

AP Biology Summer Assignment 2020

Welcome to AP Biology! This summer you will delve into the world of ecology like you never thought you would in these hot months! You will be reviewing the important concepts from 9th grade biology to prepare you for the inquiry-based investigations (labs & activities) in ecology that we will be performing the first two weeks of school. This will allow us to spend time on more challenging topics throughout the year (i.e. genetics, biotechnology, biochemistry, 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 AUGUST 28, 2020.



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: <http://oli.cmu.edu>
In the upper right hand corner of the site, click “Sign Up” and fill out the form.
2. 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.

3. Read the statements in the “**Online Consent Form**” and select “I Agree” or “I Do Not Agree” then select “Submit.”
4. Under “My Academic Courses” enter your Course Key and click “Go.”
Your Course Key is: JONES2 (there is no password)
5. Review the course details to make sure that you are registering for the correct course, and click “Register.”
6. Click the return link at the bottom of the receipt page and you will be taken back to your OLI home page.
7. Under “**My Courses**” you will see your registered course. You can double-check to make sure the correct course appears by confirming that the correct Course Key and instructors are listed.

ASSIGNMENT 1 *(adapted from AP Biology Summer Assignment 2019- C. Gray Mitchell)*

Complete the following modules in the Open Learning Initiative and make sure to **enter answers for all of the interactive questions and complete each quiz, as your online progress will be documented in the instructor view.**

Carnegie Mellon OLI Course: AP Biology

Instructor: Jennifer Jones

UNIT 10: Ecology

Complete Module 49: Introduction to Ecology

Learning Objective

1. *Define ecology and identify its major levels of study from individual to biosphere.*

Complete Module 50: Populations

Learning Objectives

1. *Define population and use sample data to calculate population size, population density, and per capita rates of birth and death (calculations are part of the online interactives “learn by doing” and “did I get this?”).*
2. *Recognize the many sources of variability in population sizes over time and distinguish models from data in studies of population ecology.*
3. *Explain how population ecology poses solutions to practical problems including pest control, endangered species conservation, and fisheries management.*
4. *Use birth and death rates to calculate the rate of increase of a population and apply this to predict numeric growth in a population over a single time step (calculations are part of the online interactives “learn by doing” and “did I get this?”).*
5. *Define limiting factor and explain how some populations tend to limit themselves.*
6. *Create a graph of exponential growth vs. logistic growth. Make sure to label the axes correctly.*
7. *Identify where carrying capacity is on your logistic growth curve and explain what it is.*

*Don't forget to complete the quiz!

Podcast if you need extra help: <http://www.bozemanscience.com/050-populations>

Complete Module 51: Communities

Learning Objectives

1. *Define ecological community and describe how a community's membership is determined.*
2. *Use the keystone species concept to explain the effects on community diversity when a keystone species is eliminated from an ecosystem.*
3. *Define and explain species richness as a measurement of community health and diversity.*
4. *Define symbiosis.*
5. *Define and recognize likely examples of mutualism, competition, and predation (including parasitism).*
6. *Define interspecific interaction and summarize relationships between species based on their direct effects on each other.*
7. *Define indirect interaction and identify examples of indirect interactions between species in communities.*

*Don't forget to complete the quiz! Podcasts if you need extra help:

<http://www.bozemanscience.com/046-communities> <http://www.bozemanscience.com/055-biodiversity>

Complete Module 52: Ecosystems

Learning Objectives

1. *Distinguish between the living (biotic) and nonliving (abiotic) components of an ecosystem.*
2. *Compare and contrast the movement of energy vs. matter (chemicals) in ecosystems.*
3. *Distinguish between producers, consumers, detritivores, and decomposers; recognize their roles within ecosystems and give an example of each.*
4. *Define trophic levels in an ecosystem*
5. *Distinguish between a food chain and a food web.*
6. *Create a food web that includes 1 species of detritivores, 5 different species of producers, 3 different species of primary consumers, 2 different species of secondary consumers, and 1 tertiary consumer. You must identify specific species of plants, animals, and decomposers, NOT merely include "producer", "primary consumer", etc. in your web.*
7. *Explain what happens to energy as it flows through an ecosystem.*
8. *Describe how the levels of an energy pyramid correspond to the trophic levels of a food chain.*
9. *Define biogeochemical cycle and apply the concept of conservation of matter to chemical cycling in ecosystems.*
10. *Compare and contrast the water, carbon, nitrogen, and phosphorus cycles in terms of their major driving processes and abiotic reservoirs.*
11. *Identify important human influences on the water, carbon, nitrogen, and phosphorus cycles.*

