**AP Biology Unit 9 – Ecology**

**Topic 1 – Population Ecology**

**Textbook:** Chapter 53 – Population Ecology

**Objectives:**

1. What factors contribute to the increase/decrease of a population?
2. Compare the exponential and logarithmic models of population growth. Why are they useful models for studying real world populations? What are some of their limitations?
3. How does the mark-recapture method of estimating the size of a population work?
4. Discuss how reproductive strategy affects the structure of a population. Provide examples related to number of offspring and the amount of parental care.
5. Compare and contrast R-selection and K-selection.
6. Discuss the effects of density-dependent factors on the structure of a population and provide examples.
7. Discuss the effects of density-independent factors on the structure of a population and provide examples.
8. How can “invasive species” affect a native population? Give example.

**Topic 2 – Community Ecology**

**Textbook**: Chapter 54 -- Community Ecology

**Objectives:**

1. Explain how competition contributes to competitive exclusion.
2. Explain how predation contributes to changes in coloration and the evolution of mimicry (batesian and mullerian).
3. Provide examples of mutualism and parasitism, and explain how your examples fit those definitions.
4. Why are ecologists unsettled on whether or not there are any truly commensal interactions among organisms?
5. What is biodiversity?  How is it measured?
6. How do keystone species contribute to the tropic structure of an ecosystem?  Provide examples of the effects of each.
7. Describe the process of primary succession.
8. Describe the process of secondary succession.
9. Describe how ecosystems provide organisms with their energetic and matter requirements.
10. Explain how changes in climate can influence primary productivity in an ecosystem.
11. Compare food chains and food webs.
12. What does it mean by “trophic structure” of a community? Give example
13. Explain how competition, parasitism, predation, mutualism, and commensalism can all affect the distribution and abundance of populations. Provide examples of each effect.
14. Provide examples of how species-specific and environmental catastrophes, geological events, and the sudden influx/depletion of abiotic resources or increased human activities can affect species distribution and abundance.
15. Explain how the genetic diversity present in a population is related to the resiliency of the population and its ability to respond to changes in the environment.
16. Explain why populations with limited genetic diversity are at greater risk of extinction. Provide examples to support your answer.

**Topic 3 - Ecosystems**

**Textbook**: Chapter 55 -- Ecosystems

**Objectives:**

1. How does the first law of thermodynamics effect the movement of matter and energy through an ecosystem?
2. Explain what limiting factors are.
3. How do limiting factors influence the productivity of an ecosystem?
4. Explain the “10% rule”, how it affects the trophic structure of the ecosystem, and why it is a bit of an oversimplification.
5. Explain what all nutrient cycles have in common.
6. Provide examples of how biotic and abiotic factors affect organism behavior, community interactions, and ecosystem structure. Utilize the following examples in your responses:
   1. Sunlight
   2. Symbiosis (mutualism, commensalism, parasitism)
   3. Predator–prey relationships
   4. Water and nutrient availability, temperature, salinity, pH
   5. Availability of nesting materials and sites
   6. Food chains and food webs
   7. Species diversity
   8. Population density