

**Big Idea 1: Structure of Matter****Learning Objective Check List**

Structure of Matter		
Mole Concept: Empirical Formula, Percent Composition, Stoichiometry	Learning objective 1.1 The student can justify the observation that the ratio of the masses of the constituent elements in any pure sample of that compound is always identical on the basis of the atomic molecular theory. [See SP 6.1; Essential knowledge 1.A.1]	
	Learning objective 1.2 The student is able to select and apply mathematical routines to mass data to identify or infer the composition of pure substances and/or mixtures. [See SP 2.2; Essential knowledge 1.A.2]	
	Learning objective 1.3 The student is able to select and apply mathematical relationships to mass data in order to justify a claim regarding the identity and/or estimated purity of a substance. [See SP 2.2, 6.1; Essential knowledge 1.A.2]	
	Learning objective 1.4 The student is able to connect the number of particles, moles, mass, and volume of substances to one another, both qualitatively and quantitatively. [See SP 7.1; Essential knowledge 1.A.3]	
Analyzing Data to Determine Electron Configurations, PES, IE, Coulomb's Law	Learning objective 1.5 The student is able to explain the distribution of electrons in an atom or ion based upon data. [See SP 1.5, 6.2; Essential knowledge 1.B.1]	
	Learning objective 1.6 The student is able to analyze data relating to electron energies for patterns and relationships. [See SP 5.1; Essential knowledge 1.B.1]	
	Learning objective 1.7 The student is able to describe the electronic structure of the atom, using PES data, ionization energy data, and/or Coulomb's law to construct explanations of how the energies of electrons within shells in atoms vary. [See SP 5.1, 6.2; Essential knowledge 1.B.2]	
	Learning objective 1.8 The student is able to explain the distribution of electrons using Coulomb's law to analyze measured energies. [See SP 6.2; Essential knowledge 1.B.2]	
Periodicity	Learning objective 1.9 The student is able to predict and/or justify trends in atomic properties based on location on the periodic table and/or the shell model. [See SP 6.4; Essential knowledge 1.C.1]	
	Learning objective 1.10 Students can justify with evidence the arrangement of the periodic table and can apply periodic properties to chemical reactivity. [See SP 6.1; Essential knowledge 1.C.1]	
	Learning objective 1.11 The student can analyze data, based on periodicity and the properties of binary compounds, to identify patterns and generate hypotheses related to the molecular design of compounds for which data are not supplied. [See SP 3.1, 5.1; Essential knowledge 1.C.1]	