

## AP Biology Summer Assignment packet

Summer 2021  
Due Date: September 8<sup>th</sup>, 2021

### OVERVIEW OF THE COURSE AND ASSIGNMENT

#### Welcome to AP Biology!

The two central goals of AP Biology are to help you develop a conceptual understanding of modern biology and to gain a deeper appreciation of science as a process (as opposed to an accumulation of facts). The AP Biology Curriculum centers around four Big Ideas (listed to the right). Student awareness of these ideas and their interconnectedness establishes the groundwork for success in this course.

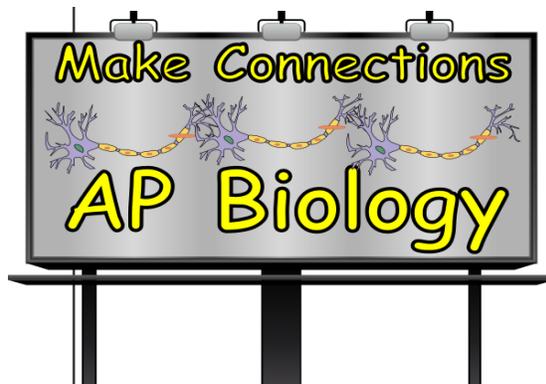
This packet will allow you to begin to explore these Big Ideas.

**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 processes.**

**Big Idea 4: Biological systems interact, and these systems and their interactions**



Supplies needed for your first day of class and every day after:

- 3 Ring Binder
- Filler Paper
- Pencils/Erasers
- Calculator
- Colored Pencils

CONTACT YOUR TEACHER  
IF YOU NEED HELP!!

Adrienne Barnes

Email: [abarnes@rahway.net](mailto:abarnes@rahway.net)

## AP BIOLOGY SUMMER ASSIGNMENT 2021

Dear Prospective AP Biology Student,

Welcome to AP Biology! As stated on the cover page, the two central goals of AP Biology are to help you develop a conceptual understanding of modern biology and to gain a deeper appreciation of science as a process. The AP Biology curriculum centers around four *Big Ideas*. By the end of the summer, you should know these Big Ideas.

### These four *Big Ideas* are:

- **Big Idea 1:** The process of evolution drives the diversity and unity of life.
- **Big Idea 2:** Biological systems (*organisms and/or cells*) utilize free energy and molecular building blocks to grow, to reproduce and to maintain dynamic homeostasis.
- **Big Idea 3:** Living systems (*organisms and/or cells*) store, retrieve, transmit and respond to information essential to life processes.
- **Big Idea 4:** Biological systems (*organisms and/or cells*) interact, and these systems and their interactions possess complex properties.

### What you need to do over the summer:

The summer assignment includes two tasks. One is due over the summer and the other is due on the first day of school in September. Do not wait until the last week of summer to start. You will miss deadlines, fail to complete the assignment, and be removed from the course.

1. Write a letter of introduction and email it to Mrs. Barnes. Due by **Monday, August 2<sup>nd</sup>, 2021**.
2. Read the book, Survival of the Sickest, and complete a reflection journal. The journal is due on **Wednesday, September 8<sup>th</sup>, 2021**.

I am looking forward to working with you in the coming school year. It will be hard, but fun. With dedication, you will succeed. Come ready to work hard and learn. Contact me via email if any assistance is needed over the summer. I will be unavailable from August 9<sup>th</sup> – August 19<sup>th</sup> so do not expect an answer during this time.

Have a wonderful and safe summer!

Mrs. Adrienne Barnes

\*Email me if you have questions: [abarnes@rahway.net](mailto:abarnes@rahway.net)

## AP BIOLOGY SUMMER ASSIGNMENT TASK INSTRUCTIONS

### TASK #1 - LETTER OF INTRODUCTION

**DUE DATE NO LATER THAN: Monday, August 2<sup>nd</sup>.**

We are going to spend a lot of time together next year, so it's best if I get a head start on learning a bit about you. Also, I will use the Internet and the Web a lot next year for this course, so let's get you used to communicating with me via e-mail. Your first digital assignment is to successfully send an e-mail to me, your AP Biology teacher.

Draft an e-mail following these rules:

- a. Use clearly written, full sentences. Do not abbreviate words like you are texting with a friend. Use spell check! This is a professional communication like you would have with a college professor, so let's practice for your rapidly approaching future!
- b. Email the letter to: [abarnes@rahway.net](mailto:abarnes@rahway.net)
- c. Make the Subject: "AP Bio: Introduction to (your full name)". Do not include the quote marks or the brackets, just the words.
- d. Begin the e-mail with a formal salutation, like "Dear Mrs. Barnes,".
- e. Now introduce yourself (your name and/or nickname) and tell me a little bit about yourself.

Include answers to the following **at minimum**.

- ↪ What do you like to do (hobbies, sports, music, interests, etc.)?
- ↪ Tell me a little bit about your family (Mom? Dad? Guardian? Siblings? Pets?)
- ↪ Was there anything that you liked about your earlier biology class? Include your favorite topic.
- ↪ Was there anything that you didn't like about your earlier biology class? Include your least favorite topic.
- ↪ Who was your last science teacher? What class?
- ↪ What other science classes have you taken?
- ↪ Are you planning on taking any other science classes this year and/or next year?
- ↪ What was the last book you read for fun?
- ↪ What are you looking most forward to 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?

f. End the e-mail with a formal closing: "Cordially," "Sincerely," "Warm regards," etc. and add your name as if you signed a letter.

