Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Period \_\_\_\_

**Unit 5 Significant Figures Homework**

1. Why do we bother with significant figures?
2. Give examples of exact and inexact numbers.
3. How many significant figures does each number have?
   1. 52,942
   2. 12.6488
   3. 50
   4. 202,100
   5. 0.00360650
   6. 0.00000009
   7. 3.02 x 10-8
   8. 1 x 101
   9. 6.49 x 103
   10. 2.0125 x 105
   11. 3.33 x 1010
   12. 4.000 x 1010
4. Express each number to **two** significant figures.
   1. 3,251
   2. 0.005
   3. 60,000
   4. 3.50x10-4
   5. 4.5 x 10-4
   6. 7.918
   7. 10.08
   8. 0.003108
   9. 5.555
   10. 0.152
   11. 96.8
   12. 3.29500

1. Convert all of the original numbers in the above problem from decimal form to scientific notation, or from scientific notation to decimal form.
2. What limits the exactness of your answer when multiplying or dividing?
3. What limits the exactness of your answer when adding or subtracting?
4. Perform the following calculations. Report each answer to the correct number of significant figures.
   1. (36.2 + 42,060)

35.05 • 0.072

* 1. (4.01 x 10-2 + 1.22 x 10-3)

35.05 • 0.072 • 8.87 x 10-5

* 1. (4500 – 65.0)

800 • 99.50

* 1. (400 + 32,072 – 88 )

52 • 3200 • 0.00645

* 1. (8,765,070 – 453.0 +200)

200,000

Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Period \_\_\_

**Unit 5 Conversion Worksheet #1**

**One-step conversions**

1. 0.34 g of magnesium metal in mg.
2. 482 cm of copper wire in m.
3. 14.4 mL of hydrochloric acid in L
4. 2.2 x 10-6 m in μm.

**Multi-step conversions**

1. 3 weeks in minutes
2. 0.0004 kg of lead in cg
3. 1.40 mL of sodium hydroxide solution in μL
4. 225,665 inches in yards

**Denominator conversions**

1. Jill walks at a pace of 1.45 km per 21.0 minutes. How fast is this in m/s?
2. A jet flies 4.80 x 102 m/s. How fast is this in miles per hour? (1 mi = 1609 m)
3. A bag of marbles weighs 3.3 lbs. How many kg do 16 bags of marbles weigh? (1 lb = 453.6 g)
4. The speed limit is 60 mph. At this rate, how many feet would you travel in 2.3 decades? (5280 ft = 1 mi)

**Density Conversions**

1. A mass of sand weighs 26 g and has a volume of 12.4 cm3. What is the density of this sand?
2. An aluminum pellet has a mass of 6.0 g. What is the volume if the density of aluminum is 2.70 g/mL?
3. The density of gas is 0.56 g/mL. If you fill your car with 28 L of gas, how much weight do you add to your car?
4. The density of a certain liquid is 1.54 g/mL. What is the volume in kL of 112.8 Mg of this liquid?
5. The concentration of a salt solution is 0.025 lbs / gallon. How many kg of salt are present in 12 quarts of this solution? (1 gal = 4 quarts)

Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Period \_\_\_\_

**Unit 5 Conversions W.S. #2**

**One Step:**

1. How many picoliters are there in 3.34 L?
2. How many weeks are there in 7.5 years?
3. How many seconds long is chemistry class on a regular 85 minute schedule?

**Denominator:**

1. A chocolate frosted donut from Dunkin’ Donuts contains 9 fat calories per gram.
2. How many fat calories are in one donut that weighs 65 grams?
3. Each donut contains 29 carbohydrates. How many carb.s are in a dozen donuts?
4. The price of gas is $2.89/gal. (Note: 1 US gallon = 3.7854118 liter, 1 gallon = 4 quarts).
5. What is the price per liter?
6. What is the price per kL?
7. What is the price of a quart of gas?

**Speed and Density:**

1. The speed limit in Vancouver is 80 km/hr. How fast is this in miles per hour?
2. 945.8 m/s =  ? m/hour
3. The speed of light is 3 x 108 m/s.
4. How fast is that in m/min?
5. In m/hour?
6. A lightyear is a unit of distance. It is the distance that light will travel in one year. How far is a lightyear in meters?
7. How far is a lightyear in Gm?
8. How many Gm will light travel in one century?
9. How many Gm will light travel in one day?
10. Silver has a density of 2.70 g/mL.
    1. What volume, in L would 0.330 g of this object occupy?
    2. How many kg would it take to fill a 2 L bottle?
    3. How volume, in quarts, would 68.5 ounces fill?
    4. How many pounds would be needed to fill 32.9 cm3?

**Squared and Cubed:**

1. A bucket holds a volume of 4310 cubic centimeters. Convert to m3.
2. A vase contains 86.3 cubic centimeters of water. What is volume of the water in mm3?
3. Convert 5.94 x 1010 mm3 to micrometers cubed.

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**Unit 5 Mole Conversions WS#1**

1. Define a mole.
2. List five units used to measure mass.
3. List 3 units used to measure amount.
4. How much does 1 mole of oxygen atoms weigh?
5. How much does 1 mole of sodium atoms weigh?
6. How many atoms are in 1 mole of oxygen atoms?
7. How many atoms are in 1 mole of sodium atoms?
8. If copper pennies weigh 3 grams each, how many copper atoms are there in enough pennies to buy a$2.99 hamburger?
9. How many moles are in 7.7 grams of rust, iron (III) oxide?
10. How much does a 6.50 mole sample of sodium chloride weigh?
11. How many stars are in 3.5 moles of stars?
12. How many hydrogen atoms are present in 2.80 g dicarbon hexahydride?

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**Unit 5 Mole Conversions WS #2**

*Molar Ratios*

1. A ferry boat is carrying a load of Volkswagen beetles that weighs 37,800lbs. How many tires are in this group of beetles? (A Volkswagen Beetle weighs 2,700 lbs)
2. How many hydrogen atoms are in 96.0 g sulfuric acid?
3. A sample of chalk (calcium carbonate) contains 3.010 x 1024 oxygen atoms. How much does the chalk weigh?
4. What is the mass, in grams, of the nitrogen atoms present in 7.09x1025 zinc nitrate compounds?
5. What is the weight of gold present in 20.00 mg gold (I) phosphate?

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**Unit 5 Mole Conversions WS #3**

*Molar Ratios*

1. How many hydrogen atoms are in 12.5 grams of water?
2. How many oxygen atoms are in 3.70 g phosphoric acid?
3. How many grams of copper (I) oxide would you need in order to have 3.4x1023 copper atoms?
4. How many oxygen atoms are present in 24.00 g carbon dioxide?
5. How many silver atoms are present in 6.01 g silver nitrate?