AP BIO REVIEW ~ UNIT 1 BIOCHEMISTRY

ELEMENTS, COMPOUNDS, ATOMS, MOLECULES, IONS AND BONDS

1. What is Matter?

2. What is an Element?

3. What is a Compound?

4. What is an Atom and what are the major components of an atom with their respective charges?

5. What is a Molecule?

6. What is an Ion and explain how one is formed due to valence electrons?

7. Explain what electronegativity is.

8. Three major types of bonds:
    a. Explain how IONIC bonds are formed:

    b. Explain how COVALENT bonds are formed:

i. Explain the difference between Nonpolar and Polar covalent bonds

ii. What are HYDROGEN bonds? Explain their importance

9. What is pH? What does it measure and what measurements are placed upon it?

10. If given the molarity of a solution, how is pH calculated?

PROPERTIES OF WATER

The hydrogen bonds among H2O molecules contribute to some very special properties for water.

1. Explain why Water is an excellent solvent.

2. Explain the importance of a high heat capacity in water.

3. Explain why Ice floats.

4. Explain how hydrogen bonds lead to strong cohesion in water.

5. Explain why water adheres to other molecules.

ORGANIC MOLECULES

1. Explain the importance of carbon in organic molecules.

2. Explain how the terms monomer and polymer are related.

3. What are Functional groups?

4. Complete the table below:

Functional Group	Structure	Examples	Characteristic properties
Amino group		Amino acids	
Carboxyl group		Amino acids Fatty acids, sugars	
Carbonyl group		Ketones aldehydes	
Hydroxyl group		Alcohols Sugars	
Phosphate group		DNA, ATP, phospholipids	
Sulfhydryl group		Amino acids	

FOUR IMPORTANT CLASSES OF ORGANIC COMPOUNDS

****You must be able to recognize the structures of these compounds – study the pictures in your text!**

1. What are CARBOHYDRATES? How can you recognize one? What are they used for?

- Classified into 3 groups…
  1) What is a Monsaccharide? Describe and sketch an example.

  2) What is a Disaccharide? Describe and sketch an example. What process is used to create a disaccharide from two monosaccharides?

  3) What is a Polysaccharide?

Four examples – Explain the structure and function of these!

- STARCH –

- GLYCOGEN -

- CELLULOSE –

- CHITIN –

2. What are LIPIDS? What qualifies a molecule as a lipid?

- Three major groups:
  1) What is a Triglycerides? Describe and sketch an example.

     a) What is a saturated fatty acid? Unsaturated?

  2) What is a Phospholipid? Describe and sketch an example. What is the importance of phospholipids in living organisms?

  3) What are Steroids? Describe and sketch an example.

3. What are PROTEINS? What is the importance of proteins in living things? What are they composed of?

- Describe the four levels of structure of a protein:
  (1) primary:

  (2) secondary:

  (3) tertiary:

  (4) quaternary:

4. What are NUCLEIC ACIDS? What are the two major types? What are the basic building blocks of any nucleic acid?

- Explain what DNA is and the general structure of DNA.

- Explain what RNA is and the three different varieties of RNA.

CHEMICAL REACTIONS in METABOLIC PROCESSES

- <u>Explain the types of reactions you should know:</u>
    1. Hydrolysis/Cleavage:

    2. Dehydration:

    3. Endergonic:

    4. Exergonic:

- ENZYMES: (*This topic is full of essay material. Know it well!)*
- What are Enzymes? What are they used for? What are enzymes made of?

    - What are Catalysts? How do enzymes act as catalysts?

    - What is a Substrate? Explain the importance.

    - What is the Active site? Explain the importance.

    - What are allosteric sites? How do these help to activate or inhibit an enzyme?

- What are enzyme inhibitors? How do these change the reactivity of an enzyme?

- Explain how the effectiveness of enzymes can be affected by the following things:
    - Temperature

    - pH

    - salinity

    - the concentration of the substrate

    - the concentration of the enzyme

- *What is a metabolic pathway?*