

CHM 110
Chapter 3 Study Guide / Learning Objectives

Chapter three in OpenStax introduces some basic chemical calculations. When we think about how chemistry works, we think of chemicals in terms of atoms, molecules, and formula units. When we do experiments in a laboratory, we usually measure mass and volume. To make sense of what is going on in the lab, we need to translate between the idea of molecules measurements of grams and milliliters. Chapter 3 gives us the tools we need to make the translation.

At the end of the chapter, you should be able to:

[Terminology]

- Define **mass, formula weight/molar mass, mole, Avogadro's number, empirical formula, molecular formula, molarity.**

[Amount of substance]

- Calculate the formula weight (molar mass) of a substance given its chemical formula.
- Convert between the mass of a substance and moles of that substance using the substance's molar mass or formula weight using dimensional analysis.

[Chemical formulas]

- Determine the percent composition by mass of a compound given its chemical formula.
- Determine the empirical formula of a compound given its percent composition by mass. (See experiment 3A in the laboratory.)

[Molarity and solution concentration]

- Determine the molarity of a solution given the amount of solute and volume of solution present.
- Determine the moles of reactant present in a given volume of a solution whose molarity is known.
- Determine the volume of a solution (of known molarity) that contains a given number of moles of solute.
- Calculate the new concentration of a solution that is diluted by adding more solvent by using the dilution equation.

[Practice problems from the textbook]

- 3, 13, 15, 17, 19, 31, 33, 47, 49, 51, 59, 61, 63