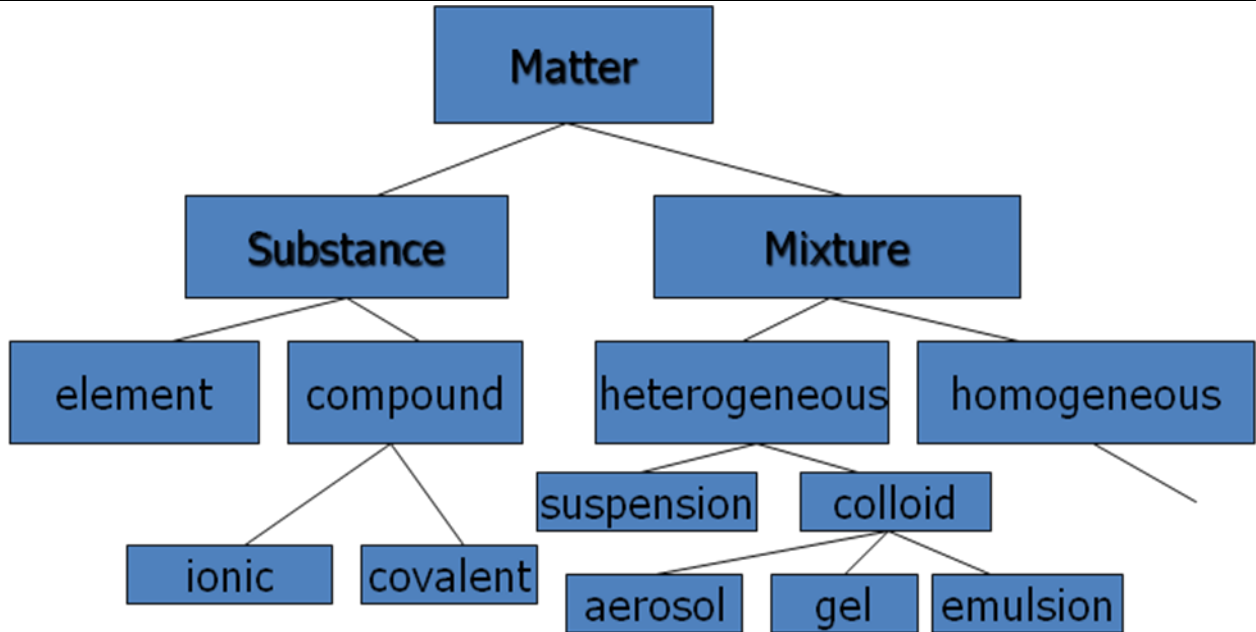


Biology
Chapter 3

I. Matter and Energy

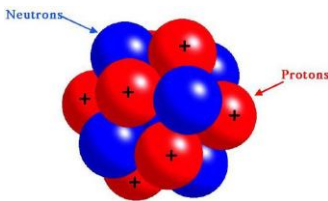
- A. Matter and Its combinations
- B. Matter and Its combinations
- C. Matter is made up of elements
- D. Atoms are the smallest part of an element
- E. Elements – Substance composed of one kind of atom



I.

II. Atoms –

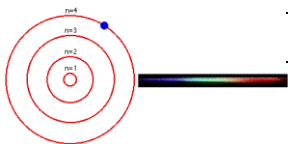
1. Nucleus



- a. Protons – positive charged particle with a mass of 1 AMU found in the nucleus
- b. Neutron – neutral charged particle with a mass of 1 AMU found in the nucleus

2. Electron cloud

- a. Electron – negatively charged particle with very little mass that orbits the nucleus at very high speeds forming an electron cloud
- b. Electron cloud is the space around the nucleus that electrons can occupy



c. Energy levels in the electron cloud

- 1) 1st level –
- 2) 2nd level –
- 3) 3rd level –
- 4) The formula

3. Atomic # is the number of _____ protons
 4. In a neutral atom the atomic # also is the # of electrons
 5. Mass # - is the # of protons & the # of Neutrons added together
 6. $\#N + \#P = \text{Mass \#}$
 7. To find the number of Neutrons you subtract the number of protons from the mass #
 8. $\text{Mass \#} - \text{Atomic \#} = \# \text{ of Neutrons}$
 9. **Isotope** – is same kind of atom, but different # of neutrons in the nuclei
 - a. neutral atom-
- A. Molecule – two or more atoms chemically joined $2\text{H}_2 + \text{O}_2 \rightarrow 2\text{H}_2\text{O}$
- a. most atoms combine in such a way that their outer energy levels have a total of eight electrons in each atom
 - b. Duet rule
 - i. some atoms combine in such a way to have two electrons in their outer energy level
 - ii. Example: H, Li, Be, B
- B. Ionic bonds –
- b. In an ionic bond one ion is positive and one is negative so they are held together by opposite charges

10. Ion –

B. The water molecule

1. Water

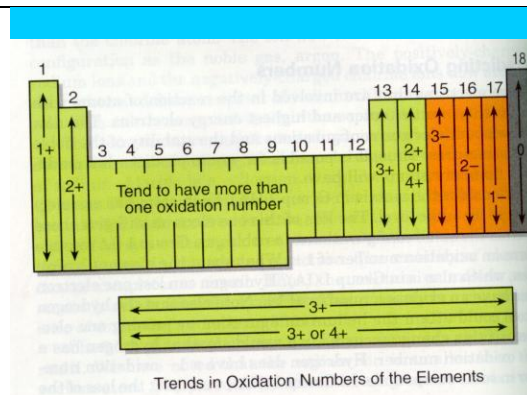
2. Living things are composed of almost 70 % water

C. Symbols and Formulas

1. Symbol –

2. Formula –

3. Oxidation numbers –



D. Chemical Change –

1. Chemical formulas –

2. Why chemical equations must be balanced

II. Solutions

A. Homogenous –

1. Solution is a homogenous mixture

a. Solvent –

b. Solute –

2. Ionic solution –

3. Covalent solution –

B. Acids and bases are homogenous solutions

1. Acid –

2. Base more hydroxide than hydrogen ions.

3. pH scale

III. Biological Chemistry (Organic Chemistry)

A. Carbon Compounds

B. Structural formulas –

C. Isomer

D. Carbohydrates –

1. Types of carbohydrates

a. Monosaccharide –

b. Disaccharide –

1) Table sugar –

2) Maltose –

3) Lactose –

c. Polysaccharides –

1) Cellulose –

2) Glycogen –

E. Lipids –

1. Used for energy and stored energy reserves

IV. Energy for life

A. Energy is the ability to do work and cause motion

1. Two main types of energy

a. Potential

b. Kinetic

B. Changes in forms of energy

C. Activation Energy –

D. Energy for cellular work

1. Enzymes
