**Summer Work for AP Biology/ UCONN ECE 1107 2022-2023**

**Mrs. Pratt**
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**classroom code: usayiqr**

Congratulations on making the decision to take AP Biology/UCONN ECE 1107! I hope you are prepared to work hard; this is not a class for a procrastinator or someone who is not interested in biology. It is a college course and the workload is of college caliber meaning: fast paced, lots of reading and writing and work to be done independently with the expectation of turning it in on time! You will have to learn time management, if you haven't mastered that already.

In order to keep your mind on science and review some of the easier topics, I am requiring you to do some summer work in preparation for the upcoming year (Don't worry; I'll be doing a lot of school work over the summer too. Revamping and improving the curriculum.)

Also, as a member of this class, you have the option of enrolling for the UCONN Bio 1107 course that can potentially (if you have a get a C or above) give you 4 credits at UCONN. These credits can also be transferred to many other colleges; if they accept them. Please note that by signing up for the UCONN ECE Biology 1107, you are required to take a final exam in the course, in addition to the AP Biology exam. I have uploaded a document in Google classroom comparing and contrasting AP vs. UCONN ECE to help you make your decision if you would like to enroll or not. Please share the information with your parents. Enrollment for the UCONN course will be in the fall. If you or your parents have questions about the ECE program, please contact me or Mrs. Rocco in the guidance department.

The purpose of the summer work is to:

- Get you to use your brain during the summer (no brain drain for you!), because we will be off and running when September comes.
- Review topics that are familiar to you.
- Get you thinking about the Science Practices and the "Big Ideas" in biology:
  The Science Practices are:
  Concept explanation, Visual Representations, Questions and Methods, Representing and Describing Data, Statistical Tests and Data Analysis and Argumentation.
  The Big Ideas are:
  **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 possess complex properties.**
- Earn some strong grades to start out the first quarter. (Assuming you do the work.)
- Enjoy the wonder of biology.

**Assignment calendar:**

| # | Due date | Assigned task |
|---|---|---|
| **1** | **NOW** | read this whole document thoroughly and sign up for our Google Classroom - code is **usayiqr** |
| **2** | **late summer** | join the AP Bio CollegeBoard Classroom. A code will be given to you over the summer when I get it. |
| **3** | **late summer** | Sign up for MasteringBiology The information to enroll will be in Google Classroom when I get it. |
| **4** | **August 26, 2022** | Upload your letter of introduction into our Google classroom. I will make a separate assignment so you can upload it. |
| **5** | **September 1, 2022** | ● Chapter notes outlines for Ch 1-4 - I will also make these separate assignments so you can upload them.<br>● Watch the following videos in AP classroom: Daily video 1.1 and 1.2 |
| **6** | **September 7, 2022** | ● *Survival of the Sickest* book review - upload assignment to Google classroom when done. |

## **YOU WILL NEED TO PICK UP THE TEXTBOOK AT SCHOOL IF I DID NOT GIVE YOU ONE IN JUNE

## Assignment #1 – NOW

Read this whole document and if you have any questions, contact me asap. Join the Google classroom. The code is **usayiqr.** All assignments will be posted there.

## Assignment #2 – Log-in to the AP Biology CollegeBoard classroom

We will be using the AP Biology CollegeBoard classroom for practice questions and mastering material. The code is

## Assignment #3 - Sign-up for the MasteringBiology website

We will also be using the companion website to our new text called Mastering Biology. It has an online text, videos as well as activities to help you learn the material. See the instructions for the access code attached to this packet.

## Assignment #4– Letter of Introduction – August 26, 2022

We are going to spend a lot of time together next year so I would like to learn a little more about you.

**By August 26th,** I would like you to upload a letter of introduction in Classroom telling me about yourself. The letter should include the following:

- Write in complete sentences. No texting lingo.
- Please include:
    i. A little bit about yourself.
    ii. Why are you taking AP Biology?
    iii. Are you planning to sign up for the UCONN ECE Bio 1107 course that is nested in this course?
    iv. What are your expectations regarding the course (amount of study time, difficulty of content, lab, pace, etc).
    v. What other science courses have you taken and at what level?
    vi. What area of biology do you have interest in?
    vii. How do you learn? – are you a visual learner, hands-on, auditory, etc.?
    viii. What activities are you involved in during the school year and which other UConn/AP courses are you planning on taking this coming year?
    ix. What are your plans after high school? If college, what are you going to major in?
    x. Anything else you want to share about yourself.
    xi. End the letter with your name.

