

Chapter 2

- Lecture notes Basic Chemistry
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- biol. 1ab

I. Composition of Matter

- Matter has a variety of forms
 - *the most common forms are: liquid, gas, and solid*

1. Matter

- Definition: anything that has mass and takes up space

2. Element

- Definition: any substance that cannot be broken down into smaller parts or simpler substances
- each element has its own elemental symbol
- example: Na= sodium, K=potassium

II. Atoms

- Definition: the smallest particle of an element that retains the properties of that particular element.

1. Parts of the Atom

- Nucleus- contains the proton and neutrons
- protons= positively charged particle
- neutrons= neutral charged particle
- electron cloud= negatively charged particles

2. Compounds

- Definition: substances made from chemically combined elements
- examples: NaCl
- chemical formulas illustrate the kinds and proportions of the atoms in a compound

3. Molecules

- Definition: smallest units of a compound that still have the properties of that compound
- example: water

II. Changes in Matter

- The formation of bond between atoms or molecules leads to changes in matter

1. Covalent bonding

- Occurs when two atoms share a pair of electrons.
- Those shared electrons then provide the "glue" to hold the atoms together
- example: carbon dioxide

2. Ionic bonding

- Occur when two atoms exchange electrons
- example: table salt, NaCl

3. Polar covalent bonds

- Occur when atoms share electrons, but it is an unequal sharing
- example: water

4. Hydrogen bonding

- Weak attractions between the hydrogen molecules of molecules
- example: water

III. Chemical reactions

- Definition: process by which elements react to form new compounds

1. Products Vs. Reactants

- Reactants start the reaction
- Products are what the reaction makes
- $\text{CO}_2 + \text{H}_2\text{O} \rightleftharpoons \text{C}_6\text{H}_{12}\text{O}_6 + \text{O}_2$

2. Mixture Vs Solution

- A mixture occurs when any two substances cannot be chemically combined
- example: oil and water
- A solution is a class of mixture in which the substances are uniformly distributed
- example: shaken oil and water

3. Acids and Bases

- An acid is a solution in which the concentration of Hydrogen ions is greater than the Hydroxide ions
- A base is a solution in which the concentration of hydroxide ions is higher than hydrogen ions
- pH scale measures the concentration of these ions
