

# AP Biology Summer Assignment 2017/18

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Modified from Kimberly Simons/Paul Picard LHS downloaded June 2017

Welcome to AP Biology for the 2017-2018 school year! Thank you for agreeing to take on the challenge of a two-semester college-level life science course. Throughout the year, you will develop skills and understandings that will help you excel in college and beyond. All assignments must be **handwritten** and are **due the first day of school**. Please email me if you have questions.

There are *three* things that you will be required to do this summer in preparation for the fall:

## AP Biology Summer Assignment:

1. Purchase the required books and bring them to our first class meeting – **10 points**

*Campbell Biology in Focus, AP Edition*. Pearson Education. ISBN: 978-0-13-3102178 or ISBN: 0-13-310217-3

*Cliff Notes AP Biology*, 5th edition. 978-0544784680

2. Read Chapters 1, 2 and 3 in the AP Biology Textbook *Campbell Biology in Focus, AP Edition*. Pearson Education. ISBN: 978-0-13-3102178 or ISBN: 0-13-310217-3. The first 3 chapters are essential for your understanding of biology and should consist primarily of chemistry review from your sophomore or junior year. Complete the accompanied reading guide/question packet as you read through the textbook. All responses should be **handwritten** directly in the reading guide in complete sentences.
3. Read and complete the graphing practice packet (AP Biology HW Assignment #3).

Items 1 - 3 above are due on the first day of class. Please plan for an exam on Chapters 1-3 at the end of the second week of class.

If you have any questions on the summer assignment or general questions about our up-coming year in AP Biology please feel free to contact me at [jaltergott@stbernardhs.org](mailto:jaltergott@stbernardhs.org)

Thank you,

Mrs. Jennifer Altergott

**Summer HW #1: Chapter 1 – Introduction – Foundations of Biology Studying the diverse forms of life reveals common themes.**

- 1.1 For each of these terms [*organelles, population, biosphere, ecosystem, organism, tissues, cells, molecules, community, organs, organ system*], write
- a brief description
  - state one specific example
  - then list the terms in order from least specific to most specific

*Complete item 1.1 on a separate sheet of paper and attach to this assignment.*

- 1.2 Describe two (2) similarities and two (2) differences between prokaryotic and eukaryotic cells.
- 1.3 Describe why DNA is important to living things.

**Biological inquiry entails forming and testing hypotheses based on observations of nature.**

- 1.4 Identify the control and experimental groups in the mouse camouflage experiment.

Why were the results of this study presented as the proportion of attacks on camouflaged and non-camouflaged mice in each area rather than as the total number of attacks?

1.5 Describe positive feedback and negative feedback, distinguishing one from the other. Describe one example of each.

## **Chapter 2 – The Chemical Context of Life**

**Matter consists of chemical elements in pure form and in combinations called compounds.**

**An element's properties depend on the structure of its atoms.**

2.1 List the six most abundant elements in living things. Provide one example, for each element, of a biological molecule, or type of molecule that contains that element.

**The formation and function of molecules depend on chemical bonding between atoms.**

2.2 Compare and contrast polar and nonpolar bonds. **Explain** the role of electronegativity in determining a molecule's polarity.

2.3 The polarity of biological molecules impacts their function. ***Explain why.***

### **Chemical reactions make and break chemical bonds.**

2.4 When a chemical reaction is at equilibrium, what is true about the reactants and products of the reaction?

### **Hydrogen bonding gives water properties that help make life possible on Earth.**

2.5 **Explain** how hydrogen bonds make water a good moderator of temperature.

2.6 **Explain** the importance of cohesion and adhesion in water transport throughout plants.

2.7 Draw a diagram of a water molecule and label the regions that are more positive or more negative. **Explain** hydrogen bonding with water, including a description of how many hydrogen bonds a single water molecule form.

2.8 Here is a list of the types of bonds and interactions discussed in this section. Place them in order from the **strongest to the weakest**: hydrogen bonds, van der Waals interactions, covalent bonds, ionic bonds.

2.9 How do biological buffers work? Why are they important? **Explain.**

## Chapter 3 – Carbon and the Molecular Diversity of Life

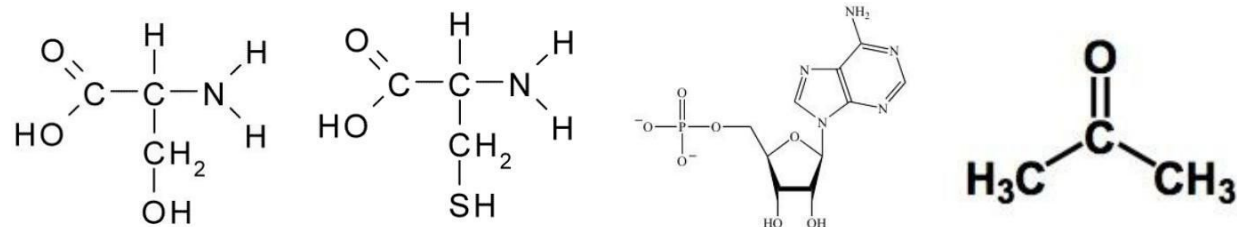
**Carbon atoms can form diverse molecules by bonding to four other atoms**

**Macromolecules are polymers, built from monomers.**

3.1 Complete the chart below on the functional groups:

Chemical group	Molecular Formula	Chemical characteristic(s)
	-CH <sub>3</sub>	
Carbonyl		Polar group
Phosphate		
	-NH <sub>2</sub>	
	-COOH	
Thiol		
Hydroxyl		

3.2 Practice recognizing the functional groups by circling and naming the groups you see in the following molecules



3.3 **Explain** how polymers are formed and broken down.

