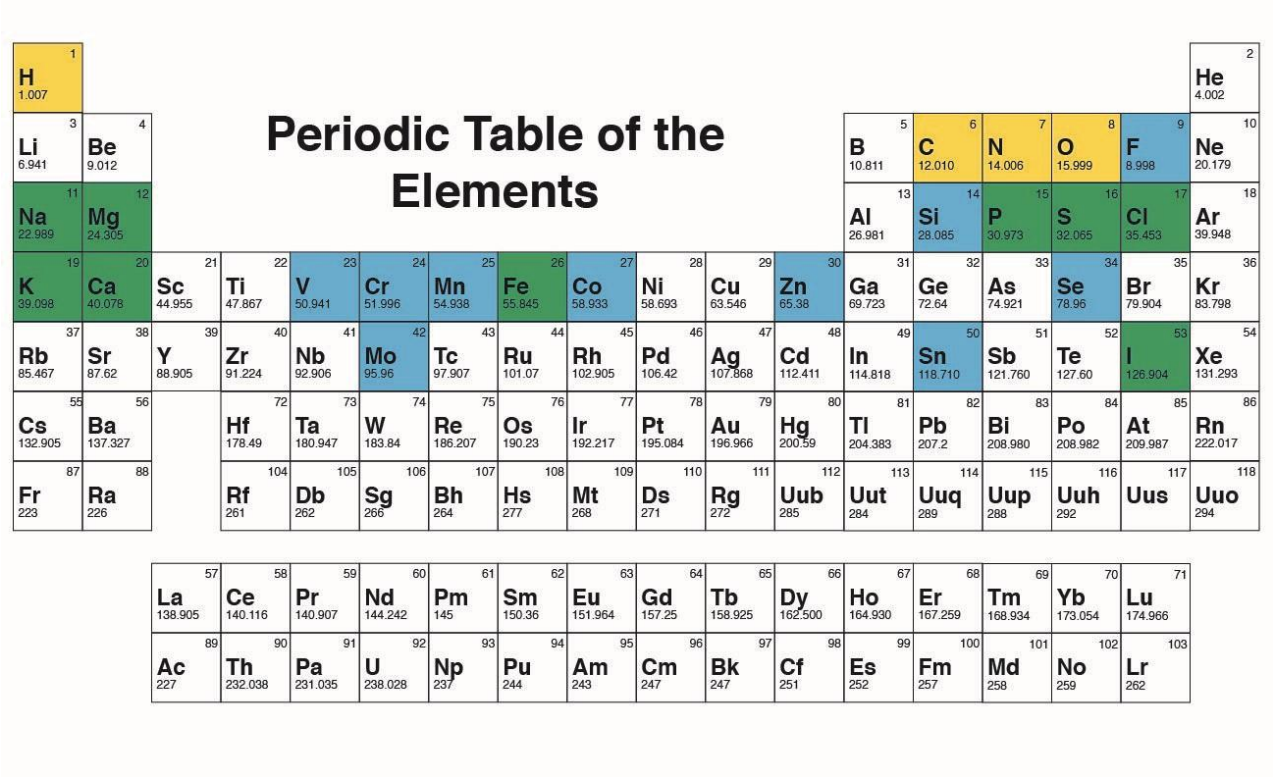
1.1

Matter

All living and non-living things are composed of **matter**. Using one of its most simple definitions, “Matter is anything that occupies space and has **mass”.** Mass is simply the amount of matter that an object contains. Matter is composed of **elements**. Elements are substances that cannot be broken down into simpler materials by ordinary chemical processes. Some common elements that you have probably heard of are carbon, hydrogen, oxygen, and nitrogen. The building blocks for elements are atoms, which we will discuss in more detail later. In nature, there are 92 naturally occurring elements. In addition to these natural occurring elements, 26 “new” elements have been artificially produced. Based on their chemical properties, these elements can be organized into what is referred to as the **periodic table of the elements**. We will refer to this table frequently as we discuss the basic chemistry of the elements.



Periodic Table of the Elements, created by BYU-I student Hannah Crowder, Spring 2011

The figure above is a “Periodic Table of the Elements.” The elements highlighted in yellow make up 96% of living matter namely **Carbon** (C), **Hydrogen** (H), **Oxygen** (O) and **Nitrogen** (N). The nine elements highlighted in green: Phosphorus (P), Sodium (Na), Potassium (K), Calcium (Ca), Magnesium (Mg), Sulfur (S), Chlorine (Cl), Iron (Fe), and Iodine (I) are considered major essential elements for living matter. The elements highlighted in blue, Vanadium (V), Chromium (Cr), Manganese (Mn), Cobalt (Co), Molybdenum (Mo), Zinc (Zn), Silicon (Si), Fluorine (F), Selenium (Se) and Tin (Sn) are considered minor or trace essential elements for living matter. Major elements are simply found in higher

concentrations in body systems than the minor elements. They are considered essential because the must be consumed and are “essential” for biochemical processes.

Notice that each element is represented by a 1 or 2 letter symbol. Often, these symbols are the first letter or letters in the name of the element: **H** for hydrogen, **C** for carbon, and **He** for helium. Occasionally, however, the symbols represent the Latin name for the element; hence, the symbol for sodium is **Na** for the Latin Natrium, and the symbol for Potassium is **K** for the Latin Kalium.

Subatomic Particles
Radioisotopes