**AP Biology Summer 2022**
**Mrs. Shelpler**
tshelpler@ccajax.org
Campbell Biology, 11th edition, ISBN-13: 978-0134093413 / ISBN-10: 0134093410

**Welcome to AP Biology!** This course is designed to be the equivalent of a two-semester introductory biology course usually taken in the first year of college. In other words, it's a little like drinking from a fire hose. It will be a rewarding experience, but also challenging.

| **The 4 Big Ideas of AP Biology** |
|---|
| **Big Idea 1:** The process of evolution drives the diversity and unity of life.<br>**Big Idea 2:** Biological systems utilize free energy and molecular building blocks to grow, to reproduce, and to maintain dynamic homeostasis.<br>**Big Idea 3:** Living systems store, retrieve, transmit, and respond to information essential to life processes.<br>**Big Idea 4:** Biological systems interact, and these systems and their interactions possess complex properties. |

On the pages that follow, you'll find assignment instructions that comprise your summer work for AP Biology. The main purpose of these assignments is to make sure that you are adequately prepared for the upcoming year. Because many of you had some sort of disruption in your biology course (COVID or FLVS), the summer assignment goal is to catch you up and/or refresh relevant topics so AP Bio won't feel like swallowing an elephant. Hopefully, you will have some fun along the way and enjoy the concepts covered! Contact me at tshepler@ccajax.org with any questions or concerns.

**The assignments are due the first day of class (with the exception of the letter to me which is due by July 15th) and will count as a grade. Please be aware that WE WILL hit the ground running so plan on having homework and assignments our first day!**

**Word of caution—DO NOT WAIT to complete this assignment a couple of days before it is due. Set yourself up for success from day one.**

**Integrity and honesty**

I am sorry to have to write these words and I apologize if I offend any of you, but it is easier and more appropriate to address these matters from the get-go. You are in an upper-level science class and the expectation is that you do your own work whether on tests, quizzes, homework,

labs, notes, etc. I expect that there is absolutely no copying other's work. It does not matter if both parties are okay with it; it is not acceptable. I am all for group work and collaboration, but I have zero tolerance for an individual getting a free ride. You only hurt yourself by copying other's work. If you desire to excel in this class, you will need to be prepared and learn the material which will not happen by using other individual's work as a crutch. If you are unsure whether you are doing something you shouldn't, err on the side of caution. I trust that you each desire to truly learn the material and have the grit and work ethic to persevere when things get challenging. I am always here for you and as classmates, you are also here to support one another, but not to carry or drag one another.

## Assignment #1: Introductory Letter- due July 15, 2022

- You will write a letter of introduction to me, Mrs. Shepler, and send it to tshepler@ccajax.org. Please remember you are writing a letter that gives me the first glimpse at your written communication skills and your ability to read instruction and follow it. Please read the letter out loud to yourself before submitting it to me.
- In the subject line of your email, write: AP Biology 2022-2023 and your name (example: AP Biology 2022-2023, Joe Smith)
- See below for the content of the letter. Follow items 1-8 to ensure you include all necessary items.

We will engage in a great deal of collaborative learning this year. I expect you will have times of struggle and my hope and suggestion is to keep open lines of communication with me. It is IMPORTANT that as a young adult, getting ready to enter college, you have solid written communication skills as well as verbal communication skills. Please email me with concerns and come talk to me about your concerns. Obviously, this summer, we will need to communicate via email. I am here for you and with you.

**Directions for the Introduction Letter:**

1. Subject line of email should list: AP BIOLOGY 2022-23 and your name
2. Salutation: Dear Mrs. Shepler,
3. Introduce yourself:
    a. What is your name? Nickname? Grade?
    b. Course you have taken? Final Grades?
    c. What subjects do you see yourself taking in college?
    d. Is there anything you especially liked or disliked about former biology classes?
4. Interests:
    a. Hobbies? Sports? Music?
    b. Family? Do you have siblings?
    c. Work? Do you plan on having a job while in high school?

5. Education:
    a. What are your personal strengths and perceived weaknesses?
    b. What causes you to struggle in a course? How do you address that challenge?
    c. What is the most effective way you've found to study for a test?
    d. How would you describe yourself as a learner?
    e. How would you describe yourself as a team or group member?
6. AP Bio:
    a. What are you looking forward to most in this class?
    b. Do you have concerns about AP Bio?
    c. Why are you taking this AP course? What do you hope to accomplish for this course?
7. Please upload a picture of yourself so your face is clearly seen.
8. Closing

****Do not stress about this letter! It is an opportunity for me to know you.

IF you have questions that you would like to know about me or AP Bio, please include them in the email you send. Give that section a heading called, "Questions for Mrs. Shepler".