**Carbohydrates serve as fuel and building material.**

3.4 What are the primary building blocks of carbohydrates?

3.5 **Describe** the primary functions of carbohydrates in the body.

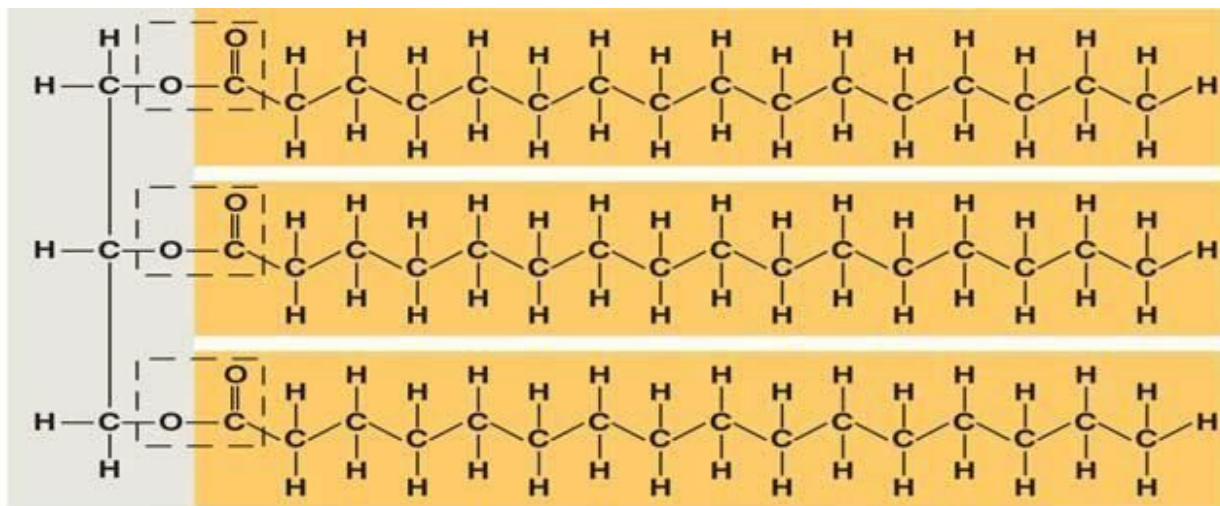
3.6 **Explain** why humans cannot break down cellulose. (Your response should include a discussion of the enzymes and linkages involved).

**Lipids are a diverse group of hydrophobic molecules.**

3.7 Lipids include fats, waxes, oils, phospholipids, and steroids. What characteristic do all lipids share?



3.8 What are the building blocks of *fats*? Label them on this figure. Also label the ester linkages.



3.9 Describe (3) functions for lipids. **Explain** how the structure of a lipid can determine its function.

**Proteins include a diversity of structures, resulting in a wide range of functions.**

3.10 Complete the table below.

Level of protein folding	Describe this folding and the bonds that hold it in place	Example
Primary (1°)		
Secondary (2°)		
Tertiary (3°)		
Quaternary (4°)		

3.11 Complete the following table.

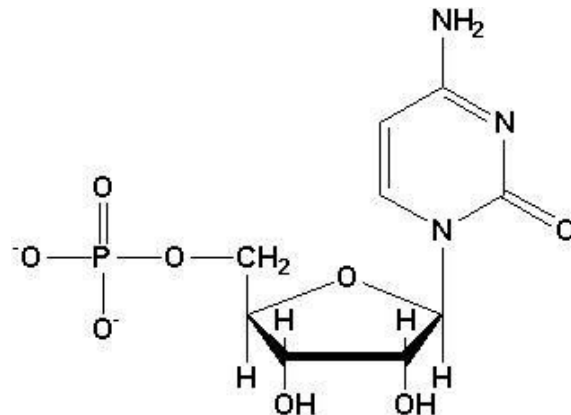
<b>Type of Protein</b>	<b>Describe this function</b>	<b>Example</b>
<b>Enzymatic</b>		
<b>Storage</b>		
<b>Hormonal</b>		
<b>Contractile and Motor</b>		
<b>Defensive</b>		
<b>Transport</b>		
<b>Receptor</b>		
<b>Structural</b>		

3.12 What does it mean when a protein is “denatured?” **Explain** some of the ways that a protein can become denatured.

3.13 How can the structure of a protein impact its function? **Explain.**

### **Nucleic acids store, transmit, and help express hereditary information.**

3.14 Label the three parts of this nucleotide. Indicate with an arrow where the phosphate group of the next nucleotide would attach to build a polynucleotide. Number the carbons of the pentose.



3.15 Is the above molecule a DNA or RNA nucleotide? **Justify** how you know.

3.16 What are the five nucleotide bases?

Which of these are found in DNA? RNA?

3.16 What is the backbone of DNA? RNA?

3.17 What is meant by 3' and 5'?

3.18 What is the complementary strand for the following DNA piece? 5'—C A G G T A C G A—3'

3.20 Complete the table below (attempt to do this *from memory*).

Macromolecule	Monomer	Polymer	Monomer shape	Polymer shape	Function(s)	Example(s)
Carbohydrates						
Lipids						
Proteins						
Nucleic Acids						