**TASK #2 - Independent Reading Assignment**  
**DUE DATE: Wednesday, September 8th, 2021.**

Over the summer, I would like you to read a non-fiction book and answer comprehension questions as you read. The questions are listed below. Your responses to the questions must be hand written and cannot be typed on a computer. You may NOT use any internet resources to answer these questions. You should NOT share your answers with anyone in any form (written, photographs, emails, etc.). Internet use and/or sharing of this, or any part of this assignment, will result in removal from the course.

The book is titled Survival of the Sickest by Sharon Moalem with Jonathan Prince (version with *thermometer* on cover).

You will have a quiz on this book during the first full week of school and one of the short answer essays for our first exam will be based on this reading.

Note: You will need to purchase this book. It is currently listed on Amazon for anywhere from \$6 - 13 depending on the condition of the book being sold. If you have genuine financial hardship, please see me privately so we can determine if a special arrangement can be made to purchase the book for you. You may also be able to get and/or buy the book from a former or current AP Biology student.

**QUESTIONS:**

***In addition to answering the specified questions for each chapter, please answer the question below for EVERY CHAPTER except the conclusion.***

**What questions do you have regarding any topic discussed in the chapter? List any topic from the chapter for which you need clarification. If you have no questions, please write that you understood the chapter and have no questions.**

*Introduction:*

1. What detrimental genetic trait does the author, and her grandfather before her, possess?
2. What are the characteristics of this disorder?
3. What other disease did the author connect to the genetic trait during her Ph.D research?
4. What is the “big” question the book will attempt to answer?

*Chapter I*

5. Describe the work, and conclusion, of Eugene D. Weinberg in 1952.
6. What bacteria caused the plague?
7. What is the connection between hemochromatosis and the plague?
8. Why is bloodletting a beneficial treatment for individuals with hemochromatosis?
9. What disease may carriers of the mutated gene that causes cystic fibrosis been resistant to?

*Chapter II*

10. Distinguish between each of the three types of diabetes.
11. Describe the connection between *Rana sylvatica* and diabetes.
12. Explain why the title of this chapter is, “A Spoonful of Sugar Helps the Temperature Go Down”.

### Chapter III

13. Why do we need Vitamin D? Cholesterol? Folic acid?
14. Briefly describe the genetic connection between each of the following:
  - a. tanning beds; birth defects
  - b. sunglasses; sunburn
  - c. hypertension; slave trade
  - d. Asian flush; drinking alcohol
  - e. skull shape; climate
  - f. body hair; malaria
15. Explain the good and the bad of ApoE4.
16. Explain the good and the bad of the CYP2D6 gene.
17. What is the significance of the CCR5-Δ32 gene?

### Chapter IV

18. Explain the role of G6PO.
19. Briefly describe the genetic connection between each of the following:
  - a. European clover; Australian sheep breeding crisis of the 1940s
  - b. Capsaicin; birds and mammals
  - c. Malaria; air conditioning
  - d. Favism; fava beans

### Chapter V

20. Identify three ways in which microbes/parasites move from host to host.
21. Summarize the relationship between the orb-weaving spider, *Plesiometa Argyra*, and the parasitic wasp, *Hymenoepimecis argyraphaga*.
22. What did Dr. Eberhard's research show about how the interaction between the spider and wasp occurs?
23. How do lancet liver flukes make their way into their hosts (sheep)?
24. What is meant by host manipulation? How does this relate to the rabies virus?
25. How does the parasite, *T. gondii*, manipulate a cat to complete its life cycle?

### Chapter VI

26. Define the following terms:
  - a) vaccine
  - b) antibodies
  - c) B-cells
  - d) "junk DNA"
27. Describe the work of the following scientists:
  - a) Jenner
  - b) Lamarck
  - c) McClintock
  - d) retroviruses
28. What is the Weissman barrier?
29. Humans have about 25,000 genes and more than a million different antibodies. How is this possible?

### *Chapter VII*

30. Briefly describe the genetic connection between each of the following:

- a) vitamin supplement; agouti mice
- b) snakes; long-tailed lizards
- c) Barker Hypothesis; fathers who smoke
- d) Smoking grandmothers; asthmatic children
- e) Betel nut chewing; cancer

31. Explain the following quote: “Good times mean more boys. Tough times mean more girls.”

### *Chapter VIII*

32. Briefly describe the genetic connection between each of the following:

- a) Progeria; lamina A
- b) Hayflick limit; telomeres
- c) Cancer cells; stem cells
- d) Size; life expectancy
- e) Risky child birth; big brains and bipedalism

33. What is epigenetics?

34. What is methylation? Explain how it can be good and bad. Give specific examples (at least one for each) from the text.

35. What are the two accomplishments of biogenic obsolescence?

### *Conclusion*

36. “Nothing in biology makes sense except in the light of evolution.” How does the book, *Survival of the Sickest*, support this quote by Theodosius Dobzhansky, a noted evolutionary biologist?

**\*\*\*\*\*Did you answer the question in the task directions above for EVERY chapter????**