ounces  
1 kilogram =  $2\frac{1}{5}$  pounds

\*Note that these are only approximations not exact values.

**For liquids:** 1 pint = 1 pound

Example: Convert 30 teaspoons to cups.

$$\frac{30 \cancel{tsp}}{1} \times \frac{1 \cancel{tbsp}}{3 \cancel{tsp}} \times \frac{1 C}{16 \cancel{tbsp}} = \frac{30 C}{48} = \frac{5}{8} C$$

Note: When setting up conversions begin by putting the initial amount over 1 and then set up the appropriate conversion factors so that the units in the numerator cancel with those in the denominator until the required unit is the only one remaining.

**Practice Exercises:** Show your work for each conversion.

$$1. \quad \frac{3}{8} \text{ pt} = \underline{12} \text{ tbsp}$$

$$3. \quad \frac{3}{4} \text{ oz} = \underline{21\frac{9}{40}} \text{ g}$$

$$2. \quad 200\text{g} = \underline{11\frac{1}{25}} \text{ lbs}$$

$$4. \quad 75 \text{ mL} = \underline{2\frac{107}{200}} \text{ fl oz}$$

The following exercises were provided to the Math Department by Mesa College's Culinary Arts program as examples of real problems students face in the program. In each case, do not use a calculator or decimals and show your work.

5. If a recipe calls for  $\frac{1}{4}$  cup of milk and you have been asked to halve the recipe, how many teaspoons do you need?

12 tbsp

6. You need 7 pounds 12 ounces of beef, however you can only order it in whole kilogram units. How many kilograms of beef should you order?

4 kg

7. If you are preparing 3 ounces servings of fruit cocktail, how many full servings can you get from 5 kilograms of fruit cocktail?

58 servings

8. You have 4 pounds 8 ounces of gouda cheese. The recipe calls for  $1\frac{3}{4}$  kilograms of gouda cheese.

Do you have enough cheese? yes

How many kilograms do you have left over or how much more do you need?

$13\frac{1}{44}$  kg extra

9. You have a case of chicken broth which contains six 2-liter containers and you need 14 quarts of stock for the soup.

Do you have enough? No

How many quarts do you have left over or how many more quarts do you need?

$1\frac{13}{40}$  more qt.

10. You are asked to make 58 strawberry tarts for an upcoming spring event. Each tart requires 50g of flour. How many pounds of flour will you need?

$6\frac{19}{50}$  lbs

11. An original recipe calls for  $3\frac{1}{4}$  cups of cream. If you wish to increase the amount by  $3\frac{1}{2}$  times, how many liters of cream do you need?

$2\frac{9}{13}$  L