Carmel High School
CP Chemistry/Honors Biology
Mr.Dooner

DIMENSIONAL ANALYSIS PRACTICE

***** many problems in both everyday life and in science involve converting measurements**

***** dimensional analysis is also known as the "factor-label method" or "unit conversion"**

--- Dimensional Analysis makes use of ratios called CONVERSION FACTORS

--- a CONVERSION FACTOR is a RATIO of two quantities EQUAL to EACH OTHER(for example... 1 foot= 12 inches)

--- the CONVERSION FACTOR COULD BE EXPRESSED AS:

$$\frac{1\ \text{FOOT}}{12\ \text{INCHES}} \quad \text{or as,} \quad \frac{12\ \text{INCHES}}{1\ \text{FOOT}}$$

--- you must multiply the GIVEN UNIT by a CONVERSION FACTOR which is expressed in the form which allows you to CANCEL OUT the GIVEN UNIT and KEEP the REQUESTED UNIT

--- HOW DO YOU GET THE VALUES FOR THE CONVERSION FACTOR? 1) BY MEMORY; 2) YOU LOOK IT UP; 3) IT IS GIVEN TO YOU IN THE PROBLEM; or 4) YOU USE AN INTERMEDIATE or a SERIES OF INTERMEDIATES

EXAMPLE: 12 days = ? minutes

EXAMPLE: 1256 cm = ? km

Problems Sets:

Use the following quantities for questions 1-3:

60s = 1 min	**5.50 yd = 1 rod**
12in = 1 ft	**7 days = 1 wk**
60 min = 1 hr	**5280 ft = 1 mi**
3 ft = 1 yd	**365 days = 1 yr**
24h = 1 day	

1. **Write the conversion factor needed for each unit conversion:**

a) feet to yards	**b) years to days**
c) yards to rods	**d) days to hours**
e) feet to miles	**f) seconds to minutes**

2. **Solve each problem by dimensional analysis on a separate sheet:**

a) **How many feet long is the 440 yard dash?**
b) **Calculate the number of minutes in two weeks.**
c) **Calculate the number of days in 1800 hours.**
d) **How many miles is 660 ft?**
e) **How many inches long is a 100 yd football field?**
f) **Calculate the number of hours in one year.**
g) **How many rods are there in 12 miles?**
h) **Calculate the number of minutes in 7 days.**

3. **Solve each problem by dimensional analysis:**

a) **A student walks at a brisk 3.50 mi/hr. Calculate the student's speed in yards/minute.**
b) **Water runs through a hose at the rate of 2.5 gal/min. What is the rate of water flow in gallons/day?**
c) **A clock gains 2.60 s each hour(2.6 s gained/hr). What is the rate of time gained in minutes/week?**
d) **A spider travels 115 inches in 1 min(speed = 115 in/min) What is the speed of the spider in miles/hour?**

4. **Using your knowledge of metric prefixes, perform the following conversions using dimensional analysis:**

a) **45 meters to kilometers**
b) **865 cm^3 to liters**
c) **0.23 km to decimeters**
d) **8.5 dm to millimeters**
e) **57.78 L to mL**