**Topics Guide 2015 Honors Final Exam**

**Classification of Matter:**

* Classification of Matter (Elements, Compounds, Mitures)
* Chemical /Physical properties and change
* Observational signs of a Chemical Reactions
* How to separate components of a mixture
* Difference exothermic/endothermic reaction
* Kinetic theory of Solids, Liquids, Gases

**Scientific Math**

* Significant Figures
* Metric Units
* Density Calculations and interpretations:

Example: a cube has a side dimension of 2.0 cm and a mass of 10.00 grams, will it sink or float in water?

* English to Metric conversions
* Specific heat calculations
* Molar Mass
* MOLES MOLES MOLES Grams to Moles to Atoms/molecules
* % composition of compounds – Percent Metal

**Atomic Theory:**

* Parts of the atom: protons, neutrons, electrons-how to determine atomic # and mass # –nuclear shorthand notation
* Isotopes - Alpha and Beta decay reactions
* Nuclear fusion and fission ½ life
* Law of Conservation of Matter and Energy and Definite and Multiple Proportions
* Valence electrons Lewis Dot Diagrams

**Arrangement of Electrons in Atoms:**

* Parts of Waves (Energy relation to wavelength and frequency)
* Ground state vs. Excited State generation of emission Spectrums
* Electron Configurations: How to construct and interpret (Orbital notations, longhand, Noble gas Configurations)
* Quantum #s ( Names, Symbols Definitions and Use)
* Three Rules for filling orbitals: Aufbau, Pauli, and Hund

# Periodic Trends

* Mendeleev --- Mosley ------Periodic Law
* Groups and Periods trends and causes of Atomic Radii, electronegativity, ionization
* Ions Cations and Anions How they form and properties

**Chemical Bonding**

* How atoms form bonds Ionic vs. Covalent bonds
* Lewis Structures
* VSEPR Theory- Geometric Shapes- how to draw structures, label shape, and determine polarity

**Chemical Nomenclature:**

* How to name compounds given formulas
* How to create formula from chemical name
* Determination of Empirical formula

**Chemical Reactions**

* Balance chemical equations by applying the laws of conservation of mass and constant composition (definite proportions).
* Classify chemical reactions as synthesis, decomposition, single replacement, double replacement, and combustion.
* Identify the signs of a chemical reaction.
* Predict products of synthesis, decomposition, single replacement, double replacement, and combustion reactions.

**Stoichiometry**

* Use the mole concept to determine the number of particles and the molar mass of elements and compounds.
* Calculate the mass-to-mass stoichiometry for a chemical reaction.
* Calculate percent yield in a chemical reaction.
* Determine limiting and excess reactants.

**Gas Laws**

* Be able to perform conversions between different Units of Volume, Pressure and Temperature.
* Apply gas laws to determine general trends involving gases
* Know and apply the ideas of KMT as well as the properties of gases what happens if change one of the variables
* Use the combined gas laws to solve word Problems
* Use the Ideal Gas Law to solve word problems

**Solutions**

* Understand the concept of dissolving and the properties that affect this process.
* Electrolytes vs nonelectrolytes
* Be able to calculate the concentration of a solution in Molarity/Molality, and Percentage by mass.
* Be able to perform calculations involving the stoichiometry of solutions

**Acid / Bases**

* Know what makes a compound an Acid or a Base
* Know common acids and base properties
* Understand the idea of pH
* Understand titrations and equivalence point
* Be able to calculate the amount of acid or base required to reach an equivalence point.

DON’T FORGET TO LOOK OVER THE LABS WE HAVE DONE TOO! (Separation, Density, Specific Heat, Hydrate, flame lab)

Anything that has been on a Quiz Test or Assignment is fair game.