Lecture 1

Introduction to general chemistry(matter),Classification of matter

Matter is any substance that has volume and mass. In this section, we explore different properties of matter and the need for standard ways to describe them.

First, let's differentiate between extensive and intensive properties. Extensive properties, such as volume and mass, rely on the amount of the substance. Intensive properties, such as density and viscosity, are independent of the amount of matter and inherent to the matter

Physical and Chemical Properties

* Scientists classify properties of matter as physical or chemical. Physical properties are those we can observe without altering the identity of the substance. For example, the melting or boiling point of a substance is a physical property because they do not alter the identity of the substance.

We can only observe chemical properties when we alter the identity of the substance. Rusting is an example of a chemical property because it is a chemical reaction that changes the composition of the substance.

Read this text. Pay attention to the chart at the end of the section, which gives examples of some physical and chemical properties of the element sodium.

* [Solids, Liquids, and Gases Page](https://learn.saylor.org/mod/page/view.php?id=31073)

The three phases of matter are solid, liquid, and gas. Note the differences between these three phases of matter on the microscopic and macroscopic levels.

* + **Solids**, like wooden blocks, have definite shape and definite volume. The particles are ordered and close together.
	+ **Liquids** have definite volume and indefinite shape, meaning they take on the shape of the container. A liquid's particles are less ordered, but still relatively close together.
	+ **Gases**, such as the air inside balloons, take the shape and volume of their container. Their particles are highly disordered.
* [Density and Its Uses](https://learn.saylor.org/mod/page/view.php?id=31074)

Density is an intrinsic property of matter. We define density (d) as the mass or volume of a substance at a given temperature. We write d = m/v where d is density, m is mass, and v is volume. If we know two of the variables in this equation, we can solve for the third algebraically. The units for density are a mass unit divided by a volume unit. The units used to describe density often differ for the phases of matter: solids (g/cm3), liquids (g/mL), and gases (g/L).

* [How Do We Classify Matter?](https://learn.saylor.org/mod/page/view.php?id=31076)

Chemists classify matter as a pure substance or a mixture. A pure substance consists of only one type of matter, while a mixture consists of multiple types of matter. Pure substances are further categorized as single-element or compound. Mixtures are further categorized as homogeneous (single-phase) or heterogeneous (multiple phases). The distinction between homogeneous and heterogeneous mixtures presented here is dependent on phase, or physical, boundaries. Mixtures, whether homogeneous or heterogeneous, can be separated by physical means into pure substances.