**Chemistry Fall Final Exam Study Guide**

**Unit 1: The Basics – Atoms and Number Reporting**

Be able to:

-Convert a number into scientific notation

-Apply the rules for rounding using significant figures (how many to keep when you add or subtract, multiply or divide)

-Use the unit conversion chart on the back of your periodic table to convert between metric and standard units

-Use the periodic table to determine the atomic mass, atomic number, and the numbers of protons, neutrons, and electrons for each element

-Explain why the atomic mass of an element does not include the mass of its electrons

-Identify the charge on an atom when it ionizes

-Explain what an isotope is

-Identify the major contributions of Dalton, Thompson, and Rutherford to early atomic theory

-Explain what Rutherford’s gold foil experiment proved

**Unit 2: Quantum Theory and Periodic Trends**

Know the following Vocabulary:

 valence electrons

 alkali earth metal

 alkaline metals

 noble gases

halogens

quantum

electronegativity

metal

nonmetal

ionization energy

atomic radius

Be able to:

-Describe the periodic trends for ionization energy, electronegativity, atomic radius, ionic size

-Explain what it means for an atom to be inert (stable)

Which group of elements is inert?

How do the other elements achieve this? (Hint: What does the octet rule state?)

-Summarize the Bohr model of the atom

-Summarize the quantum mechanical model of the atom

-Locate the s, p, d, and f orbitals on the periodic table

-Write the electron configuration for any element

-Draw an electron orbital diagram for any element

-Summarize Hund’s Rule and the Pauli Exclusion Principle

-Identify groups vs. periods on the periodic table

-Explain what the elements of a single group have in common

**Unit 3: Chemical Reactions**

Know the following Vocabulary:

 ionic bond cation

 anion

ionic compound

molecular compound

single covalent bond

double covalent bond

triple covalent bond

reactants

products

Be able to:

-Write formula for any molecular or ionic compound

-Identify whether a compound is ionic or molecular based on its name or formula

-Name any molecular or ionic compound using correct nomenclature

-Draw the Lewis dot structure for an atom, formula unit, and/or molecule

-Identify what type of reaction is being represented by a chemical equation. Be able to predict the products. Here are the six types of reactions we studied:

 Synthesis

 Decomposition

 Single Replacement

 Double Replacement

 Combustion

-Balance a chemical equation

-Name and write formulas for the common acids

-List the reactants and products in the combustion reaction of a hydrocarbon (for example, C6H14).

-Interpret the metals activity series and the activity series for halogens to determine whether given single replacement reaction will occur

-List the possible indicators of a chemical change

**Unit 4: Stoichiometry**

Know the following Vocabulary:

 mole

molar mass

 Avogadro’s number

 mol ratio

mol fraction

formula mass – it is calculated same as molar mass, but the units are amu [atomic mass units] instead of grams because it represents the mass of one molecule or formula unit of a compound instead of one mole.

Be able to:

-Find the molar mass of a compound or element

-Convert between grams and moles

-Convert between moles and particles (the term “particles” refers to atoms, molecules, or formula units)

-Complete stoichiometric problems

**Helpful resources**

1. Mr. Fitch’s website – Look under the “Chemistry Documents” tab for old homework assignments, answer keys, lecture notes, etc.
2. Your textbook – use this as a resource for practice problems, explanations of important concepts, and vocabulary definitions.
3. The Internet – Here you can find video lessons on all the concepts we’ve studied, definitions for vocabulary, and more practice problems with solutions.
4. …and if all else fails, Mr. Fitch is available during Access and after school.