Biochemistry Objective Sheet

**Test Objectives**

Bio.1.2.1

• Explain how cells use buffers to regulate cell pH and how cells can respond to maintain temperature, glucose levels, and water balance in organisms.

Bio.4.1.1

Compare the structure and function of each of the listed organic molecules in organisms:

• Carbohydrates (glucose, cellulose, starch, glycogen)

• Proteins (insulin, enzymes, hemoglobin)

• Lipids (phospholipids, steroids)

• Nucleic Acids (DNA, RNA)

Bio.4.1.3

• Develop a cause and effect model for specificity of enzymes - the folding produces a 3-D shape that is linked to the protein function, enzymes are proteins that speed up chemical reactions (catalysts) by lowering the activation energy, are re-usable and specific, and are affected by such factors as pH and temperature.

Note: *Students should understand that enzymes are necessary for all biochemical reactions and have a general understanding of how enzymes work in terms of the connection between shape and function*

**Essential Vocabulary- ALL must be defined for full credit**

acid, base, pH, buffer, element, atom, compound, molecule, inorganic, organic, carbon, hydrogen, oxygen, nitrogen, phosphorous, polymer, monomer, carbohydrate, monosaccharide, glucose, polysaccharide, starch, cellulose, glycogen, lipid, glycerol, fatty acid, saturated, unsaturated, phospholipid, steroid, nucleic acid, nucleotide, DNA, RNA, protein, amino acid, R-group, hemoglobin, insulin, enzyme, denature, catalyst, activation energy, substrate, active site, re-usable, specific, indicator

**Statements to Master (ALL must be answered for full credit)**

1. Identify acids and bases as numbers on the pH scale
2. Explain how buffers are used by living cells to maintain pH balance
3. Explain the relationship between an atom, element, molecule, and compound.
4. Differentiate between inorganic and organic compounds
5. Identify THREE organic molecules and THREE inorganic molecules
6. Identify the four major organic compounds in organisms and the subunit (monomer) of each.
7. Identify the elements present in each organic molecule. Draw the chemical structure as evidence of the elements present you have listed.
8. Describe the basic functions of each of the four major organic compounds.
9. Discuss the organic compounds that provide the body with energy vs. the organic compound that is building material.
10. Name several examples of each of the four major organic compounds.
11. Identify the chemical indicators used to identify the presence of organic compounds.
12. Explain that proteins differ in their sequence of amino acids and that this sequence determines the structure of the protein, and thus, its function.
13. Identify enzymes as types of protein that regulate all chemical reactions in an organism.
14. raw a graph showing the rate of a biochemical reaction with and without an enzyme and explain how enzymes catalyze chemical reactions.
15. Diagram an enzymatic reaction, labeling shapes to represent the enzyme, substrate, enzyme-substrate complex, and product(s)
16. Differentiate between a dehydration synthesis and decomposition (hydrolysis) reaction and provide an example of each.
17. Identify environmental factors that can cause an enzyme to denature, and explain that this will cause the enzyme to lose its shape meaning that it can no longer perform its function.
18. Discuss the characteristics of enzymes. How were these demonstrated in your lab?