

Unit 1: The Fundamentals

adapted from

http://www.phschool.com/advanced/lesson_plans/chem_brown_2003/index.html

Objectives:

- Distinguish between physical and chemical properties and changes.
- Understand the difference between elements, compounds, and mixtures.
- Be familiar with the units of the metric system of measurement and the temperature scales.
- Be able to convert measurements using dimensional analysis.
- Determine the number of significant figures in a measurement and be able to express the results of a calculation with the proper number of significant figures.
- Distinguish between protons, neutrons, and electrons, and be able to describe the composition of an atom of any particular element in terms of these subatomic particles.
- Describe the basic anatomy of an atom and the ratio of the diameter of the nucleus to that of the atom.
- Know the difference between an atom, an ion, and a molecule.
- Have a basic knowledge of the periodic table, which includes being able to predict whether an element is a metal or a nonmetal, and what will be the probable charge of its ion.
- Distinguish between empirical, molecular, and structural formulas.
- Be able to write the correct name of an inorganic compound from its formula and vice versa.
- Define hydrocarbon, alkane, and alcohol and be able to write the name from the formula and vice versa for simple alkanes and alcohols.

Lab Objectives:

- Learn some of the procedures used in observing physical properties and how they are used to identify substances.
- Become acquainted with the methods of separating the components of a mixture (decanting, extraction, and sublimation).

Lab Concepts:

- Identification of Substances by Physical Properties
- Separation of the Components of a Mixture

Key Words:

(pure) substance	physical properties	ion	periodic group,
element	chemical properties	nucleus	metallic elements
compound	intensive properties	proton	nonmetallic elements
mixture	extensive properties	neutron	metalloids
solution	physical change	electron	molecular compounds
law of constant	chemical change	atomic mass unit	molecular formula
composition (law of	density	isotope	empirical formula
definite proportions)	significant figures	atomic number	ionic compound
precision	atom	mass number	polyatomic ion
accuracy	molecule	nuclide	cation
		atomic weight	anion

Tips:

- Mass number, atomic mass, and atomic weight are not synonymous.
- Only molecular substances have molecules.
- Mixing doesn't mean reacting. Only if a new substance forms is it a chemical reaction.
- Mass and volume are not the same thing.
- Calculators ordinarily display more digits than are significant.
- Normally, treat conversion factors as exact numbers.