*Don't forget to complete the quiz! Podcasts if you need extra help:

<http://www.bozemanscience.com/020-biotic-and-abiotic-factors>

<http://www.bozemanscience.com/014-environmental-matter-exchange>

<http://www.bozemanscience.com/047-ecosystems> to 8:27 ONLY

<http://www.bozemanscience.com/ap-bio-labs-part-2> 4:50 - 8:00 ONLY

Complete Module 53: Human Impact

Learning Objectives:

1. *Identify three major factors that promote a large human impact on our environment.*
2. *Define sustainable technology and identify practices as sustainable or unsustainable based on long-term consequences for people and the environment.*
3. *Define and identify renewable versus nonrenewable resources; define and identify biodegradable versus non-biodegradable materials.*
4. *Graph how the global human population size has changed over time and explain the roles of the Agricultural and Industrial Revolutions.*

5. *Define biodiversity and list 5 benefits humans derive from biological diversity.*
6. *List examples of the four major threats to biodiversity in the modern world.*
7. *Explain the greenhouse effect as it relates to climate change.*
8. *Define anthropogenic global climate change.*
9. *Identify the main human activities that have contributed to increased levels of carbon dioxide and other greenhouse gases in the atmosphere.*
10. *Identify examples of evidence for recent warming and global climate change.*
11. *Identify some changes that may help to limit future impacts of humans on the environment, including strategies to deal with global climate change.*

*Don't forget to complete the quiz! Podcast if you need extra help:

<http://www.bozemanscience.com/051-ecosystem-change>

Complete Module 54: Unit Summary – Ecology

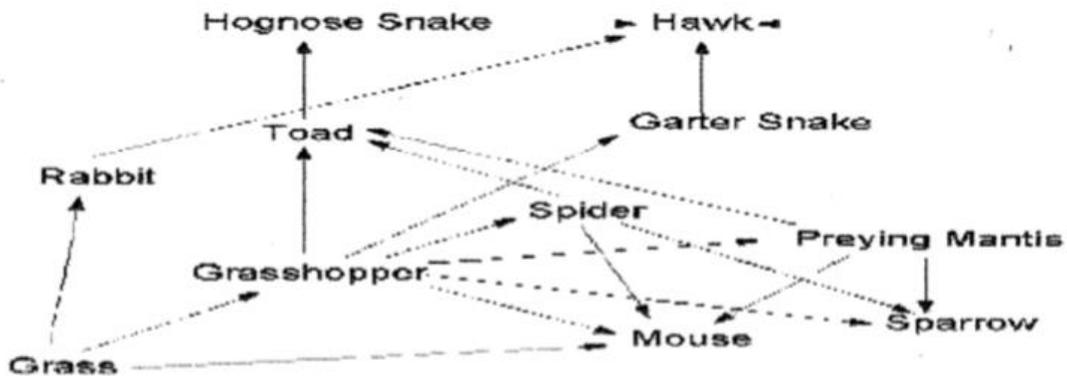
1. *Skim over the summary page*

*Don't forget to complete the quiz!

ASSIGNMENT 2

Please answer the free response question below and email it to me (jjones@episcopalacademy.org) by August 28, 2020. You should complete this AFTER you finish the OLI course.

Interdependence in nature is illustrated by the transfer of energy through trophic levels. The diagram below depicts the transfer of energy in a terrestrial food web.



- Choosing organisms from 4 different trophic levels of this food web as examples, explain how energy is obtained at each trophic level.
- Describe the efficiency of energy between trophic levels and discuss how the amount of energy available at each trophic level affects the structure of the ecosystem.
- If an inorganic herbicide was sprayed on the grass, what would be the likely effect of this toxin on the hawk in time? Explain.