The student should be able to:

1. Define and give examples of elements, compounds, and mixtures.
2. Define the terms atom and molecule.
3. Describe the structure of an atom in terms of its component subatomic particles, and provide the symbol, electrical charge, and relative mass of the subatomic particles.
4. Define atomic number, mass number, and amu.
5. Determine atomic number, mass number, proton number, neutron number, and electron number for any element given appropriate data.
6. Define and recognize examples of isotopes.
7. Calculate the atomic weight of an element given the mass numbers and percent distribution of each of the nuclides of the element of interest.
8. Define the term mole.
9. Define the terms gram-atomic weight and gram-molecular weight.
10. Calculate the number of atoms and/or moles of atoms present in a given mass of an element.
11. Calculate the number of molecules and/or moles of molecules present in a given mass of a compound given its formula.
12. Calculate the mass of a substance in grams given the number of moles and its chemical formula.
13. Calculate the percent weight composition of a compound given its chemical formula.
14. Determine the empirical formula of a compound given its elemental percent weight composition.
15. Differentiate between an empirical and a molecular formula, and derive the latter from the former.
16. State and recognize examples of the Law of Definite Proportions.
17. State and recognize examples of the Law of Multiple Proportions.
18. State Gay-Lussac's Law of Combining Volumes of reacting gases.
19. Describe Avogadro's Principle and its relationship to Gay-Lussac's law.