

Summer Assignment AP Biology 2017-2018

AP Biology is designed to be the equivalent of a college course in biology. This class will be conducted in similar fashion to what you could expect to see in college. The goal of AP Biology is to provide students with the scientific principles and focus on the four big ideas of biology.

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 possess.

Big idea #4: Biological systems interact, and these systems and their interactions possess complex properties.

In order to cover the material necessary for the AP Biology Exam in May, we need to move at a rapid pace. To cover everything required, there is a summer assignment.

Items you will need:

2 ½ inch 3 ring binder with dividers

Graph ruled composition book

Black or blue pens

Part I: Ecology (Chapters 52-56)

We will begin the 2017-2018 school year with Ecology, so you need to come prepared for the first day by having read the Ecology chapters. In addition to reading the text, you will also define the list of “Key Terms” and complete “Focus Questions” for Ecology. Please follow the instruction at the top of the page for the focus questions and vocabulary. There will be an assessment on the first day of school on which you can use your vocabulary and focus questions. **You will need to check out a copy of the AP Biology book from the AC before you leave this year.**

Part II: Assignment #2- Get to know you

Subject Line: AP Biology 17-18, Your Name

Body: Your full name (& nickname that you go by if you have one) & stuff about you!

- Who was your last science teacher? What class?
- What other science classes have you taken? Are planning to take next year?
- What do you like to do (hobbies, sports, music, interests, etc.)?
- Was there anything that you liked or disliked about your earlier biology class?
- What are you looking forward to the most in AP Biology?
- What are you most anxious about in AP Biology?
- Why are you taking AP Biology? What do you hope to accomplish/gain?

Email to me by July 1st hooke01@wsdmi.org

Part III: Natural History Collection

This assignment will send you out of doors to do field work, “old-fashioned” Biology. You are to find an example of each organism listed in the following pages and photograph it in its natural habitat.

You will then present those photographs through the use of PowerPoint to assemble a natural history collection of the specimens you collect. The collection will include photographs of the organism, its common and scientific names, its classification, and information that describes where and when it was collected. This part of the assignment will not be due until one week prior to the end of the first quarter (probably late October).

Helpful Resources

Email hooke01@wsdmi.org

[248-408-4516](tel:248-408-4516)

Log on to Edmodo.com

Group code is _____

The Natural History Collection

Part I: The first part of the collection is general in nature and includes:

- Four insects (two can be arachnids instead)
- Three wildflowers (avoid the very common ones like dandelions/daisy)
- Two non---flowering plants
- Two fungi
- Five animal artifacts (Be creative! Capture a spider web; find a track; find an egg casting, shell, or nest...etc. Be sure to ID the specimen from the artifact.)
- Three songbirds
- Three birds of prey or waterfowl
- Three herpetiles --- sometimes spelled herpitiles (amphibians and reptiles)

Part II: The second part of the collection is specific in nature and centers on some of the common trees of Michigan and five invasive or toxic plants. Trees must have **at least three photos** per organism: entire tree, top and bottom of leaf, bark/trunk.

- You must identify five trees native to Michigan
- You must identify at least one invasive or toxic plant (ex. poison ivy, purple loosestrife, Russian olive, stinging nettle, tree of heaven)
- You must also find an example of phragmites and typha and provide a slide explaining the relationship of these two organisms

Part III: Extra Credit: You may earn extra credit for each additional organism you identify up to 10 additional organisms.

Do's and Don'ts

- Do take a camera and small notebook with you as you collect. Remember to record the original colors and markings immediately as they may not photograph as well as you had hoped. When photographing trees, take one shot of the entire tree, one of its bark, and another of the leaves.
- Do avoid plain brown moths (very hard to identify with our resources) and caterpillars.
- Do be sure to have organisms that are different in type in the general collection - ex. Only one kind of grasshopper, one shelf-fungus. Each artifact type should be different in nature (only one footprint and one shell)
- Do observe rules of the State Parks and private property. There is no need to do any damage or harm to anything in this assignment. Take nothing but a picture; leave nothing but your

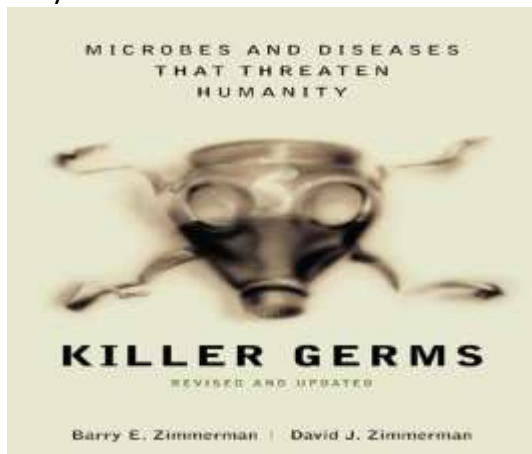
footprint.

