Chemistry Review Project **Due Date: May 23rd & 24th Bring to class!!!** **Wong**

Students will create a review booklet for what we have covered in chemistry. This will be comprised of a note sheet for each chapter. Each chapter must be at least 1 page (but no more than 2 pages per unit) and no larger than 8x11" paper. Pages must be **HANDWRITTEN** with the exception of images of lab equipment which may be copied and pasted. This is for your benefit to help you prepare for your upcoming SOL/final exam!!! Pages must be neat and legible.

10 pts per section (10 x 9 = 90) & 10 pts for neatness and overall appearance (90 + 10 = 100pts!!!)

Each section must contain the information below. This is the minimum requirement, extra information that you find helpful may also be included.

Chapter 1: The Atom: Describe the importance of the following: Democritus; Scientists-Dalton (include model of the atom), Thomson (include model of the atom & experiment), Rutherford (include model of the atom & experiment), Millikan (include experiment), Bohr (include model of the atom), Planck, Heisenberg, & de Broglie. In an atom, what is the job of a proton, electron, and neutron and how the amount of each determined? What do the following represent and where are the values of each located: Atomic #, Atomic Mass, & Mass #. Describe the following: Isotopes, Ions-Cation & Anion, Hund's Rule, Aufbau, Pauli Exclusion Principle, electron configuration, and orbital diagram. Do the electron configuration and orbital diagram for Bromine & Sulfur. Do the electron Configuration for N^{3-}. Discuss the composition, shielding, and penetrating power of alpha, beta, and gamma.

Chapter 2: Periodic Table: Importance of Mendeleev and Mosely. Draw 2 periodic tables. On the first label metals/non-metals/ metalloids, each group #, Alkali metals, Alkaline Earth Metals, Transition Metals, Halogen, Nobel Gases/Inert Gases, Oxidation # above each group, Periods, Blocks-s,p,d,f. On the 2nd table draw the overall increasing trend for electronegativity, ionization energy, shielding effect, and atomic radius. Define/Describe electronegativity, ionization energy, shielding effect, & atomic radius as well as cation size vs. neutral atom & anion size vs. neutral atom

Chapter 3: Bonding & Naming: List Polyatomic Ions with formulas for Ammonium, Acetate, Hydroxide, Chlorate, Nitrate, Sulfate, Phosphate, & Carbonate. Provide the name & formula for ammonia and methane. Discuss how bond type is determined using electronegativity values, include the ranges for each type of bond. Discuss ionic bonds include naming rules with example, formula rules with example, and properties. Discuss covalent bonds include naming rules with example, formula rules with example, and properties. Discuss how each of the following is determined and provide examples for: VSPER- shapes, bond polarity, molecular polarity, and Intermolecular Forces.

Chapter 4: Chemical Reactions & Stoichiometry: Describe Indicators of chemical reaction. Describe/explain ways to increase reaction rates. Discuss the types of reactions (also include neutralization & redox) make sure to provide an example of each & show how to balance 2 reactions one must be a combustion reaction. What does (aq) and (s) indicate in a reaction and how is it determined? Show how to solve/provide 3 examples of reaction stoichiometry problems must include a mole→ mole; gram→ gram; and liter→ molecules problem. Show how to solve/ provide 1 example limiting and excess reactant problem including percent yield. Discuss/explain a reaction at equilibrium. Explain Le Chatelier's principle and how changing concentration, temperature, heat, and pressure effects the reaction at equilibrium, provide examples of each.

Chapter 5: States of Matter & Gases: States of Matter- solids, liquids, gases, phase changes. Discuss boiling and how it is a function of pressure. Draw a heating curve & draw a phase diagram on both graphs label the states and phase changes include directionality; be sure to label axis's!!! Describe the following relationships include graphs for each: Boyles Law, Lussac's Law, & Charles Law. Explain each effusion, diffusion, & graham's Law. Relationship between atm→ mmHg→ kPa. Explain Kinetic Molecular Theory, gas pressure, absolute Zero & elastic collisions.

Chapter 6: Acid, Bases & Solutions: Homogeneous versus Heterogeneous. Describe parts of a solution-solute & solvent. Describe/explain how to increase solubility rate. Seven separation techniques. Explain the following unsaturated, saturated, super saturated, concentrated, dilute, miscible, Immiscible, like dissolves like – include examples, pH scale, neutralization, naming acid rules, acids, bases including ammonia, colligative properties, and electrolytes. Explain how to set up and preform a titration including what is your final goal.

Chapter 7: Thermochemistry: Heat vs. Temperature and include units for each. Discuss specific heat. Endothermic vs. Exothermic include: a physical and chemical example of each, a thermochemical equation for each, and draw a reaction pathway diagram (potential energy diagram) for each and label the products, reactants, ΔH, activated complex, and activation energy. Explain enthalpy and entropy. Show how to solve/ provide examples of 2 thermochemical reaction stoichiometry problems. Provide 2 mathematical examples with using Heat of Fusion/Vaporization.

Chapter 8: Math: Metric prefixes (kilo→ milli) and SI Units of measurement. ALL FORMULAS!!! Provide a formula & an example of: Percent error, percent yield, density, percent composition, ideal gas law, Dalton's partial pressure, Boyle's Law, Lussac's Law, Charles Law, Combined Gas Law, Q=mcΔT, Molarity, Dilution, °C→ Kelvin, pH, & pOH. Show how to calculate/ provide: 2 examples of calculating molar mass including a polyatomic ion in parenthesis, 1 example of empirical formula (include when to multiply by 2) , 1 example of molecular formula, & 1 example ***each*** for calculating significant Figure Rules +/- x/÷. Discuss Avogadro's #, standard temperature, & standard pressure. Discuss inversely proportional & directly proportional and include a graph of each. Label independent variable and dependent variable on a graph. Provide a 2 worked out half-life examples that determines: the amount of mass remaining after a certain amount of time & the number of half-life's that occurred based on the change of mass..

Chapter 9: Laboratory: Accuracy vs Precision. Picture and function of lab equipment: beaker, Erlenmeyer flask, test tube, graduated cylinder, test tube rack, test tube holder, ring stand, wire gauze, clay triangle, crucible with lid, evaporating dish, watch glass, wash bottle, volumetric flask, buret, & dropping pipet. Discuss measuring with correct number of significant figures. What are the following used for: safety shower, fume hood, eye wash, and fire blanket. Steps of the scientific method, independent variable, and dependent variable.

You may include any other information you may need to succeed!!!

Due Dates:

April 4 and 5: Ch. 1
April 10 and 11: Ch. 2
April 25 and 26: Ch. 3
May 2 and 3: Ch. 4
May 9 and 10: Ch. 5
May 16 and 17: Ch. 6
May 23 and 24: ALL CHAPTERS TURNED IN TOGETHER; ENTIRE PROJECT IS DUE

Flashback Quizzes – At the end of every week (Thursday/Friday). You may use your review booklet.

Quiz #1: The Atom – April 4 and 5
Quiz #2: The Periodic Table – April 10 and 11
Quiz #3: Bonding & Naming – April 25 and 26
Quiz #4: Reactions, Balancing & Naming – May 2 and 3
Quiz #5: Atoms, Ions, e^- Configuration & Naming – May 9 and 10