Welcome to AP Biology 2021-2022
"Summer of Biology"

Dun.Dun….Dun.Dun…dun…dun…dun…dun

Is it safe to go back in the water? NO! Like a shark, there lurks the **AP Biology Summer Assignment!** This summer you will delve into the world of biology like you never thought you would in those hot months! We will explore the topic of ecology to feed your appetite for the coming year of hard work.

This summer assignment has been designed for several purposes:

1. To get you to think during those summer months to keep your mind sharp, because we will expect a lot out of it come September!

2. Expand your vocabulary by familiarizing you with terms that we will be using in class.

3. Introduce you to major concepts from AP Biology through non-classroom methods of learning.

AP Biology is an exciting, fun, and rigorous college-level course. There are so many topics to explore! We will cover almost every chapter in the Campbell book. Emphasis is placed on conceptual understanding, not just memorization of facts. This course requires a special commitment from you. Part of this commitment is a summer assignment. Completion of this summer assignment will allow us to get a jump start into AP Biology at the beginning of September. The summer assignment gives you the chance to demonstrate that you have the best intentions of giving this course your dedication, study time, intelligence, and humor.

Time management is KEY in this class. Next year, you will need to put in at least 3-5 hours a week just on this class to be successful. We will cover (almost) the entire textbook. Some of the information will build on Honors Biology and other chapters will be completely new. The quality of work expected from students will be at the college level.

There will be an exam on ecology the first week of class. <u>All summer work must be submitted on Google Classroom by the first day of class</u>. Late work will be **<u>half credit</u>**. Plagiarism, copying, and/or cheating will make it very difficult to pass your first unit exam.

WELCOME!

ABOARD

ASSIGNMENTS OVERVIEW

1. **Sign-up for google classroom by *August 15th*.** Class code: xr6leys
   - *Once you join, you will have access to the AP Biology Campbell 10th Edition textbook. You will not receive a hard copy textbook until we return to school in September.*

2. **Ecology Scavenger Hunt**

3. **Ecology Textbook Readings & Notes**

4. **Ecology Math Practice**

5. **Ecology FRQ Practice**

If you have any questions, email me at sbarro.lauren@rvilleschools.org

Have a great summer!!!

Mrs. Sbarro

Part 2: Ecology Scavenger Hunt

Create a google slides presentation. Find and take a "selfie" with each item on the scavenger hunt list. Using the textbook, write a brief description to go with each of the images. You will need to be in the shot! No taking images off the internet or photo-shopping images. Each object can only count for one item on the list.

Example of a Description:

*The bee in the photo below is serving as a **(41) pollinator**. The bee will move from flower to flower feeding on the nectar the plant has to offer. As the bee feeds on the nectar it will rub up against the pollen produced by the flower's stamen. Some of the pollen will adhere to the bee's body. When the bee moves to a new flower, some of the pollen attached to its body will stick to the sticky stigma of the female's pistil on the new flower. This is known as cross pollination, where the pollen of one flower is used to fertilize the egg of a different flower.*

Scavenger Hunt List:

1. Commensalism
2. Mutualism
3. Parasitism

4. Herbivore/Primary Consumer
5. Omnivore/Secondary Consumer
6. Carnivore/Tertiary Consumer
7. Example/Evidence of Decomposition
8. Example/Evidence of Human Impact on an Ecosystem
9. Scavenger
10. Detritivore
11. Heterotroph/Consumer
12. Autotroph/Producer

13. Biotic
14. Abiotic

15. Secondary Succession

16. Mimicry
17. Cryptic Coloration
18. Example of Artificial Selection
19. Example of a Genetically Modified Organism

20. Community
21. Population
22. Ecosystem
23. Biome

24. Gymnosperm
25. Angiosperm

26. A plant adaptation
27. An animal adaptation

28. Pollinator
29. Lichen
30. C3 Plant
31. C4 Plant
32. CAM Plant
33. Moss
34. Fungus

35. Exoskeleton

36. Endotherm
37. Ectotherm

38. Invasive Species

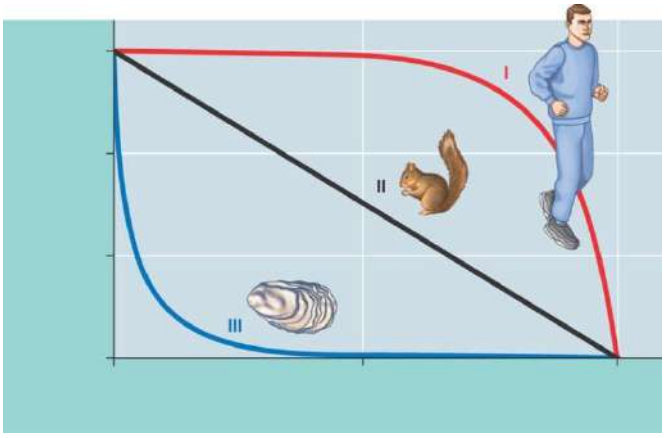
Part 3. Ecology Textbook Readings & Notes

*Create a document. Take notes on the following information from the textbook. Answers must be **typed**. All students should submit their own authentic work. If you use outside sources, please site them in APA Format.*

1. Define and compare the following terms:
    a. Immigration
    b. Emigration

2. What are the three patterns of population dispersion and what conclusions can you draw from these patterns?

3. Use the diagram to the right – explain the three types of survivorship curves.



4. Compare and contrast semelparity and iteroparity. Give advantages of each as they apply to an example organism – focus on the adaptive benefit. Are there any disadvantages? This is a core concept.
    a. Consider two rivers: one is spring fed and is constant in water volume and temperature year round; the other drains a desert landscape and floods and dries out at unpredictable intervals. Which is more likely to support many species of iteroparous animals? Why?

