

AP Biology Summer Assignment 2024

Welcome to AP Biology!

I look forward to meeting you. My name is Mrs. Wadad Sharif, and I have been teaching for 18 years. This is my fourth year at BBS as AP Biology teacher and Sustainability coordinator.

This summer you will delve into the world of ecology, which 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 keep your mind sharp! It is an opportunity to earn 100% on your first quiz, as this assignment will be graded for the completion of all the learning objectives. However, at the same time you have to do your best. Please have this assignment completed by **AUGUST 25, 2024** and email it to **wadad.elcharif@student.bbs.edu.kw**. You will also have a written summative assessment at the beginning of the third week.

While I would not recommend procrastinating until the last days, I would suggest holding off on this until the end of July, as it will not take a lot of time (it varies depending on the speed you watch the videos), but I want it to be relatively fresh in your mind. Do not wait until the day before class starts, though...as I do not want you to burn yourself out before we even begin!

The two main goals of AP Biology are to:

- 1- Help you develop a conceptual framework for modern biology
- 2- Gain a deeper appreciation of science as a process (as opposed to an accumulation of facts).

The AP Biology Curriculum centers around the four Big Ideas and you will need to not only know these but also understand how they all relate:

- 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.

Assignment

Unit 8: Ecology (<https://www.youtube.com/watch?v=jNsdldGLTDg>)

□ 8.1 Responses to the Environment

1. How do organisms respond to changes in their environment?
2. What is a stimulus?
3. What is a signaling behavior and what does it produce?
4. List five types of communication mechanisms used in animals.
5. List four uses of these communication mechanisms.
6. Natural selection favors the behaviors that increase _____ and _____
7. Explain the difference between innate and learned behavior.
8. What is cooperative behavior? Why do organisms use cooperative behaviors?
9. What is aposematism? Give two examples.
10. How do mammals establish territories?



□ 8.2 Energy flow through the ecosystem

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

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

<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

2. Distinguish between the living (biotic) and nonliving (abiotic) components of an ecosystem.
3. Compare and contrast the movement of energy vs. matter (chemicals) in ecosystems.
4. Distinguish between producers, consumers, detritivores, and decomposers; recognize their roles within ecosystems and give an example of each.
5. Define trophic levels in an ecosystem
6. Distinguish between a food chain and a food web.
7. Create a food web that includes 1 species of detritivores, 6 different species of producers, 4 different species of primary consumers, 3 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.
8. 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.

□ 8.3 Population Ecology

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

1. Define population
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 factors and explain how some populations tend to limit themselves.

□ 8.4 Effect of Density of Population

1. What is population density?
2. How does food availability affect population density?
3. What are density dependent factors? Give two examples.
4. What are density independent factors? Give two examples.
5. What are the three stages of growth shown in the logistic growth curve?
6. What would a graph of population size in a population experiencing logistic growth look like?
7. Create a graph of exponential growth vs. logistic growth. Make sure to label the axes correctly.
8. Identify where carrying capacity is on your logistic growth curve and explain what it is.
9. What causes a population to reach carrying capacity?
10. Write the equation for logistic growth here. How does dN/dt change as N gets closer to K ?

□ 8.5 Community Ecology

Podcast: <https://www.youtube.com/watch?v=jq9XqUeVDSsc>

<http://www.bozemanscience.com/050-populations>

1. Define ecological communities 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 symbiosis.
- 4.. Define and recognize likely examples of mutualism, competition, and predation

(including parasitism).

5. Define indirect interaction and identify examples of indirect interactions between species in communities.

☐ **8.7 Disruption to ecosystem (Human Impact)**

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 6 benefits humans derive from biological diversity. 6. List examples of the five major threats to biodiversity in the modern world.

7. Explain the greenhouse effect as it relates to climate change.

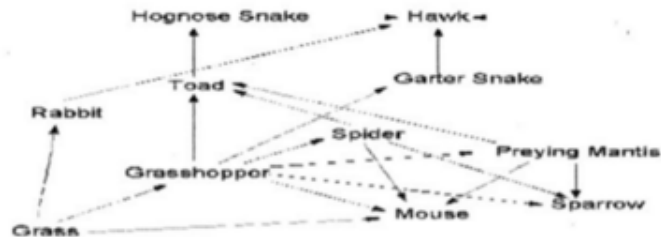
8. Identify four main human activities that have contributed to increased levels of carbon dioxide and other greenhouse gases in the atmosphere.

9. Identify some changes that may help to limit future impacts of humans on the environment, including strategies to deal with global climate change.

☐ **Free Response Question**

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

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.