CH 221 Name: _____

Dimensional Analysis Worksheet

Directions: You must show all work and it must be presented in a neat and orderly fashion. The numbers in your setups and answers must include proper units and significant figures. You must use proper dimensional analysis technique, which means use one continuous conversion. **Answers appear immediately following the problems.**

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1. Convert 124.0 days into seconds.

2. Convert 9.75×10^7 fluid ounces of water (density = 0.99998 g/mL) into metric tons.

3. Convert 3.87×10^{-8} km into cm.

4. Convert 67 U.S. quarts into kL.

5. Convert 6.5 pounds into cups if the density of the liquid is 2.03 g/L.

6. Convert 3.409 miles per hour into km per minute.

7. Convert 56.2 m^3 into yd^3.

8. What is the density of a mystery liquid in g per mL if 65.0 fluid ounces weighs 202 mass ounces?

9. A piece of gold leaf (density 19.3 g/cm^3) weighs 1.93 mg. What is the volume in mm^3?

10. What is a better deal, a one gallon gasoline for $2.89 or one liter of gasoline for $0.75? Support you answer using calculations.

11. A car travels at a rate of 65 miles per hour. If the car gets 33.5 miles to the gallon, how many hours can a car travel on 25.0 pounds of fuel? (density of fuel is 6.50 pounds/gallon)

12. The recommended dose of a medication is 5 mg/kg body weight. You have a patient whose weight is 125 pounds. The pharmacy offers three different oils containing 500 mg, 250 mg, and 100 mg of medication. Which pill should you give your patient?

13. The bromine content of the ocean is about 65 grams of bromine per million grams of sea water. How many cubic meters of ocean must be processed to recover 1.0 pounds of bromine if the density of sea water is 1.0×10^3 kg/m^3?

14. An average man is requires about 2.00 mg of fiboflavin (vitamin B2) per day. Cheese contains 5.5µg of riboflavin per gram of cheese. How many pounds of cheese would a man have to eat per day if this is his only source of riboflavin?

15. Alan is going to the Boy Scouts Jamboree in D.C. next summer and he has been asked to bring the smores supply for all the boys going from the district in Oregon. Each giant chocolate bar makes 16 smores. Each boy will be limited to exactly 3 smores. The problem is that he has to buy the chocolate once he gets to D.C. because there will be too many of them and they may melt in the summer heat. On average, the stores only carry 25 of these giant chocolate bars in stock. How many stores will he have to visit if there are 2,225 boys?

16. In the yearly fundraiser at school, kids can earn a hamburger phone if they raise at least $250 in donations. Aaron was able to get all of his family and family friends to pledge enough money that he will earn $35 for each mile he runs. The problem is he runs very slowly, 88 inches per second. How many hours will it take him to run just long enough to earn the hamburger phone?

Answers to the Dimensional Analysis Worksheet:

1. $1.071 * 10^{7}$ s
2. $2.88 * 10^{3}$ tons
3. $3.87 * 10^{-3}$ cm
4. $6.3 * 10^{-2}$ kL
5. $6.1 * 10^{3}$ cups
6. $9.142 * 10^{-2}$ km
7. 73.6 yd^3
8. 2.98 g/mL
9. 0.100 mm^3
10. $0.75/L (which equals $2.84 / gallon)
11. 2.0 hr
12. Use 250 mg pill (answer = 300 mg)
13. 7.0 m^3
14. 0.80 lb
15. 17 stores
16. 1.4 hr