

Unit 1/Big Idea 1: Chemical Elements and the Arrangement of Atoms

(Chapters 1, 2, 3, 5 and 6)

1. Mass Percent (2 requirements)

a. Can you identify an element or determine its purity using mass percent calculations? **Chp 2-7**

b. Can you use mole relationships to convert between moles, mass, particles, volume, and pressures? **Chps 1-10, 2-5, 2-6, 12-3, 12-8**

2. Electronic Structure of Atoms and Periodicity (1 requirements)

a. Can you predict and justify periodic trends in data for *PES**, *radii (6-2)*, *ionization (6-3)*, *electronegativity (6-6)* using Coulomb's Law? **Chps 6-2 to 6-6, 13.2**

3. Atomic Models (3 requirements)

a. Can you use experimental data (*mass spectrometry 5-8*, *PES**, *electromagnetic waves 5-10*) to justify the replacement of early atomic models with the shell model and eventually the quantum mechanical model? **Chps 5-12 to 5-15**

b. Can you use mass spectrometry to identify elements and determine atomic mass? **Chps 5-8, 5-9**

c. Can you design a lab using a spectrophotometer to determine the concentration of a solution (Beer's Law*)?

4. Law of Conservation of Mass (1 requirement)

a. Can you balance chemical reactions and use mole ratios to predict amounts needed or produced in a chemical reaction? **Chps 3-1, 3-2**