**Chemistry Study Guide**

**Chapter 4: The Structure of the Atom**

* **4.1: Early Theories of Matter**
  + **Vocabulary**
    - Atom
  + **Objectives**
    - Become an expert on and create a product to teach younger students about one aspect of atomic theory and associated experimentation.
    - Make connections between different ideas within the development of atomic theory and the atomic model.
    - Summarize key discoveries and people related to the development of atomic theory and our understanding of the atom.
    - Explain the relationship between unstable nuclei and radioactive decay.
    - Characterize alpha, beta, and gamma radiation in terms of mass and charge.
    - Write equations for nuclear decay.
    - Graph changes in mass and atomic number for decay events.
* **4.2: Subatomic Particles and the Nuclear Atom**
  + **Vocabulary**
    - Electron
    - Nucleus
    - Proton
    - Neutron
  + **Objectives**
    - Define atom in your own words.
    - Describe the structure of a typical atom. Be sure to identify where each subatomic particle is located.
    - Make a table comparing the relative charge and mass of each subatomic particle.
* **4.3: How Atoms Differ**
  + **Vocabulary**
    - Atomic number
    - Isotope
    - Mass number
    - Atomic mass unit (amu)
    - Atomic mass
  + **Objectives**
    - Identify the atomic number (number of protons) as determining the identity of an atom.
    - Define an isotope and explain why atomic masses are not whole numbers.
    - Calculate the number of protons, electrons, and neutrons in an atom given its atomic number and mass number.
    - Calculate mass number given number of protons and neutrons.
* **4.4: Unstable Nuclei and Radioactive Decay**
  + **Vocabulary**
    - Nuclear reaction
    - Radioactivity
    - Radioactive decay
      * Alpha particle
      * Beta particle
      * Gamma ray
  + **Objectives**
    - Explain the relationship between unstable nuclei and radioactive decay.
    - Characterize alpha, beta, and gamma radiation in terms of mass and charge.
    - Write equations for nuclear decay.
    - Graph changes in mass and atomic number for decay events.