

AP Biology Summer Assignment 2021

Welcome to AP Biology! This summer you will be reviewing some important concepts from 9th grade biology (characteristics of life, scientific inquiry, chemistry basics) in order to prepare you for the inquiry-based investigations (labs & activities) that we will be performing the first few weeks of school (AP Biology Unit 1, “Chemistry of Life”). This will allow us to spend time on more challenging topics throughout the year (i.e. genetics, biotechnology, cellular energetics, molecular biology).

This summer assignment has been designed to get you to think during these summer months to keep your mind sharp, because I will expect a lot out of it come September! It is an opportunity to earn 100% on your first quiz, as this assignment will be graded for completion as your first quiz grade. **Please have this assignment completed by Monday, AUGUST 30, 2021.**



We will use Carnegie Mellon’s Open Learning Initiative (OLI) as our main resource. The OLI includes an online text and interactive questions throughout each chapter section to check for understanding. You will need to create a free student account:

1. Go to the Open Learning Initiative (OLI) website: <https://oli.cmu.edu/courses/introduction-to-biology-open-free/>
2. Click “Enter and open free course” and then sign up for an Independent Learner Account (note that on the sign up page you do not have to enter an institution name).
3. On the “**Confirm Your Account Information**” page, review the account information you entered. If everything is correct, click the “Confirm Account” button. If not, click “Edit Account” to make your changes.

Important Note: the only account setting that can't be changed after you confirm your account is your Account ID.

4. Read the statements in the **“Online Consent Form”** and select “I Agree” or “I Do Not Agree” then select “Submit.”
5. Click “Open and Free Courses” and then in the search tab search for “Introduction to Biology”. Once you open it click visit course.



6. Under **“My Courses”** you will now see your registered course.
7. Create a Google Doc and share it with me. You will be completing the assignment in this document. Please title it “Last name, First name, AP Bio Summer 2021”.
8. Complete the following modules in the Open Learning Initiative. As you go progress through the course, you should and make sure to:
 - a. **Answer the learning objectives for each module.**
 - b. **Enter answers for all of the interactive questions and complete each quiz, including the open ended questions. Please attach screen shots of your completed quizzes.**

The interactives that require Flash will not work and that is okay.

I. ASSIGNMENT #1: OLI Course

UNIT 1: Biology: The Science of Life

Complete Module 2: Introduction to Biology

LEARNING OBJECTIVES	Define biology.	List the characteristics of life and apply them to identify an item as biotic (living) or abiotic (nonliving).	Describe and identify the levels of biological organization from molecules to the biosphere, noting the interrelationships between levels.
	Define and identify emergent properties.	Determine whether or not viruses are alive.	

Complete Module 3: Themes in Biology

LEARNING OBJECTIVES

Identify the overarching/recurring themes in biology and explain how they relate to the goals of this course.

Explain the relationship between structure and function in biology.

Define homeostasis and explain its role in maintaining life.

Define energy and matter and be able to identify substances as one or the other.

Compare and contrast the way energy and matter move through living systems.

Explain how different parts of living systems rely on each other for survival.

Outline the processes of reproduction and growth, identifying the role of DNA in each.

Define evolution.

Relate the concept of inheritance to the unity of life and describe the process of natural selection, predicting its outcome for a simple example.

Complete Module 4: Scientific Inquiry

LEARNING OBJECTIVES

State a reasonable definition of "science" in your own words.

Relate biology to other scientific endeavors.

Explain how science uses the method of reproducible experiments and verifiable observations to understand the physical world.

Identify legitimate hypotheses based on whether or not they are testable and falsifiable.

Describe the control group and experimental group in a controlled experiment.

Identify and distinguish between the independent variable, the dependent variable, and standardized variables in a controlled experiment.

Define the term "significant" when used to describe the results of a scientific experiment.

Apply an understanding of the nature of science to identify scientific and nonscientific claims.

Podcasts for additional information:

<http://www.bozemanscience.com/biology>

<http://www.bozemanscience.com/005-essential-characteristics-of-life>

<http://www.bozemanscience.com/scientific-method>

UNIT 2: Introduction to Chemistry

Complete Module 5: Unit Introduction (just read this page; there are no questions to complete)

Complete Module 6: Atoms

LEARNING OBJECTIVES	Describe the basic structure of the atom.	Distinguish between atoms and elements.	Define the three subatomic particles, their charge, and where they reside in the atom.
	Distinguish between atomic number and atomic mass.	Describe the charge and location of an electron in an atom.	Apply your understanding of atomic structure to the function of radioactive isotopes used in medical imaging.
	Relate different isotopes of the same element to the atomic mass number for the element.		

Complete Module 7: Chemical Bonds

LEARNING OBJECTIVES	Describe chemical bonding and the role of electrons.	Define and describe ionic bonds.	Define and describe covalent bonds.
	Define and describe hydrogen bonds.	Interpret drawings, structural and skeletal formulae of molecules and identify all the covalent bonds in such drawings.	Predict the correct partial charges on bonded atoms when the electronegativity of the two atoms.

Complete Module 8: Water

LEARNING OBJECTIVES

List the four properties of water and describe each property.

Explain why water's properties are important for living things.

Recognize key functional groups and predict whether compounds will be hydrophobic, hydrophilic, or amphipathic.

Complete Module 9: Acids & Bases

LEARNING OBJECTIVES

Categorize a substance as acidic, basic, or neutral based on the pH of the solution.

Use relative hydrogen ion concentrations in solutions to determine whether a solution is an acid, a base, or neutral.

Define pH.

Predict the pH of a substance based on its hydrogen ion concentration.

Determine the pH of various everyday solutions.

Interpret the results when different solutions are tested with red and blue litmus paper.

Predict the outcome of a neutralization reaction.

Describe the role of acids, bases, and buffers in living systems.

Podcasts for additional information:

<http://www.bozemanscience.com/atoms-the-periodic-table>

<http://www.bozemanscience.com/chemical-bonds-covalent-vs-ionic>

<http://www.bozemanscience.com/water-a-polar-molecule>

<http://www.bozemanscience.com/acids-bases-ph>

UNIT 3: Biological Macromolecules

Complete Module 10: Unit Introduction (just read this page; there are no questions to complete)

Complete Module 11: Introduction to Organic Macromolecules

LEARNING OBJECTIVES	Identify a molecule as organic or inorganic.	List the four major categories of organic molecules.	Identify the reason organic molecules are diverse and durable.
	List the four major categories of biological macromolecules and their monomers.	Identify the structure of an organic molecule based on a chemical drawing.	Select the correct chemical drawing based on the 3D structure.
	Recognize key functional groups and predict whether compounds will be hydrophobic, hydrophilic, or amphipathic.		

Podcast for additional information:

<http://www.bozemanscience.com/042-biological-molecules>

II. ASSIGNMENT #2: Introduction

Please introduce yourself to me! In your introduction, please answer the following questions:

- Why are you taking AP Biology?
- What else are you taking this year?
- What are your extracurriculars (both in school and outside of school)?
- What are you excited about learning in AP Bio this year?
- What are your fears/uncertainties regarding this course?
- Tell me anything else that you want to!