AP Biology Summer Assignment

Due date: Week of August 24, 2020.

Purpose: The following chapters are mostly review from PreAP biology. Completing this assignment during the summer prior to the school year will allow the AP biology class to move through basic materials at a faster pace. You will be expected to understand the following chapters well enough to complete an assessment in the 2nd week of school (8/23/21 - 8/27/21). We will be covering the chapters 3 - 6 very quickly within the first 2 weeks of school. Chapter 1 and 2 will not be covered directly as a lesson, but you should be familiar with the material in those chapters as they will come up often in all the chapters that follow.

These questions will be collected at the end of the second week of school. You have two options to complete the assignment during the summer session before the 2021-2022 school year:

Option 1— Check out an AP biology book during the summer from the front office at WHS. You can keep the book for the coming year. You will be getting access to the online textbook at the start of the school year. (Was not available this year, as new textbooks were adopted)

Option 2 – Use the class web site to access the class note power points. The power points are summaries of the chapters that we will cover in class. They are NOT comprehensive of all details and examples that are in the textbook, but will suffice to explain the basic concepts. You may need to use the internet to help fill in some of the details.

The AP biology web site is located at the following address.

www.kapabiology.com

The power point notes are behind a locked page, so you'll need the following password to access them:

kapabio123

If you do not complete the assignment during the summer, you will likely be behind for the first couple of weeks. This class will be moving very quickly in reference to content materials. To ensure that you succeed to the best of your abilities you need to be well prepared before we cover the content in class.

Please sign up for the AP Bio 21-22 WHS list. This way I, Mr. Kapa, can get info to you over the summer if I need to.

Send text to:	number: 81010
	message: @apbio2122w

Chap 1: Biology Themes, Evo Intro and Inquiry

<u>Chap 1</u>

List the 5 themes we will focus on in this biology class.

Define the term emergent properties.

List and Explain the 10 levels of organization in biology, include their emergent properties (go smallest to largest)?

Explain the Central Dogma of biology (gene expression)?

Differentiate between Energy flow and Chemical flow in ecosystems.

Explain two examples of interactions between systems...1) at the cellular level

2) at the ecological level.

Define the term evolution.

Explain two examples that demonstrate the Unity in the Diversity of Life.

List and Describe Charles Darwin's three observations about natural selection.

Define the terms *hypothesis* and *theory*, then **Differentiate** between the two terms.

Define the terms inductive reasoning and deductive reasoning, then Differentiate between the two terms.

Define the terms independent variable and dependent variable, then Differentiate between the two terms.

Chap 2: Basic Chemistry (Review)

<u>Chap 2</u>

This chapter is mostly definitions. You should be able to define any of these words from memory at any point in this class. If you are taking chemistry concurrently this year with AP biology, some of these terms will be new to you.

You will not have to officially define these terms in this chapter, however you are responsible for their meaning and understanding. Fair Warning!

Important Vocabulary:

- Element
- Compound
- Essential Element (understand table 2.1 in the book)
- Atom
- Nucleus
- Neutron
- Proton
- Electron
- Valence Electron
- Electron Shell
- Electron Orbital
- Atomic Number
- Atomic Mass
- Isotope
- Half-life
- Radiometric Dating

- Energy
- Ion
- Period
- Group
- Covalent Bond
- Single Bond
- Double Bond
- Triple Bond
- Ionic Bond
- Hydrogen Bonds
- Van der Waals Interactions
- Chemical Reaction
- Reactant
- Product
- Chemical Equilibrium

Chap 3: Water and Life

<u>Chap 3</u>

Define the term polar covalent bonds.

Explain what polar molecules are.

Explain how polar covalent bonds help water be the universal solvent.

List and Explain the four emergent properties of water.

Differentiate between cohesion and adhesion.

Explain how water's high specific heat helps to regulate temperatures on <u>both</u> an organismal and ecological scale.

Explain why ice float on liquid water?

Explain what would happen if solid water was more dense than liquid water during something like an ice age.

Differentiate between hydrophobic and hydrophilic.

Define the terms solvent, solute and solution.

Define the terms hydration shell and Draw and example of it at the molecular level.

Define the terms acid and base and Differentiate between the two terms.

Explain what is being measured for pH.

Be able to calculate concentration from pH and vice versa.

Define the term buffer and Explain how buffers affect the pH of solutions.

Explain how increasing CO₂ levels in the atmosphere can cause destruction of coral reefs.

Chap 4: Carbon and Molecular Diversity

Chap 4

Define the term *organic* in reference to chemistry.

Draw a diagram of the Miller-Urey experiment setup and **Explain** the conclusion of this experiment. (Eventually we will tie this in to chap 25)

Explain why carbon's versatility is important for life on Earth.

Diagram and Describe the seven functional groups for biological chemistry in figure 4.9 (pg. 63)

Chap 5: Biomolecules

Chap 5

Define the terms *monomer* and *polymer* then Differentiate between the two terms.

Diagram and Explain the two process that either synthesis polymers or breakdown polymers.

List and Describe the four groups of carbon compounds. (Understand all bolded terms in this chapter)

Differentiate between which groups have a monomer/polymer structure and which one does not.

Explain the two major roles of carbohydrates in biological systems.

List the name of the bond that connects monosaccharides to make a polysaccharide for carbohydrates, proteins and nucleic acids then **Draw** a diagram of each.

Diagram and **Explain** the difference between α and β glucose polysaccharides.

Differentiate between starch, cellulose, glycogen and chitin.

Define the term *hydrocarbon* from chapter 4.

Describe three molecular roles of lipids in biological systems.

Differentiate between saturated fats and unsaturated fats.

Diagram a phospholipid molecule and Describe how it is used in cells.

Diagram a steroid molecule (Ex: Testosterone, Estrogen, Cholesterol) and Explain their role in biological systems.

List and Describe the 8 roles of proteins.

Diagram a generalized amino acid molecule, **Label** the α carbon and the *R* group side chain.

State how many different amino acids there are in biological systems.

Define the terms *enzyme* and *catalyst*, then Differentiate between the two terms.

State the name for the bond between the amino acids in a polypeptide.

List and Describe the 4 levels of protein structure.

Diagram a nucleotide molecule and Label the three main regions.

Describe the main roles of nucleic acids.

State the name for the bond between the nucleotides in nucleic acids.

Diagram the five nucleotides. Designate which ones are used in DNA and which ones are used in RNA.

Explain the meaning of the term antiparallel. (A diagram will help in this explanation)

Chap 6: Organelles

<u>Chap 6</u>

Describe the functions of the following organelles: (* are VERY IMPORTANT structures)

- Cytosol *
- Plasma membrane *
- Nucleus *
- Nucleolus
- Ribosome *
- ER (smooth and rough)
- Golgi apparatus/complex
- Vesicles/vacuoles
- Lysosome
- Mitochondrion *
- Chloroplast *
- Cytoskeleton
- Cell wall

Define and Differentiate between the terms prokaryotic cell and eukaryotic cell.

List and Explain at least 3 uses of vacuoles.

Explain the *endosymbiotic theory* and how it applies to chloroplasts and mitochondria organelles.

Explain the purpose of *motor proteins*.

List and Describe the three components of the cytoskeleton. (Table 6.1, pg. 113 - 117)

Describe the *extra cellular matrix*.

List and Differentiate between the cell junctions present in plant cells vs. animal cells.