GREEN HOPE HIGH SCHOOL - AP Biology Summer Assignments 2018
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Key Materials and Course Resources:
Textbook: Campbell Biology, 9e (ISBN-13: 978-0321558237)
(The textbook will be provided on the first day of classes, but feel free to purchase your own copy so you can write in it)
College Board Links: Course and Exam Description, Effective Fall 2012
Lab Manual: AP Biology Investigative Labs
Required materials: binder with paper, quad-ruled lab notebook, calculator, and it's **STRONGLY SUGGESTED** that you purchase the **Barron's AP BIOLOGY EXAM prep- book** (6th edition ISBN-13: 978-1438008684)

Summer assignments:
1) Review and re-familiarize yourself with the Basic Biology and Science Concepts
2) Complete the Practice Review Math and Chemistry questions
3) **Complete the Grid In Sample Math and Chemistry Problems (Note: watch out for sig figs)***
4) Purchase a quad-ruled notebook and calculator –**REQUIRED** the first day
5) Visit The College Board site and review over the overall course description and the Exam Format (P.124-169)
6) Read the Sections: About the Exam and Biochemistry from the Barron's AP BIOLOGY prep-book

***Note:** Grid In Math and Chemistry sample problems at the end of this assignment are due Monday, 8/27, in class
Late penalty = 50% and only will be accepted up till the end of the first Unit

Important Dates:
QUIZ (1/2 test grade) Chapters1-3 ➔ Thurs. September 6th   **TEST Unit 1 Chapters 1- 6** ➔ Thurs. September 13th

Need Help or Have Questions?
Email Ms. Thomasch: jthomasch@wcpss.net or **Ms. Woodyard (Parkin)**
**Note:** both teachers are traveling over the summer so help will be "sporadic" via email during that time

Basic Biology and Science Concepts: (It is expected that students be familiar with these concepts before the first day of classes – however; this part of the assignment is not collected)

1) The steps and overall process of the Scientific Method
2) The overall process of the Engineering Design Model
3) Inquiry Based Science
4) Inductive Reasoning vs Deductive Reasoning
5) Hypothesis (how to formulate and how to be written)
6) Independent vs Dependent Variables (as part of an experiment and how to be graphed)
7) Controlled vs Uncontrolled Experiment
8) Control group vs experimental group
9) Quantitative vs Qualitative data
10) Theories vs Laws
11) Negative vs Positive Feedback
12) The Characteristics of Life
13) Prokaryotic vs Eukaryotic Cells
14) DNA (overall structure and function) and Overall Gene expression
15) Evolution and Natural Selection
16) Levels of Classifications (Domains and the 6 kingdoms)
17) Genomics
18) Cell Reproductive Methods (Binary Fission, Mitosis, and Meiosis)
19) Basic Genetics (Solving monohybrid crosses using punnett squares)
20) Organic Molecules of Life – Proteins, Lipids, Nucleic Acids, and Carbohydrates (monomers, polymers, and key functions)

Practice Math and Chemistry Review questions: (It is expected that students be familiar with these types of calculations/concepts before the first day of classes – however; this part of the assignment is not collected)

1) Grasshoppers in Madagascar show variation in their back-leg length. Given the following data, determine the **mean** and **standard deviation** for this data. (Round the answer to the nearest hundredth) Length (cm): 2.0, 2.2, 2.2, 2.1, 2.0, 2.4 and 2.5

2) What is the **Surface Area to Volume ratio** for this cell? (Round to the nearest hundredth)
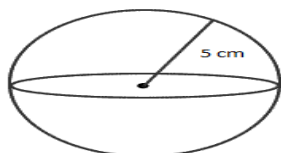
3) Calculate the probability of tossing three coins simultaneously and obtaining three heads. Express answer as both **fraction form** and **percentage**.

4) Determine the **number of significant figures** in each of the following:
a) 804.5 g   b) 0.0144030 km   c) 1002 m   d) 30 000 cm   e) 400 mL   f) 0.000625000 kg

5) Perform the following operations and express each answer in **scientific notation**
a) $(1.54\times10^{-2}g) + (2.86\times10^{-1}g)$
b) $(7.023\times10^{9}g) - (6.62\times10^{7}g)$
c) $(8.99\times10^{-4}m) \times (3.57\times10^{4}m)$
d) $\dfrac{2.17\times10^{-3}\,g}{5.011\times10^{4}\,mL}$

6) **Define** each of the following:
a) Atomic number   b) mass number   c) Atomic weight/mass   d) mole   e) isotope

7) Determine the number of **protons, electrons** and **neutrons** are in an atom of bromine-80?

8) Write the **Nuclear Symbol/Isotope Notation** for carbon-13.

13) **Distinguish** between the **different types of bonds/attraction**:
a) Covalent   b) nonpolar vs polar covalent bonds   c) ionic   d)Hydrogen/imf

14) Rewrite the following unbalanced equations as **balanced equations**:
a) $H_2 + Cl_2 \rightarrow HCl$ b) $NaOH + H_2SO4 \rightarrow H_2O + Na_2SO_4$

15) Find the **Molecular Weight (mass)** for the following: (Round to 2 sig figs)
a) H_2O b) $C_{13}H_{18}O_2$ (Ibuprofen)   c) $C_9H_9O_4$ (aspirin)   d) H_2SO_4

16) What is the **pH** of each of the following?
a) 1×10^{-3} M HCl   b) 1×10^{-5} M NHO$_3$ c) 1×10^{-4} M NaOH   d) 1×10^{-2}M KOH

17) Which is more **acidic?** (H⁺) of 1.0×10^{-3} or 1.0×10^{-12} Which is more **basic?** (H⁺) of 1.0×10^{-8} or 1.0×10^{-3}

18) Stomach acid has a pH of about 1-2. What would the **H⁺ concentration** be around?

19) Complete the following Table:

[H₃O⁺] or [H⁺]	scientific notation	pH
0.1		
0.01		
0.001		

0.0001		
0.00001		
0.000001		
0.0000001		
0.00000001		
0.0000000001		
0.00000000001		

20) As [H$^+$] gets smaller, scientific notation exponents get _____, and pH goes _____
    As [H$^+$] gets larger, scientific notation exponents get _____, and pH goes _____

Grid in Math- Chemistry Problems. Show all work and use Significant Figures.
(Expect to see similar problems on the first quiz and test) DUE IN CLASS 8/27

1) **Calculate** the **molecular mass** (to 3 sig figs) of epinephrine, $C_9H_{13}NO_3$
2) **Describe the steps/procedure you would follow to prepare the following from a solid**: 150 mL of 0.20 M NaCl
Hint: you need to first determine the number of grams of the NaCl needed
3) **Describe the steps you would need to follow to prepare/dilute the following stock solution**: 2000 mL of 0.05 M ammonia starting with an
8.0 M ammonia stock solution
4) **Calculate** the **volume** of the specified titrant required to **neutralize** 15 ml of 0.28 M NaOH.
Titrant: 0.60 M H$_2$SO$_4$ [2NaOH + H$_2$SO$_4$ ➔ 2H$_2$O + Na$_2$SO$_4$]
Hint: Formula = $n_aM_bV_b = n_bM_aV_a$
5) What **molarity** is 5.2% NaCl?
6) **Calculate** the **mean** for the following titrations of dissolved oxygen (ppm):
8.2, 8.3, 8.6, and 8.4
7) **Calculate** the **standard deviation** of the measurements in problem 6.