

AP Biology Summer Assignment

Welcome to Advance Placement Biology! The AP Biology class is a year-long course that provides students with an opportunity to develop a conceptual framework for biology, emphasizing practical applications and critical thinking. This is a college level course, so it is expected that the students come to class prepared and motivated to work in a fast-paced environment. I am excited for the year to come!

The hard work starts over summer! The assignment consists of PARTS and all must be completed according to the directions.

Part 1: Letter of Introduction – Due DATE ENTER HERE. I would like to learn a little more about you before our school year begins. Draft an email to me *carefully* following these rules:

- Use clearly written, full sentences. Do not abbreviate words like you are texting with a friend.
- Use SPELL CHECK. This is a professional communication, similar to a conversation with a college professor.
- Address it to me at: scott.whitney@sdhc.k12.fl.us
- Make the subject: "AP Bio: Introduction to <insert your name here>"
- In the letter introduce yourself to me and tell me about yourself, like:
 - Why are you taking AP Biology?
 - What career would you like to pursue?
 - What are your educational strengths and weaknesses?
 - How do you learn and study (styles of teaching, studying etc.)?
 - What do you like to do in your spare time?
 - Do you have a job?
 - What other dual enrollment or AP classes are you taking?
 - Tell me a little about your family.
 - What was the last book you read for fun?
 - What are you most looking forward to about AP Biology?
 - What are you most anxious about in AP Biology?

End the email with a formal closing ("Cordially," "Sincerely," "Warm regards," etc.) and add your name as if you signed the letter. Please send from an email address that you use often. I will need to communicate via email throughout the year.

Part 2: Foundation Knowledge –DUE DATE HERE. This review consists of important chemistry material you'll need to know prior to the start of class. There will be a quiz on this subject matter on DATE HERE. This is pre-requisite material that you should be able to answer *without assistance*. If not, make sure to review or learn the material on your own.

You are to answer all questions on a separate sheet of paper. Attach this sheet to the front of your work for full credit. This **must be handwritten and not typed!** Please use complete sentences.

Define, describe and provide examples for:

- | | | | |
|---------------------|-----------------------|------------------|----------------------------|
| A. Potential energy | G. Atomic weight | L. Covalent bond | S. London-dispersion force |
| B. Kinetic energy | H. Isotope | M. Ionic bond | T. Dipole-dipole |
| C. Neutrons | I. Valence | N. Polar | U. Molar mass |
| D. Protons | J. Structural formula | O. Nonpolar | V. Exothermic |
| E. Electrons | K. Molecular formula | P. Cations | W. Endothermic |
| F. Atomic number | | Q. Anions | |
| | | R. Hydrogen bond | |

Study Questions:

1. Define both kinetic and potential energy. Give an example of both.
2. How do elements differ from compounds?
3. Name and define the subatomic particles that are part of an atom. How do they differ from each other? How do these difference contribute to properties of an atom?
4. What is an atom? Give an example.
5. What is the difference between atomic number and atomic weight?
6. Determine the atomic number and atomic weight for:
 - a. Carbon
 - b. Oxygen
 - c. Nitrogen
 - d. Phosphorus
 - e. Calcium
 - f. Hydrogen
 - g. Selenium
 - h. Manganese
7. Where is the mass number put with respect to an element's symbol?
8. What does the subscript number to the left of an element's symbol indicate?
9. What is the difference between ^{12}C and ^{14}C ?
10. What is ^{14}C called?
11. What is a valence electron? Why are they important? How can one determine the valence electron of an element?
12. Draw a structural formula (Lewis Dot Structure) for the following:
 - a. CH_4
 - b. NaCl
 - c. O_2
 - d. H_2O
13. Which of the structures in #12 above have or can form:
 - a. Single covalent bonds
 - b. Ionic bonds
 - c. Double covalent bonds
 - d. Hydrogen bonds
14. Which of the structures in #12 are:
 - a. Polar? Why are they polar?
 - b. Nonpolar? Why?
15. Explain electronegativity.

Part 3: Preparing for STEM Fair – DUE DATE HERE. STEM Fair is mandatory for all AP Biology students, however, you get to pick any topic of your choosing. You will write a few journal entries each week over the summer, until proper paperwork is submitted, you are **not** allowed to begin your experiment. We will be writing "I wonder" statements. These entries should not take a lot of time and do not have to be complex. The purpose of this exercise is to encourage brainstorming. Your statements should pose a question about the world around you. For example:

- "I wonder why Mr. Whitney's room is ridiculously cold."
- "I wonder what cleaning product is the best for washing cars."
- "I wonder why that billboard only uses primary colors."

You should write down at least three entries per week, over the course of 10 weeks (summer). This should give you thirty "I wonder statements." Upon return to class we will discuss our ideas. These statements are a starting point, do not worry about the complexity of the idea. More information to follow about STEM Fair.

Part 4: Watch the following Bozeman Science videos and complete the answers in the attached handout.

AP Biology Practice 1 - Models and Representations Video Review - 10 pts

Video - www.bozemanscience.com/apb-practice-1-models-representations

A) What is a model?.....A visual representation of _____

B) A _____ of how it works is a "Conceptual Model".

C) What are the **four Big Ideas** we will be discussing in AP Biology? List below along with associated example:

1) _____ - example shows natural _____

2) _____ - example:

3) _____ - genetics and cell

4) _____ - pyramid of

D) What are the **5 things** you will need to be able to do using models and visual representations? List below and then answer (Please keep in mind, some of the examples that he uses may be unknown to you at this time, focus on the "practice" not the content.)