I will answer to the best of my ability. 😊

## Assignment #2: Biology Course Review

**Print out the review at the link below and have it to access throughout the year.**

- **https://www.soinc.org/sites/default/files/uploaded_files/BIOLOGY_PRINCIPLES_REVIEW11-20-14.pdf**

## Assignment #3: Watch a series of videos and answer the questions below

**A. Scientific Method Refresher**

Video: Scientific Method by Bozeman https://youtu.be/GKGtkzgKfkc?t=284 (start video at 4:44 and stop at 10:10)

a. What does the scientific method begin with?
    a. What is the example question he gave?

b. What is a hypothesis?
    a. What hypothesis does Mr. Anderson give?

c. What is an independent variable?
    a. What is Mr. Anderson's example?

d. What is the dependent variable?
    a. What is the example in the video?

e. What are control variables?
    a. List several control variables in the plant experiment?

f. What is a control group?
    a. What conditions do the plants in the example have?

g. What is data?
    a. When you graph, where do dependent and independent variables go?

h. What is the conclusion?

i. Where are results published?

j. What is the purpose of re-testing a hypothesis?

…If you listened beyond 10:10 and heard the part about "truth", I'd like to replace his word 'truth' with 'theory or scientific truth'. Scientific theories exist, but they can never be proven 100% because at any point in time, a new experiment, evidence, or discovery can change what we currently know. The only truth that we can solidly build a foundation on is God's word; everything else is a human discovery. It is presumptuous to believe we know all there is to know about science and can claim things as "truth" in science. God is the reason and Creator of all in our natural world. We do know some things to be true based on what we currently know in science but keep in mind new discoveries are constantly being made in science and all the

sudden "truth" shifts. You will hear this word in science- truth- but as a Christian you ought to keep in mind what the actual truth is and process what you learn in science through that lens. As a Christian, you want to be able to understand what the science world is saying and what the science world means when they use these terms ("scientific truth" or "truth") so that you can engage in this world, but you simultaneously remain in your foundations of Christian truth- actual God-given truths.

**Do you have any additional thoughts you'd like to share on this? If so, do so below.**

**B. Graphing and Statistics Practice:**

You may be asking, "Why am I learning statistics in AP Bio!?!?" The reason is because we will be looking at and analyzing data throughout the year. Having a strong understanding of what graph to use to display information and having the skills to interpret the results will help you become a strong scientist while we are learning content. If you move into a scientific field in college, these concepts are inseparable from scientific research and learning.

Below you will find video links and questions to accompany the videos. **Please answer the questions completely.** If the video leaves you feeling confused or you don't feel you understand it well, *seek out other sources for explanation.*

1. Beginner's Guide to Graphing Data: http://www.bozemanscience.com/beginners-guide-to-graphing-data

    a. What type of graph uses a "best fit" line?

    b. Explain the difference between a bar graph and a histogram.

    c. Which type of graph shows a change over time?

    d. Which type of graph displays a correlation of variables?

        - Distinguish between the independent variable and dependent variables in an experiment, and where their axes are on the graph.

e. Which type of graph is best for comparing 2 or more different groups?

f. Which type of graph is better for showing distribution of data?

g. Explain when a pie chart/graph should be used and give (draw, label) an example.

h. State at least 5 elements that any graph should always display.
   1.
   2.
   3.
   4.
   5.

2. Statistics for Science: http://www.bozemanscience.com/statistics-for-science
   a. What is n?

   b. What is $\bar{x}$?

   c. What is M?

   d. What was the range of the sample in his video?

   e. Explain "degrees of freedom" (with any example) and what the formula for it is n-1.

3. Standard Deviation: https://youtu.be/09kiX3p5Vek
   a. What is meant by normal distribution?

   b. What does standard deviation (SD) measure?

   c. Can 2 sets of data have the same mean but a different SD? _____ Explain.

d. 1 SD means _____% of the population falls within this range, while 2 SD mean _____% falls within this range.

e. Pause the video and calculate the SD from the 2nd set of data given by hand. Show your work.

4. Standard Error: http://www.bozemanscience.com/standard-error
   a. Explain the significance of the standard error among 2 different sets of data with different sample sizes that have the same mean (in terms of precision).

5. Standard Deviation and Standard Error of the Mean: https://youtu.be/3UPYpOLeRJg
   a. What do SEM bars that have overlapping means on a graph indicate?

   b. Explain the significance if SEM bars overlap, but the means do not overlap.

   c. Explain the significance if there is no overlap between SEM bars.

## Assignment #4: Active Reading Guide for Chapter 1

Please print this out and complete the reading guides as you read the chapters. If you want to make additional notes, you can do so on the pages or a separate paper. **These will be due the first day of class.** The reading guide comes from a different edition of the text than we are using, so there are some subtle differences like figure numbers and images.

- https://www.ccajax.org/AP_Biology_Ch_1(1).pdf

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**Have a wonderful summer! Reach out if you need anything! tshepler@ccajax.org**