- Don't wait too long -- things begin to die in the fall! You can still do your collecting in the first couple of weeks in September, but you will be doing it *in addition to your regular class work*.
- Do collect more than you need -- sometimes you have something that is really difficult to identify; backup samples are good.
- Do remember to record the sort of habitat (side of the road, in a marsh, a shaded woods, GPS location, etc.) where your samples were found -- this is part of your information to include in the field-book and will help you in using the classification guides.
- Don't handle bird nests; they can be full of parasites and many birds return to their nest each year.
- Do have pictures clear enough so that identification is easily made.
- Do take your own pictures. No swapping of shots or taking them from a book or the Internet; include a time and date stamp if possible.

Part IV –Complete the chemistry review and prefixes and suffixes packets found on Edmodo.

Part V-Read the book “Killer Germs” by Barry Zimmerman

As you read the book, do a journal entry about your thoughts, questions you have or things that surprise you. You should do an entry each time you read. You may type or hand write your entries, they will be turned in when school starts.

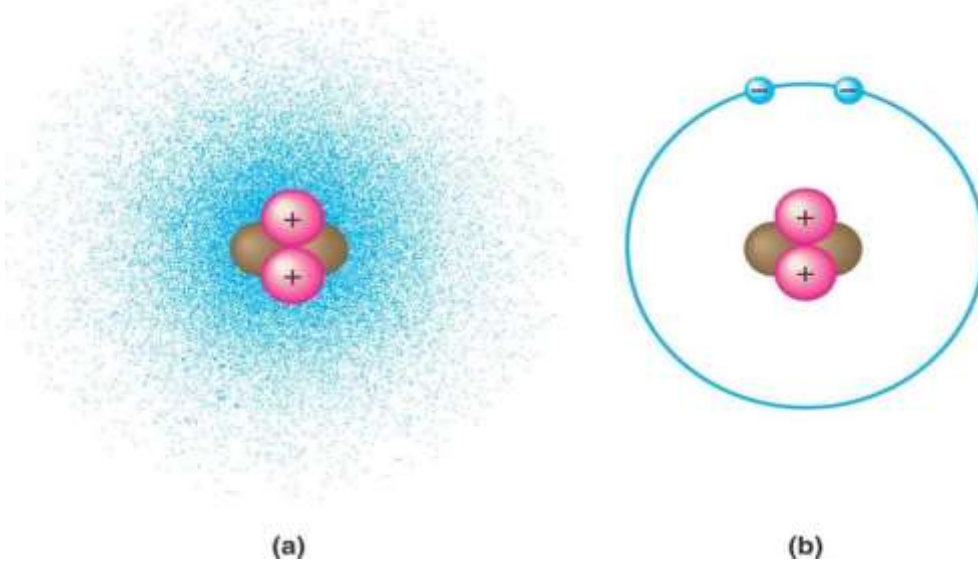


I am looking forward to our time together in AP Biology, as I am sure many of you are. If you have any questions over the course of the summer, feel free to email me at hooke01@wsdmi.org.

Enjoy the summer! Mrs. Hook

This is an overview of basic chemistry – put this all in your AP Biology three ring binder!

1. Contrast the term element with compound.
2. Know the symbols of the following elements and their charge:
 - a. Carbon
 - b. Hydrogen
 - c. Oxygen
 - d. Nitrogen
 - e. Phosphorus
 - f. Sulfur
3. Label the diagram below and define the terms that you label.



4. Contrast the terms atomic mass and atomic number.
5. What is the difference between the terms atomic mass and atomic weight?
6. What is an isotope and what is “special” about radioactive isotopes?
7. What determines interactions between atoms? Why are valence electrons important?
8. Define the following terms:
 - a. Chemical bond

- b. Covalent bond
- c. Single bond
- d. Double bond
- e. Electronegativity
- f. Nonpolar covalent bond
- g. Polar covalent bond

9. What is the difference between a structural and molecular formula?

10. Know both the molecular and structural formula for the following compounds. a. Oxygen gas

b. Carbon dioxide

c. Glucose

d. Phosphate

e. Ammonia

f. Water (you would be surprised at how many people missed this!!!)

11. How do ionic bonds compare with covalent bonds?

12. Compare and contrast hydrogen bonds and van der Waals interactions.

13. Define a dynamic chemical equilibrium in terms of quantities of reactants and products. This is a critical concept!

14. Why is water considered a polar molecule?

15. For each of the below listed properties of water – briefly define the property and then explain how water’s polar nature and polar covalent bonds contribute to the water special property.
- a. Cohesion
 - b. Adhesion
 - c. Surface tension
 - d. High specific heat
 - e. Heat of vaporization
 - f. Evaporative cooling
16. What is special about water and density?
17. Explain how these properties of water are related to the phenomena described in the statements below. More than one property may be used to explain a given phenomenon.
- a. During the winter, air temperatures in the northern United States can remain below 0°C for months; however, the fish and other animals living in the lakes survive.
 - b. Many substances—for example, salt (NaCl) and sucrose—dissolve quickly in water.
 - c. When you pour water into a 25-ml graduated cylinder, a meniscus forms at the top of the water column.
 - d. Sweating and the evaporation of sweat from the body surface help reduce a human’s body temperature.
 - e. Water drops that fall on a surface tend to form rounded drops or beads.
 - f. Water drops that fall on your car tend to bead or round up more after you polish (or wax) the car than before you polished it.
 - g. If you touch the edge of a paper towel to a drop of colored water, the water will move up into (or be absorbed by) the towel.
18. Define the following terms:
- a. Solute