## Assignment #5– Chapter notes Ch 1-4 due Sept 1, 2022

The textbook is the AP Edition of *Biology 12th Edition* by Campbell/Reece.

1. Read Ch 1-4 in the textbook. Complete the notes outlines for each chapter and submit them into Google classroom. I will set them up as individual assignments. The material in these chapters should be review for you. Most of it is chemistry.
2. Watch the Daily videos 1.2 & 1.2 in the AP CollegeBoard classroom.
3. I have also uploaded Audio versions of the Google Slides presentations that go along with these chapters. My expectation is that you will listen to them BEFORE we meet.
4. If you have any topics that you would like me to review when school starts, please leave me a message in Google classroom or email me. If I do not hear from you, I will assume that you understand the material.
5. Be prepared to take a test on these four chapters during the first two weeks of school.

## Assignment #6 – "*Survival of the Sickest – A Medical Maverick Discovers Why We Need Disease*" by Dr. Sharon Moalem due Sept 7, 2022

Lastly, I would also like you to read the book, ***Survival of the Sickest - A Medical Maverick Discovers Why We Need Disease*** **by Dr. Sharon Moalem.** **ISBN-13:** 978-0060889654
I have uploaded a copy of it in pdf form in the Google Classroom or you can get a used copy cheap on Amazon.com or your local library. It is a fascinating book of the evolution of current diseases and how they served a purpose at some point in history. Most students enjoyed reading it in the past.

I would like you to write a minimum of a two page (Times-Roman, 12 point font, double spaced) book review based on your thoughts about the book. DO NOT SUMMARIZE the book. Write as if you are recommending or not recommending the book to someone.

I realize this may seem like a lot of work, but it will keep your mind sharp and help us get through the curriculum so we are not in a major rush come May/June 2023.

I am looking forward to a great year with you and sharing my passion for biology. Please know that I am just an email away for any help you need or any questions you may have. I do check my school email daily, unless I am on vacation and don't have access to Wi-Fi, and I will reply promptly. If your parents have any questions about the AP Biology/UCONN ECE, please have them email me also.

**My words of advice: "**Bring your eagerness to learn, an open mind, and a willingness to work hard."

**Words of advice from this past year's students:**
**"keep up with the work"**
**"don't procrastinate on the summer work or you will have a lot to do the week before school"**
**"Don't be afraid to ask for help."**

Enjoy your summer the rest of the summer! Please email me if you have any questions. **npratt@ctreg14.org**

Mrs. Pratt

**Ch 1 notes outline - Evolution, the Themes of Biology and Scientific Inquiry**

1 Explain the following characteristics of life:

a. Order
b. Evolutionary adaptation
c. Regulation
d. Energy processing
e. Growth and development
f. Response to the environment
g. Reproduction

**Concept 1.1 - The study of life reveals unifying themes**

**Theme: New properties emerge at Successive Levels of Biological Organization**

2. What are the levels of Biological organization?
3. Define the following**:**
    a. Emergent properties
    b. Systems biology
4. Explain the difference between a eukaryotic and a prokaryotic cell.

**Theme: Life's Processes involve the Expression and Transmission of Genetic Information**

5. How is DNA critical to expression and transmission of genetic information?
6. Define genome.
7. What is the difference between genomics and proteomics?
8. What is the purpose of bioinformatics?

**Theme: Life Requires the Transfer and Transformation of Energy and Matter**

9. What kinds of life activities use energy?

**Theme: From molecules to Ecosystems, Interactions are important in Biological Systems**

10 What is feedback regulation?
11.What is the difference between negative feedback and positive feedback? Give examples.
12. How do humans interact with our environment in terms of climate change?

**Concept 1.2 The Core theme: Evolution accounts for the unity and diversity of Life**

13. What is evolution?
14. Name the three domains of life and if there are kingdoms in them, name those too.
15. How does life show unity in the diversity? Give an example.
16. What is natural selection? Who first coined the term? Give an example.

**Concept 1.3 In studying nature, scientists make observations and form and test hypotheses.**

17. What is the difference between inductive reasoning and deductive reasoning?
18. What is a controlled experiment?
19. Explain the difference between a hypothesis and a theory?

