

# Summer Assignment AP Biology

NAME: \_\_\_\_\_

In preparation for success in this college level science course, all students enrolled in AP Biology are given a "Summer Packet" to be completed **BY HAND** (no typing) and **brought to the very first day of class!** The material in this packet includes the following:

A Question Packet over Unit One: Biochemistry. All material in this packet is a review from Chemistry class (which is a prerequisite for this course), so all concepts should be very familiar to you. As textbooks are not issued until the first day of classes, you may use any resources at your disposal (such as books, websites, old notes and papers from Chemistry class, etc.) When we gather together for the 7-8 days of class, we will go over this material at a very rapid pace, as the amount of information and the conceptual rigor of the course requires that we "jump-in" to learning the material right away! Be prepared for a quiz on this information the 2<sup>nd</sup> week of school!

I look forward to seeing you next year, and to establishing a strong, successful beginning of your experience in AP Biology here at Westlake! Have a restful, exciting summer!

~Ms. C

WHS

AP Biology

## **The Four Main Ideas in AP Biology from AP Central and the College Board:**

- |             |                                                                                                                                  |
|-------------|----------------------------------------------------------------------------------------------------------------------------------|
| Big Idea 1: | The process of evolution drives the diversity and unity of life.                                                                 |
| Big Idea 2: | Biological systems utilize free energy and molecular building blocks to grow, to reproduce, and to maintain dynamic homeostasis. |
| Big Idea 3: | Living systems store, retrieve, transmit, and respond to information essential to life processes.                                |
| Big Idea 4: | Biological systems interact, and these systems and their interactions possess complex properties.                                |

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## **Task One: Define the Following Terms:**

1. Covalent Bond
2. Polar Molecule
3. Nonpolar Molecule
4. Hydrolysis
5. Monomer
6. Polymer
7. Hydrogen Bond
8. Saturated Fatty Acid
9. Unsaturated Fatty Acid
10. Activation Energy
11. Competitive Inhibitor
12. Feedback Inhibition
13. Free Energy of Activation
14. Induced Fit
15. Metabolism
16. Noncompetitive Behavior

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## **Task Two: Draw the Molecular Configuration Of The Following Functional Groups Of Organic Structures**

1. Amino Group
2. Carboxyl Group
3. Hydroxyl Group
4. Peptide Bond
5. Phosphate Group

## **Task Three: Answer the following based on chemistry and physics principles of biochemistry in living organisms.**

1. Contrast a reactant and product in a chemical reaction.
2. How is a catabolic pathway different from and anabolic pathway?
3. What does pH measure? What is the range of the scale? What is considered an acid? Base? Neutral?
4. How is the composition of an acid different from a base?
5. Contrast the differences between hydrophilic and hydrophobic in terms of molecular properties.

## **Task Four: Water is a critical component of life and chemical reactions in metabolic regulation. Answer the following questions regarding the properties and functions of water.**

1. What is the difference between a solute and solvent?
2. What is the difference between surface tension, adhesion, and cohesion?
3. What is specific heat and how does this property relate to water in living organisms?

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4. Describe 4 major functions of water in living organisms:

a.

b.

c.

d.

**Task Five: Enzymes have very specific roles in the metabolic processes of living organisms. Answer the following regarding their structure and function.**

1. Define enzyme.
2. What is a catalyst?
3. What is an active site?
4. Define substrate.
5. How is a cofactor different from a coenzyme?
6. What is denaturation and what are the four factors that can cause it to occur in an enzyme?
7. What is allosteric regulation as it applies to enzyme function?

**Task Six: The four major Organic Groups (Carbohydrates, Lipids, Proteins, and Nucleic Acids) are the basic components of all life structures. Answer the following regarding their composition and function:**

1. What is the basic formula for a monosaccharide?
2. How is a disaccharide structurally different from a polysaccharide?
3. What is a glycosidic linkage?

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4. Draw a glycerol linked to two fatty acids (this would be a diglyceride).
5. Draw a phospholipid bilayer (the type that composes cell membranes).
6. Amino acids link together to form a polypeptide chain or a \_\_\_\_\_.
7. In nucleic acids, which bases are purines, and which are pyrimidines? How do purines structurally differ from pyrimidines?
8. A nucleotide is composed of 3 main parts:
9. List 3 structural or compositional differences between DNA and RNA.
10. Draw the structure of ATP... label the 3 basic types of molecular groups.

Task Seven: Proteins determine much of the communication within our cells in addition to being a major component of most structures. Answer the following questions regarding this organic group:

1. There are \_\_\_\_\_ known amino acids which compose the subunits of proteins. Of these they all have four parts that are identical regardless of which amino acid we are studying. The four common components of all amino acids include a central carbon, a \_\_\_\_\_, a \_\_\_\_\_, and a \_\_\_\_\_.
2. What is the R group in an amino acid?
3. Define primary structure of a protein.
4. Define secondary structure of a protein.
5. Define tertiary structure of a protein.
6. Define quaternary structure of a protein.