**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**

**Chap 1**

**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)**

**Chap 2**

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**

**Chap 3**

**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 *both* 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  and  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 * 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**

**Chap 6**

**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.