**Concept 1.4 Science benefits from a cooperative approach and diverse viewpoints**

20. What are model organisms used in experiments?
21. What is the value of diverse viewpoints in science?

**Ch 2 notes outline- The Chemical Context of Life**

**Concept 2.1 Matter consists of chemical elements in pure form and in combinations called compounds**

1. Explain the difference between an element and a compound. Give an example of each.
2. What are essential elements? Give an example.
3. Name the four major elements that make-up 96% of living matter.
4. What are trace elements? Give an example
5. How is iodine used in the body? What happens if you don't get enough of it?

**Concept 2.2 An element's properties depend on the structure of its atoms.**

1. Review the particles of an atom
2. Explain the difference between atomic mass and atomic number.
3. What is an isotope?
4. What are radioactive isotopes?
5. How are radioactive tracers used in medicine?
6. Explain radiometric dating.
7. How do atoms have potential energy? What happens to the potential energy the farther away an electron is?
8. What is the significance of the valence electrons of an atom?

**Concept 2.3 The formation and function of molecules depend on chemical bonding between atoms.**

1. What is a covalent bond?
2. What is the difference between a single bond and a double bond?
3. What is electronegativity?
4. Explain the difference between a nonpolar covalent bond and a polar covalent bond.
5. What is an ionic bond?
6. What is the difference between a cation and an anion?
7. Explain the following weak chemical interactions:
    a. Hydrogen bonds
    b. Van der Waals (London dispersion) interactions
8. What molecular shape does methane have? Why is it this shape?

**Concept 2.4 Chemical reactions make and break chemical bonds**

1. What kinds of things regulate chemical reactions?
2. What is meant by chemical equilibrium?

**Ch 3 notes outline - Water and Life**

**Concept 3.1 Polar covalent bonds in water molecules result in hydrogen bonding**

1. What is a polar molecule? Give an example.
2. How many other water molecules can water bond with? What types of bonds hold those water molecules to each other?

**Concept 3.2 Four emergent properties of water contribute to Earth's suitability for life.**

1. Explain the following terms that deal with water and give an example of each:
    a. Cohesion
    b. Adhesion
    c. Surface tension
2. What does temperature measure?
3. What is a calorie?
4. Explain how water is capable of stabilizing temperature by its specific heat. HOw does this affect life on Earth?
5. What is vaporization? What does it have to do with water?
6. Explain evaporative cooling. What does it do for life on Earth?
7. What is unique about the density of water as it cools? How does that help life on Earth?
8. What is meant by "water is the solvent of life"?
9. How does water form solutions?
10. Explain the difference between a hydrophobic substance and a hydrophilic substance.
11. What is molecular mass?
12. What is molarity? How would you make a 1M solution of NaCl?
13. What is an astrobiologist? Why might what they study be important to us?

**Concept 3.3 Acidic and Basic conditions affect living organisms**

1. What is the difference between a hydrogen ion, hydroxide ion and a hydronium ion?
2. What is an acid?
3. What is a base?
4. What scale is used to measure acids and bases? What is it based on ?
5. If the original pH of a substance is pH 6, how many more times stronger would be a substance with a pH of 3?
6. What is the purpose of a buffer?
7. Explain how blood is buffered.
8. What is ocean acidification? What causes it? What are the consequences of this happening?

**Ch 4 notes outline - Carbon and the Molecular Diversity of Life**

**Concept 4.1 Organic chemistry is the study of carbon compounds**

1. Explain Stanly Miller and Harold Urey's experiment. What was the conclusion?

**Concept 4.2 Carbon atoms can form diverse molecules by bonding to four other atoms**

1. How can carbon bond to four other atoms?
2. What is a hydrocarbon? Give an example.
3. What are the four basic ways that carbon skeletons can vary?
4. What is an isomer?
5. Explain the difference between structural isomers, cis-trans isomers and enantiomers. Give an example of each.
6. Why are enantiomers important in the pharmaceutical industry?

**Concept 4.3 A few chemicals groups are key for molecular function.**

1. What is meant by a functional group?
2. Explain the following functional groups. Make sure to draw the structure and give an example.
    a. Hydroxyl group
    b. Carbonyl group
    c. Carboxyl group
    d. Amino group
    e. Sulfhydryl group
    f. Phosphate group
    g. Methyl group
3. What does ATP stand for?
4. What is the structure of ATP?
5. How do organisms get energy from ATP?