

## Basic Concepts and Skills in Chemistry Expected of Students Entering Chemistry 1450

Text = *Chemistry* (4<sup>th</sup> ed.) J. McMurry and R. C. Fay, Prentice Hall 2004

Concept/Skill	Text Sections	Example Chapter Problems
Use factor label method (conversion factors) in calculations.	Sec. 1.13	1.16-1.17, 1.60, 1.61, 1.72
Know the names and symbols of first 30 elements, plus those of Au, Ag, Hg, Pb, Br, I	Sec. 1.2-1.4	1.44, 1.45
Know the difference between atoms, molecules and ions.	Sec. 2.4, 2.8	2.10, 2.13, 2.25, 2.62, 2.63
Know the nature of basic components of an atom—electrons, protons, and neutrons.	Sec. 2.4-2.5	2.4-2.6
Understand the distinction between an isotope's mass number and the average atomic weight (mass) of an element; understand the distinction between amu and gram molar mass.	Sec. 2.6, 3.3	2.42, 2.43, 3.4
Know the difference between an ionic compound and a covalent one.	Sec. 2.8, 2.10	2.10, 2.12, 2.65, 2.67
Use the periodic table to predict element combinations that yield ionic compounds and those that combine to form covalent compounds.	Sec. 2.8, 2.10	2.10, 2.12, 2.65, 2.67
Write the formulas and names of chemical compounds.	Sec. 2.8, 2.10	2.78, 2.79, 2.81
Calculate the molar mass of a compound	Sec. 3.3	3.42, 3.44,
Convert grams to moles and moles to grams for elements and compounds.	Sec. 3.3	3.42 – 3.51
Write and balance chemical equations	Sec. 3.1, 3.2	3.38 – 3.41
Do stoichiometric calculations based on a balanced chemical equation.	Sec. 3.4	3.31, 3.33, 3.59, 3.60, 3.63
Write correct dissociation equations for ionic solutes in water.	Sec. 4.2, 4.3	4.4, 4.32, 4.33
Classify reactions into four general types: combination, decomposition, single replacement, and double replacement.	Sec. 4.1	
Distinguish between strong and acids.	Sec. 2.9, 4.2	
Understand what neutralization is and how acids and bases react in this way.	Sec. 4.5	4.9, 4.54, 4.55
Understand what oxidation and reduction are; be able to determine the oxidation number (state) of an element in a compound or in an ion	Sec. 4.6, 4.7	4.11, 4.13
Write proper Lewis dot structures for atoms, molecules and polyatomic ions. Know how to determine the number of valence electrons.	Sec. 7.5, 7.6	7.4, 7.5, 7.9, 7.11
Understand the basics of energy, heat flow, and calorimetry. Know the relationship(s) of these to temperature.	Sec. 8.3, 8.8	8.10, 8.11
Understand the qualitative aspects of the kinetic molecular theory of matter	Sec. 9.6	9.27, 9.28, 9.34, 9.35,