PROVIDENCE HIGH SCHOOL

SCIENCE DEPARTMENT

Honors Chemistry Summer Work

This packet of work should be completed over the summer vacation and turned in to DR. HARJANI on the FIRST DAY OF SCHOOL.

You will be expected to be competent in the following skills at the beginning of next school year.

Table of Contents:

Scientific Notation

Scientific notation (also called exponential notation) is a concise way of talking about both very big and very small numbers.

1. Go to **http://www.edinformatics.com/math_science/scinota.htm**
2. Work through the following sections related to scientific notation:
    a. Introduction to scientific notation (the above link takes you here)
    b. Multiplication using scientific notation
    c. Division using scientific notation
3. Complete the following problem set.

Scientific Notation Problems:

Write the following numbers in scientific notation.

1. 1001 _____
2. 53 _____
3. 6,926,300,000 _____

4. -392 _____

5. 0.00361 _____

6. 0.13592 _____

7. -0.0038 _____

8. 0.00000013 _____

9. -0.567 _____

10. 6,500,000 _____

Convert the following numbers from scientific notation to regular notation.

1. 1.92×10^{3} _____

2. 3.051×10^{1} _____

3. -4.29×10^{2} _____

4. 6.251×10^{9} _____

5. 8.317×10^{6} _____

6. 1.03×10^{-2} _____

7. 8.862×10^{-1} _____

8. 9.512×10^{-8} _____

9. -6.5×10^{-3} _____

10. 3.159×10^{2} _____

Use scientific notation (and only scientific notation!) to find the answer to the following problems.

1. $(4.1357 \times 10^{-15}) \cdot (5.4 \times 10^{2}) =$ _____

2. $(1.695 \times 10^{4}) \div (1.395 \times 10^{15}) =$ _____

3. $(4.367 \times 10^{5}) \cdot (1.96 \times 10^{11}) =$ _____

4. $(6.97 \times 10^{3}) \cdot (2.34 \times 10^{-6}) =$ _____

5. $(5.16 \times 10^{-4}) \div (8.65 \times 10^{-8}) =$ _____

Metric System

The metric system is used by scientists in every field of science and every country. The measurements you will be taking and working with in chemistry will be in metric system units.

1. Go to
   http://www.visionlearning.com/library/module_viewer.php?mid=47
   for a good introduction to the metric system.
2. Learn the following tables. These prefixes will be used frequently in your chemistry class and you must know what they mean.

Prefix	Symbol	Factor
Kilo-	k	10^{3}
Centi-	c	10^{-2}
Milli-	m	10^{-3}
Nano-	n	10^{-9}

The base units of each quantity are as follows:

Quantity	Unit	Symbol
Length	Meter	m
Mass	Gram	g
Temperature	Kelvin	K
Time	second	s
Amount of substance	Mole	mol

Dimensional Analysis

Dimensional analysis is simply unit conversion. A simple example is if a friend has 10 quarters and asks you how many dollars he or she has ($2.50). You converted from units of “quarters” to units of “dollars” using the conversion factor 4 quarters = 1 dollar.

1. Go to
   http://chemistry.alanearhart.org/Tutorials/DimAnal/index.html

2. Work through sections 1-6 on the above website.
3. Complete the following two problem sets. The conversion factors you need can be found in the Metric System section.

Dimensional Analysis Problems 1

1a. 1000 m = _____ km

1b. 7 cm = _____ mm

2a. 900 cm = _____ m

2b. 3 m = _____ cm

3a. 9000 m = _____ km

3b. 2 cm = _____ mm

4a. 10000 m = _____ km

4b. 8 cm = _____ mm

5a. 6.7×10^{-5} m = _____ nm

5b. 7×10^{2} cm = _____ m

6a. 8 km = _____ m

6b. 8 m = _____ cm

7a. 3000 m = _____ km

7b. 50 mm = _____ cm

8a. 10 m = _____ cm

8b. 6000 m = _____ km

9a. 600 cm = _____ m

9b. 4 cm = _____ mm

10a. 500 cm = _____ m

10b. 2 km = _____ m

Dimensional Analysis Problems 2

1a. 1 L = _____ ml

1b. 4 L = _____ ml

2a. 2000 g = _____ kg

2b. 5×10^3 g = _____ kg

3a. 2 L = _____ ml

3b. 8 kg = _____ g

4a. 6000 g = _____ kg

4b. 1000 g = _____ kg

5a. 5000 ml = _____ L

5b. 9000 ml = _____ L

6a. 3 L = _____ ml

6b. 3 kg = _____ g

7a. 8000 ml = _____ L

7b. 7000 g = _____ kg

8a. 6 L = _____ ml

8b. 9×10^3 g = _____ kg

9a. 10 kg = _____ g

9b. 4000 g = _____ kg

10a. 10 L = _____ ml

10b. 7 L = _____ ml

Basic Atomic Structure

The atom is the fundamental unit of matter and is the basis for the study of chemistry. You are expected to know the basic structure of the atom, including the identity of the three subatomic particles, as well as the mass, charge and location of each subatomic particle.

1. Go to **http://www.cartage.org.lb/en/themes/Sciences/Chemistry/Generalchemistry/Atomic/BasicStructure/BasicStructure.htm** for a simple explanation of basic atomic structure.
2. Complete the following table:

Particle	Symbol	Mass (amu)	Charge	Location in the Atom
Proton	p^+			
Neutron	n^0			
Electron	e^-			

Introduction to the Periodic Table

Print off a periodic table from **www.webelements.com**. Familiarize yourself with its layout and know what information is found in each box of the periodic table (see the Key on the Periodic Table).

Element Symbols

All of the elements shown in the periodic table have names. These names are often very long and inconvenient to work with (like gadolinium), so each element also has a one or two letter symbol. (Note that for two letter symbols the first letter is uppercase and the second is lowercase.) These symbols are the language of chemistry, so it is important that you know the symbols for some common elements. You'll find that most of the symbols make sense (for example, the symbol for carbon is C), while others don't (like the symbol for sodium being Na). The symbols that don't make sense are usually derived from the Latin name of the element, while the ones that make sense come from the English name.

1. Memorize the following common element names and symbols.

    a. Hydrogen (H)
    b. Helium (He)
    c. Carbon (C)
    d. Nitrogen (N)
    e. Oxygen (O)
    f. Fluorine (F)
    g. Neon (Ne)
    h. Sodium (Na)
    i. Magnesium (Mg)
    j. Aluminum (Al)
    k. Sulfur (S)
    l. Chlorine (Cl)
    m. Potassium (K)
    n. Calcium (Ca)
    o. Iron (Fe)
    p. Nickel (Ni)
    q. Copper (Cu)
    r. Zinc (Zn)
    s. Bromine (Br)
    t. Silver (Ag)
    u. Gold (Au)
    v. Mercury (Hg)
    w. Lead (Pb)
    x. Iodine (I)