Ch. 2: Chemistry of Life & Ch.3: Biochemistry

Objectives

1. Write the elements and their symbols (Element Quiz).
2. Read an article on "Tattoo" and answer question on the composition of tattoo inks.
3. Draw the atomic structure of elements/atoms.
4. Draw a diagram to show how atoms combine (ionic bond and covalent bond).
5. Read an article on "Flatus" and answer about compounds involved in our flatulence.
6. Write the five properties of water and identify property of water demonstrated in the experiments in water demo quiz.
7. Balance the chemical equation by writing the coefficients
8. Design (write) a lab procedure to find the most effective enzyme in detergent by studying rate of protein break down of a gelatin model.
9. Design (write) a lab procedure and implement the procedure to find the factors that affect the effectiveness of enzyme.
10. Report (speak/write) the investigation finds to peer then analyze class data to draw a conclusion in factors that affect the effectiveness of enzyme.
11. Read an article on "Dirty Laundry" and answer questions on effects of enzyme in detergent.
12. Synthesize cheese using enzyme provided.
13. Read an article on "History of Soap making" and answer questions on science of soap synthesis.
14. Synthesize soap (optional).
15. Investigate the pH of household products using three biological indicator and pH paper (lab write up).
16. Investigate the different indicators for macromolecules like carbohydrates, protein, and lipids (write up).
17. Perform tests on three of the four macromolecules (glucose, protein, and lipids) using Benedict, Biuret, and Sudan IV solutions. Then investigate one unknown compound after completing their tests.

Chapter 2 notes

A. Review of Definition

- Matter
- **Atom**: Smallest particle that cannot be broken down by ordinary means. All matters (living and nonliving) are made up of atoms.
- **Element**: Made up of one kind of atom.

Example: Hydrogen is made up of hydrogen atoms.

- **Molecule**: Made up of one or more atoms combined.

Example: water (H_2O) is made up of 2 hydrogen atoms and 1 oxygen atom

B. Periodic Table of Elements

- Periodic Table Trends - Highlight the metalloids B, Si, Ge, As, Se, Sb, Te, At
- Metal - Any element left of the ladder
- Nonmetal - Any element right of the ladder.

C. Chemical composition of the Human Body

Oxygen	64%
Carbon	18%
Hydrogen	10%
Nitrogen	3%
Phosphorus	1%
Sulfur	0.75%

How about the air we breathe? What is the most abundant gas in the atmosphere?

D. Atomic numbers and Masses

An atom is made up of

-proton(+), electron (-), neutron (0)

Atomic Number = Number of Proton

Atomic Mass = # of Proton + # of Neutron

E. Isotope - same element with different number of neutrons **example**: Hydrogen and Deuterium

F. Rutherford and Bohr Model of atoms

G. Type of Bonding

i. Ionic Bonding (Ionic Compound)

Transfer of electrons

Metal (+) + Nonmetal (-)

Example: **NaCl, $CaCl_2$, LiBr**

- metal always written first.
- To name ionic compounds, name the metal then add – ide to non-metal.

ii. Covalent Bonding (molecule)

Sharing of electrons

Nonmetal + Nonmetal

Polarity due to electronegativity

Example: CO, CO_2, H_2O

Use Prefixes and add -ide

One – Mono, Two – Di, Three – Tri, Four - Tetra

H. Properties of Water

Hydrogen Bonding (Polarity of water)

1. High Heat of Vaporization
2. Adhesion
3. Cohesion
4. High Heat Capacity
5. Capillary Action

I. Mixture

- homogeneous vs. heterogenous (penny lab)
- solution: unsaturated, saturated, and super-saturated (lollipop lab)

J. Activation Energy

K. Enzyme - protein that acts as a catalyst by reducing activation energy.

Catalyst- A substance that increases the rate of a chemical reaction without itself undergoing any permanent chemical change.

L. Factors that affect Reaction Rate

Temperature, pH, concentration, surface area