**5C Unit Analysis.doc**
**Prealgebra** **Name:** _____ **Due Date:** ____

**WHY:** Unit analysis is powerful problem-solving plan. For example, nurses use unit analysis to calculate dosages. In science classes, unit analysis is used to convert from one unit of measure to another.

## LEARNING OBJECTIVES:

1) Use unit analysis to convert from one unit to another.
2) Solve problems with insufficient and/or extraneous (verbal or graphical) information.
3) Convert to and from mixed English units.

## WARM-UP:

1) Simplify the following fractions.
   a) $\frac{2.5}{2\frac{1}{2}}$ b) $\frac{5280 \text{ feet}}{1 \text{ mile}}$ c) $\frac{1 \text{ hour}}{60 \text{ minutes}}$
2) Simplify the following expressions. Give exact answers in reduced fraction form.
   a) $\frac{2}{3}\cdot\frac{3}{4}\cdot\frac{4}{5}\cdot\frac{5}{6}\cdot\frac{6}{7}\cdot\frac{7}{8}\cdot\frac{8}{9}$ b) $\frac{75}{10}\cdot\frac{22}{35}$
3) Give a reason for each step (for each equal sign).

$$0.25 \text{ miles} = \frac{0.25 \text{ miles}}{1}\cdot\frac{5280 \text{ feet}}{1 \text{ mile}} = 1320 \text{ ft}$$

## ACTIVITY:

Use unit analysis to convert units. Round answers to the tenths.

1) How many 1-tablespoon doses are there in a 1½ -cup bottle of Dayquil? Hint: 2 Tbsp = 1 oz. Use the conversion factors given to fill in the blanks of the unit analysis.

$$\frac{1½ \text{ cup}}{1} \quad \_\_\_\_\_ \quad \_\_\_\_\_ \quad =$$

2) How many miles is a 10-kilometer run?
   Hints: 1 inch ≈ 2½ centimeters; 100 centimeters = 1 meter; 1000 meters = 1 kilometer

$$\frac{10 \text{ km}}{1} \quad \_\_\_\_\_ \quad \_\_\_\_\_ \quad \_\_\_\_\_ \quad \_\_\_\_\_ \quad \_\_\_\_\_ \quad =$$

3) How does the question tell you what to write as the first fraction in your unit analysis?

4) The minimum wage in California is $6.75 per hour. What is the yearly income of a full-time, minimum-wage employee in California who takes two weeks of unpaid vacation each year?

5) A patient needs to receive 600 milligrams (mg) of aminophylline (a drug that aids breathing) at a rate of 40 milligrams per hour. The nurse puts the 1000 mg of aminophylline in the patient's 500 milliliters (ml) of IV solution at 2:15 p.m. on Thursday. How many drops per minute of IV solution should be infused into the patient?

1000 mg = 1 gram (g)
75 drops = 5 ml
1000 ml = l liter (l)

Some problems require conversion to or from *mixed units* (for example, 1010 min = 16 hr, 50 min). This type of problem is more easily done by long division than by unit analysis (see the example to the right).

```
      hrs  min
       16r50
60 ) 1010
     -60
      410
     -360
       50
```

6) A child whose height is above the 95$^{th}$ percentile or below the 5$^{th}$ percentile is unusually tall or short, and should be checked by a doctor for a medical condition, such as a hormonal imbalance. Use the growth chart on the next page to answer the following questions.

   a) Justin is 4'2", 60 lbs., and is 6 years, 3 months old. Does Justin's height indicate that he is unusually tall or short? Show your work. Include marks on the growth chart to show how you used it.

   b) Enrique is 4'9½", 70 lbs., and was born on January 7, 1996. Does Enrique's height indicate that he is unusually tall or short?

   c) What is the "usual" range of heights (in ft and in) for a boy who is 9 years, 8 months old?