1) _____

i. Relating to beetles, draw/label the final graph he created below:

ii. Why do you think there were fewer light colored beetles when the trees became darker?

2) _____ What was is going to move in his example? _____

3) _____ They will give you a model and then _____ based on that. ...

4) _____ Means that you are _____ your knowledge to a visual representation

5) _____ Asking you to _____ the knowledge that you have.

E) Models allow us to make _____ of a _____ model.

Part I: Video learning Bozeman Science - 30 Pts total

You will learn about 3 key practices to succeed in AP biology by watching a video and answering questions about each. We will be using a lot of videos for Bozeman science this year as homework so this will give you a good introduction to the Host Mr. Anderson and the videos. Each video is about 10 minutes but allow yourself 30 minutes each to pause video and answer questions

Each video centers on the 4 Big Ideas of AP biology:

Big Idea 1: EVOLUTION

The process of evolution drives the diversity and unity of life.

Big Idea 2: Cellular Processes: ENERGY and Communication

Biological systems utilize free energy and molecular building blocks to grow, to reproduce, and to maintain dynamic homeostasis.

Big Idea 3: Genetics and INFORMATION Transfer

Living systems store, retrieve, transmit, and respond to information essential to life processes.

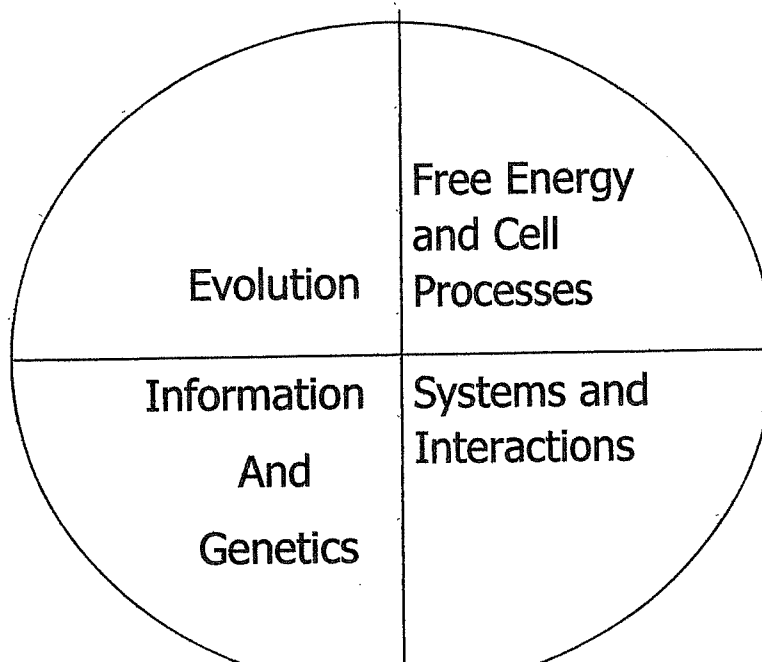
Big Idea 4: Interactions of SYSTEMS

Biological systems interact, and these systems and their interactions possess complex properties.

The 3 videos are as follows: Each work sheet has a specific link, but you can access them all if you google: < Bozeman AP biology> and choose first link. They will all be listed

- 1) Video 1 - Using Models - 10 pts
- 2) Video 2 - Using Mathematics - 10 pts
- 3) Video 3 - Scientific Questioning - 10 pts

You must print out or obtain the 3 sheets following on next page. They can also be submitted to me via email. Note. There are 7 Intro AP practice videos by Bozeman science; you can do more for extra credit.



AP Biology Practice 2 - Using Mathematics Video Review Sheet - 10 pts

www.bozemanscience.com/apb-practice-2-using-mathematics

A) All sciences have what at their core? _____

B) What is "Mathematical Biology" driven by:

1) _____: sequencing DNA - what is the trend? _____

2) _____ Theory: being used to predict _____ Rule of _____

3) Computing _____: computers are getting

4) Laboratory experiments in silico:

a) In vitro: _____

b) In vivo: _____

c) In silico: simulating _____

C) **Four equations in the four big ideas:** You want to be familiar with these

1) Evolution:

3) Free energy:

2) Information:

4) Systems:

D) Understandings in Using Mathematics:

1) _____ the _____ of a Mathematical Routine: Pause video, try and do it and then check it. If you can no do, just take notes (CALCULATOR REQUIRED)

2) Apply _____ Routines: Again, try this problem. You can do this one based on common sense! (CALCULATOR REQUIRED)

3) _____ quantities that _____ natural phenomena.

a) Estimate which way water will go in each.

b) Potatoes: you can do this, just use graph. Potatoes have _____ M Sucrose

1. I should be able to ask you, "How do we...."
2. Students should be able to answer, "This is how...."
3. What is a good example of how you ask questions all the time?
4. What is the problem with:
 - a. Smallest bird question?
 - b. Universe question?
 - c. Genetically modified food question?
5. Why is the plant growth question more scientific?....but what is a problem with it too?
6. Why is the CO₂ question a good scientific question?
7. A good question is going to lead to: (2x)
8. What are the three things you have to be able to do during the practice of "Scientific Questioning"?
9. Write out one of the three questions he "posed" concerning the phylogenetic tree. (You are just asking, not answering.)
10. When you "refine" a question, you are taking it to another _____
11. What is the third part of scientific questioning?
12. What can you then do if you are good at scientific questioning?