

Biology Ch 6 Notes Handout

Ch 6: The Chemistry of Life

I. **Section 1: Atoms and Their Interactions:**

A. **Elements:** _____ is made up of elements.

1) An element is a substance that can't be _____
_____ into simpler chemical substances

1. Natural elements in living things:

a. 96% of us are made up of the basic four elements:

i. C

ii. H

iii. O

iv. N

b. Trace elements- play a role in _____

B. Atoms: The Building Blocks of Elements

1) An atom is the _____ particle of an _____
that has the characteristics of that element

1. Atoms are the _____
_____ of ALL _____

2) Structure of an atom-

1. Nucleus- the _____ of the atom

a. Contain _____ and

b. Positive charge =

Neutral charge =

2. Electron Cloud- region of space around the nucleus containing _____ which have _____ charge.

a. Electrons stays in the atom b/c

_____ attract.

C. Isotopes of an Element-

1) Atoms of the same element that have different numbers of _____ are called Isotopes. But they have the SAME number of _____.

D. Compounds and Bonding-

1) A _____ is a substance that is composed of atoms of _____ different elements that are chemically combined.

a. Ex. Sodium Chloride or _____

2) Covalent bonds - electron pairs are _____

3) Ionic Bonds- electron are gained or _____

E. **Chemical Reactions-** they occur when _____ are formed or broken, causing _____ to recombine into different substances.

1) In organisms, chemical reactions occur inside _____.

- 2) All chemical reactions that occur WITHIN an organism are called _____ for that organism.

F. Mixtures and Solutions-

- 1) A _____ - a combination of substances in which the individual components retain their properties.
- 2) A _____ - is a _____ in which one or more substances (solutes) are evenly dissolved in s (solvent).
- 3) Examples of each
1. Mixture-
 2. Solution-

G. Acids and Bases-

- 1) Chemical reaction can occur only when conditions are _____
- 2) It may depend on
1. _____
 2. _____
 3. _____
 4. _____
- 3) The pH is a measure of how _____ or _____ a solution is.
1. A scale ranging from 0 to _____ is used to measure _____.

2. 7 is _____
3. 2-3 is _____
4. 14 is _____
5. Draw a scale below and list some common items...

Section 2: Water and Diffusion

II. Water and its Importance- it is the one of the most important compound in living organisms. It makes up _____ to _____ percent of most organisms.

A. Water is Polar-

- 1) A _____ molecule is a molecule with an unequal distribution of charge, positive on one end and negative on the other end.
 1. _____ is an example of a polar molecule
 - a. Because of this property water has special properties of surface tension and cohesion.
 2. Draw a picture of a polar water molecule below

3. Water can dissolve many ionic compounds such as _____ and other polar molecules such as _____.
 4. Water also attracts other _____.
- 2) Water resists temperature change- therefore, water requires more _____ to increase temperature than most other common liquids
 - 3) Water expands when it freezes- unique in that it is one of the _____ substances that expands, also Ice is _____ dense than liquid water, so it _____ on the surface.

B. Diffusion- All objects in motion have energy of motion called _____ energy. This random movement is what allows us to make some of our favorite drinks like Kool-Aid or Crystal light.

- 1) This random movement of particles was named _____
- 2) Process of diffusion-
 1. Diffusion- net movement of particles from an area of _____ concentration to an area of _____ concentration.

2. 3 Key Factors, _____, temperature, and _____ affect the rate of diffusion.
3. Dynamic Equilibrium- occurs when materials move _____ and _____ the cell at _____ rates. Results in _____ change in concentration.

Section 3: Life Substances

III. The Role of Carbon in Organisms-

- A. Carbon atoms have 4 electrons available for bonding- Draw a single , double, and triple bond of carbon below:

- a. Carbon compounds vary in size, so when carbon atoms bond, they can make _____ chains, branched chains, or rings.

B. Molecular Chains- Small molecules together form _____ called polymers. A **polymer** is a large _____ formed when many smaller molecules bond together.

C. The Structure of Carbohydrates-

a. A **carbohydrate** is a _____ molecule composed of carbon, _____, and oxygen. Usually composed of a ratio of about _____ hydrogen atoms and _____ oxygen atom for every carbon atom.

b. Simplest carbohydrate-

c. Largest carbohydrate-

D. The Structure of Lipids-

a. A **lipid** is a large biomolecule that is made mostly of _____ and hydrogen and a small amount of oxygen.

Example:

i. Characteristics- insoluble in _____ b/c they are non-polar molecules and water IS _____

E. The Structure of Proteins-

a. A **protein** is a large, complex _____ composed of carbon, hydrogen, oxygen, nitrogen, and sometimes sulfur.

b. The basic building blocks of proteins are called _____.

- c. There are about 20 common amino acids that can make thousands of proteins.
- d. Proteins are the _____ of many structural components of organisms.
- e. _____ - are important proteins found in living things. An **enzyme** is a protein that changes the _____ of a chemical reaction. For example, Pepsin is an enzyme in the stomach that helps break down proteins.

F. The Structure of Nucleic acids-

- a. A **nucleic acid**- is a complex _____ that stores cellular information in the form of a _____.
- b. Nucleic acids are _____ made of smaller subunits called _____.
- c. Nucleotides are arranged in three groups- a _____ base, a simple sugar, and a phosphate _____.
 - i. DNA, which stands for _____ acid is a nucleic acid.
 - ii. The information coded in DNA contains the _____ used to form all of the organism's _____ and structural _____.

- iii.** Another important nucleic acid is _____, which stands for ribonucleic acid. RNA is a nucleic acid that forms a _____ of DNA for use in making proteins.