5. Compare the two common types of population growth – exponential and logistic. **Draw** a picture of what each graph would look like.
    a. What is zero population growth?
    b. What is carrying capacity and what determines the carrying capacity of a population?

6. What is the relationship between interspecific interactions, interspecific competition and the competitive exclusion principle?

7. Explain why food chains are relatively short. (Include information on the 10% Rule)

8. How do you characterize the dominant species? How is this different from the keystone species?

9. Compare and contrast primary and secondary succession. What is an example of a pioneer species?

10. **Draw** an ecological pyramid and label all trophic levels including the types of consumers found at that level and the amount of energy available.

11. How are the general characteristics of plants (for example, morphology) influenced by climate? In other words, explain what effects climate has on the types of plants that grow in the area.

12. In general, how is the distribution of major ecosystems or biomes related to climate? If you know the mean annual temperature and the mean annual precipitation of an area, would you be able to accurately predict the type of biome that could exist there? Explain.

Part 4. Ecology Math Practice

*Create a document and answer the following math questions. Show all work for credit. You may upload **hand-written** documents for this section only. Make sure the images are clear and the final answer is circled.*

RATE AND GROWTH	
Rate dY/dt **Population Growth** dN/dt=B-D **Exponential Growth** $\frac{dN}{dt} = r_{max}N$ **Logistic Growth** $\frac{dN}{dt} = r_{max}N\left(\frac{K-N}{K}\right)$	dY= amount of change t = time B = birth rate D = death rate N = population size K = carrying capacity r_{max} = maximum per capita growth rate of population

Population growth rate practice problems: **(You will be given the equations for the test but will have to know how to do the calculations.)**

1. A certain population of mice is growing exponentially. The growth rate of the population (r) is 1.3 and the current population size (N) is 2,500 individuals. How many mice were added to the population the following year?
2. In 2006, the USA had a population of about 300 million people. If there were 14 births and 8 deaths per 1,000 people – What was the country's net population growth that year?
3. A population of 300 butterflies exhibits **logistic growth**. If the carrying capacity is 500 butterflies and r = 0.1, what is the population growth rate? Round to the nearest whole number.
4. In a population of 600 squirrels, the per capita birth rate in a period is 0.06 and the per capita death rate is 0.12.
    a. a. What is the per capita growth rate of the population? Round to the nearest hundredth.
    b. What is the actual number of squirrels that die during this particular period? Round to the nearest whole number.
    c. What is the actual number of squirrels that are born during this period? Round to the nearest whole number.
5. Suppose that of a cohort of 200 rats in a rat colony born in January, 160 are still alive at the start of March and 120 are still alive at the start of May.
    a. What is the survivorship up to the start of March? Round to the nearest hundredth.
    b. What is the mortality rate from the beginning of March to the beginning of May? Round to the nearest hundredth.
    c. If the survivorship during May is 0.3, how many rats died during the month of May? Round to the nearest whole number.
6. You set raccoon traps around an area and find that the population of raccoons is approximately 2,000. Over the course of the next year, you determine that 300 raccoons are born and 290 die. Calculate the growth rate.

Part 5. Free Response Questions

*Create a document with the answers to these free response questions. Answers must be **typed** and should be one paragraph or 5-7 sentences. All students should submit their own authentic work based on the textbook. If you use outside sources, please site them in APA Format.*

1. Explain how the density of a population affects and is determined by resource availability in the environment. Compare density-dependent and density-independent factors.

2. Explain how the structure of a community is related to the energy availability in the environment. Use a specific biome in your description.

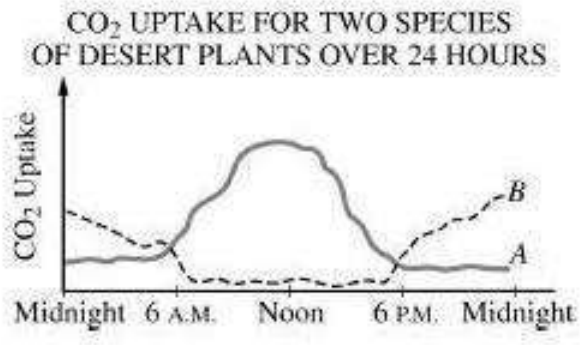
3. Choose **three** of the following illustrative explains and explain the impact of these disruptions to the normal functioning of an ecosystem.
    a. Kudzu
    b. Zebra Mussels
    c. Dutch Elm Disease
    d. Potato Blight
    e. Logging
    f. Urbanization

4. For each of the following, examine the cause of the phenomena and the impact on biodiversity in an ecosystem.
    a. Acid Rain
    b. Smog
    c. Climate change
    d. Eutrophication
    e. Biomagnification
    f. Ozone depletion
    g. Overharvesting
    h. Invasive species
    i. Habitat loss

5. Compared with other terrestrial biomes, deserts have extremely low productivity.

a) **DISCUSS** how temperature, soil composition, and annual precipitation limit productivity in deserts.

b) **DESCRIBE** a four-organism food chain that might characterize a desert community, and IDENTIFY the trophic level of each organism.



c) **DESCRIBE** the results depicted in the graph. **EXPLAIN** one anatomical difference and one physiological difference between species A and B that account for the CO_2 uptake patterns show. **DISCUSS** the evolutionary significance of each difference.

<u>The following FRQ will prepare you for our first unit in AP Biology.</u>

6. Water is important for all living organisms. The functions of water are directly related to its physical properties.

(a) **Describe** how the properties of water contribute to TWO of the following.
- transpiration
- thermoregulation in endotherms
- plasma membrane structure

(b) Water serves as a reactant and a product in the carbon cycle. **Discuss** the role of water in the carbon cycle.

(c) **Discuss** the impact of one human activity on the water cycle.