- b. Solvent
- c. Aqueous solution
- d. Hydrophilic
- e. Hydrophobic
- f. Molarity

19. MOLARITY

A. Concentration – *comparison of solute to solvent* (solute : solvent)

- a. Concentrated – *large ratio of solute to solvent*
- b. Dilute – *small ratio of solute to solvent*

B. Molarity –

- a. Symbol – M
- b. Equation – in reference table $M = \frac{\text{moles of solute}}{\text{L of solution}}$ $M = \frac{\text{mass}}{\text{L of solution}}$

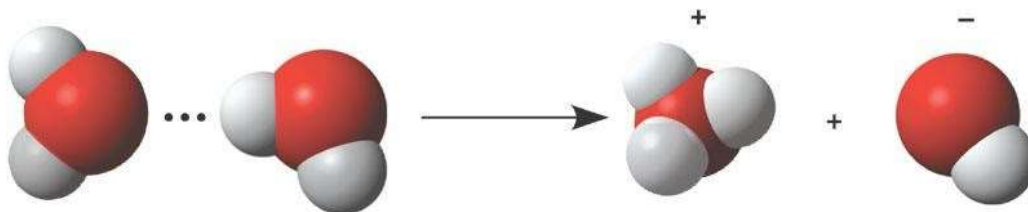
C. Example Problems

1. What is the molarity of a solution formed by mixing 10.0 g of H ₂ SO ₄ with enough water to make 0.100 L of solution?	2. To prepare 10.5 L of a 2.50 M solution of KOH, how many grams of potassium hydroxide must be used?
3. How many moles of LiBr must be added to .650 L of water to make a 2.0 M solution?	4. What is the molarity of the solution produced when 145 g of NaCl is dissolved in sufficient water to prepare 2.75 L of solution?
5. How many grams of KCl are needed to prepare 0.750 L of a 1.50 M solution?	6. What is the molarity of the solution produced when .594 mol of HCl is dissolved in 0.385 L of water?

7. To produce 3.00 L of a 1.90 M solution of sodium hydroxide, how many grams of NaOH must be dissolved?

8. If 8.77 g of KI are dissolved in enough water to make 4.75 L of solution, what is the molarity of the solution?

20. Label the diagram below to demonstrate the dissociation of the water molecule and then relate this diagram to the term pH.



21. What defines an acid and a base?

22. Why are small changes in pH so important in biology?

23. What is a buffer? Give an example on how they would work in a living organism.

24. What is acid precipitation and why is it important to living organisms?

25. Why is organic chemistry so important in the study of biology?

26. What is special about carbon that makes it the central atom in the chemistry of life?

27. Describe and contrast the three types of isomers. Draw a sketch of each a. Structural –

b. Geometric –

c. Enantiomers –

28. Be familiar with each of the following functional groups – know it's chemical compound and the functional properties

a. Hydroxyl

b. Carbonyl

c. Carboxyl

d. Amino

e. Sulfhydryl

f. Phosphate

Biology Prefixes and Suffixes-The Language of Science

The main reason students find it difficult to understand science is because of all the hard to write, spell and read words. Actually, scientific vocabulary is a mix of small words that are linked together to have different meanings. If you learn the meanings of the little words, you'll find scientific vocabulary much easier to understand. Find the mean to the following Greek/Latin root words.

Word	Meaning
a / an	
meso	
leuco	
aero	
anti	
amphi	
aqua / hydro	
arthro	
auto	
bi / di	
bio	
cephal	
chloro	
chromo	
cide	
cyto	
derm	
haplo	
ecto (exo)	
endo	
epi	
gastro	
genesis	
herba	
hetero	
homo	
ov	
kary	
neuro	

Word	Meaning
hemo	
hyper	
hypo	
intra	
-itis	
lateral	
-logy	
-lysis	
-meter	
mono	
morph	
micro	
macro	
multi / poly	
pod	
-phobia	
-philia	
proto	
photo	
psuedo	
synthesis	
sub	
troph	
therm	
tri	
zoo, zoa	
-tropism	
-taxis	
-stasis	

soma	
saccharo	
primi / archea	
phyll	

zyg / zygous	
phago	
path / pathy	
sym / syn	

Once you have completed the above table, use it to develop a definition, in your own words, for each of the following terms.

1. Hydrology _____
2. Cytolysis _____
3. Protozoa _____
4. Epidermis _____
5. Spermatogenesis _____
6. exoskeleton _____
7. Abiotic _____
8. Pathogen _____
9. psuedopod _____
10. Hemophilia _____
11. Endocytosis _____
12. herbicide _____
13. Anaerobic _____
14. Bilateral _____
15. autotroph _____
16. Monosaccharide _____
17. Arthropod _____
18. polymorphic _____
19. Hypothermia _____
20. Biogenesis _____

