

Chapter 1
Matter and Energy: An Atomic Perspective
Learning Objectives

8.12.2022

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

1. **Describe the composition of matter and explain basic chemical principles** including:
 - the differences between: (a) pure substances and mixtures, (b) elements and compounds, (c) heterogeneous and homogeneous mixtures, (d) atoms and molecules, (e) intensive and extensive properties, (f) molecular compounds and ionic compounds, (g) chemical and physical properties or processes
 - the characteristics of the three states of matter (solid, liquid, gas) and the names of the phase transitions between them

2. **Recognize and interpret chemical formulas and models**, and be able to:
 - distinguish between empirical formula, molecular formula, structural formula and condensed structural formula.
 - recognize the atoms and bonds in ball-and-stick and space-filling models, and how they relate to structural formulas

3. **Make measurements and use math to solve chemistry problems**. For example, be able to:
 - perform conversions between Kelvin and Celsius temperature scales
 - explain the difference between accuracy and precision of measurement
 - determine the number of significant figures in a measured quantity and know how to express a measured or calculated quantity using the correct number of significant figures
 - perform calculations involving density
 - recognize common unit prefixes in the metric system
 - convert between units using dimensional analysis

Note - Section 1.9 (Analyzing Experimental Results) is not assigned.