Chapter 2
Atoms, Ions, and Molecules: The Building Blocks of Matter
Learning Objectives

8.2.2021

To satisfy the minimum requirements for this course, you should be able to:

1. Understand atomic structure and composition with respect to protons (p^+), neutrons (n^0), and electrons (e^-).

2. Recognize and define nucleon, isotope, nuclide, atomic number, mass number and atomic mass unit (amu).

3. Understand the organization of the periodic table and be able to:
   - write the symbol and charge for an atom or ion, having been given the number of protons and electrons, and perform the reverse operation
   - write the symbol for an isotope given its atomic number and the number of neutrons in the nucleus
   - define group (or family) and period
   - identify an element as a metal, nonmetal, or metalloid
   - identify the following groups: 1 (alkali metals); 2 (alkaline earth metals); 17 (halogens); 18 (noble gases)
   - predict the charge of monoatomic ions based on the periodic table

4. Understand how empirical and molecular formulas are used to express the chemical composition of a substance and be able to:
   - explain the differences between molecular compounds and ionic compounds
   - define cation and anion

5. Perform calculations involving the masses of atoms and molecules. Examples include:
   - use Avogadro's number, N_A, to relate moles to number of particles
   - calculate atomic weight from isotope abundance, and vice versa
   - calculate the molecular mass or formula mass (in amu) and molar mass (in g/mol) of a substance from its chemical formula
   - interconvert number of molecules, number of moles, number of atoms and mass of a substance

N.B. Section 2.6 will not be covered.