

Ecology Independent Study

Advanced Placement Biology

There is a lot of information to cover in AP Biology. In order to maximize lab time in class, you will be completing the ecology unit over the summer. Below you will see a list of learning objectives for this unit. Based in the scale below, you must complete an appropriate number of learning objectives for a test grade to be applied to the 1st marking period. This assignment is due the first day of the 2011-2012 school year. If you have any questions or need to check out a textbook, please contact Mr. Temperley during office hours.

Numbering/Lettering System of Objectives:

- The first number represents a general number of all the objectives 1-80
- The second number represents the chapter that it applies to (50, 52-55)
- The third number represents the number within the chapter
- The letter represents the difficulty; A being the least difficult, C is the most difficult
- Asterisks represents suggested objectives, the ones I feel you really need to know

Grade Scale:

Score	Minimum As	Minimum Bs	Minimum Cs	Minimum *s	Total Questions
97-100	10	10	10	40	50
92-97	10	10	10	38	48
88-91	8	8	8	36	46
83-87	8	8	8	34	44
80-83	6	6	6	32	42
76-80	4	4	4	30	40
72-76	4	4	4	28	38
68-72	2	2	2	26	36
64-68	2	2	2	24	34
60-64	0	0	0	0	30

Format:

You must type the answers to the objectives. You do not need to write out the objective, but it may be helpful to have when you study for the AP test. You DO need to use the numbering system to refer to the objective. Example: 36.53.12 (A)* And, PLEASE put them in order.

Chapter 50: An Introduction to Ecology and the Biosphere

- 1.50.1 (A) Explain why the field of ecology is a multidisciplinary study.
- 2.50.2 (A) Distinguish among physiology, ecology, community ecology, and ecosystem ecology.
- 3.50.3 (A)* Describe the relationship between ecology and evolution.
- 4.50.4 (A)* Explain the importance of temperature, water, light, soil, and wind to living organisms.
- 5.50.5 (A) Explain the principle of allocation.
- 6.50.6 (B) Describe how environmental changes may produce behavioral, physiological, morphological, or adaptive responses in organisms.
- 7.50.7 (B) Explain the concept of environmental grain and under what situation(s) a single environment may be both coarse-grained and fine-grained.
- 8.50.8 (C)* Describe the characteristics of the major biomes: tropical forest, savanna, desert, chaparral, temperate grassland, temperate forest, taiga, tundra.
- 9.50.9 (A)* Compare and contrast the types of freshwater communities.
- 10.50.10 (C)* Diagram and identify the various zones found in the marine environment.

Chapter 52: Population Ecology

- 11.52.1 (A)* Define the scope of population ecology.
- 12.52.2 (A)* Distinguish between density and dispersion.
- 13.52.3 (B)* Explain how ecologists measure density of a species.
- 14.52.4 (C)* Diagram and describe conditions which may result in clumped dispersion, random dispersion, and uniform dispersion of populations.
- 15.52.5 (B)* Explain how age structure, generation time, and sex structure of populations can affect population growth.
- 16.52.6 (C)* Describe the characteristics of populations which exhibit Type I, Type II, and Type III survivorship curves. Diagram each curve.
17. 52.7 (B)* Explain how carrying capacity of the environment affects the intrinsic rate of increase of a population.

- 18.52.8 (A)* Explain how density-dependent factors affect population growth.
- 19.52.9 (A)* Explain how weather and climate can function as density-independent factors in controlling population growth.
- 20.52.10 (B)* Explain how density-dependent and density-independent factors may work together to control a population's growth. Site an example.
- 21.52.11 (C)* List the three major characteristics of a life history and explain how each affects the:
- a. Number of offspring produced by an individual
 - b. Population's growth
- 22.52.12 (A)* Explain how predation can affect life history through natural selection.
- 23.52.13 (A)* Distinguish between r-selected populations and K-selected populations.
- 24.52.14 (B) Explain how a "stressful" environment may alter the standard r-selection and K-selection characteristics.

Chapter 53: Community Ecology

- 25.53.1 (C) Compare and contrast the individualistic hypothesis of HA Gleason and the interactive hypothesis of FE Clements with respect to communities.
- 26.53.2 (B)* Explain the relationship between species richness, relative abundance, and diversity.
- 27.53.3 (B)* List four properties of a community and explain the importance of each.
- 28.53.4 (A)* Explain how interspecific competition may affect community structure.
- 29.53.5 (B)* Explain the competitive exclusion principle, and explain how competitive exclusion may affect community structure.
- 30.53.6 (A)* Distinguish between an organism's fundamental niche and realized niche.
- 31.53.7 (B)* Explain how resource partitioning can affect species diversity.
- 32.53.8 (B)* Describe the defense mechanisms evolved by plants to reduce predation by herbivores.
- 33.53.9 (B)* Explain how cryptic coloration and aposematic coloration aid an animal in avoiding predators.
- 34.53.10 (A)* Distinguish between Batesian mimicry and Mullerian mimicry.

- 35.53.11 (A) Explain how predators use mimicry to obtain prey.
- 36.53.12 (A)* Explain the role of predators in community structure.
- 37.53.13 (A) Distinguish between parasitism, mutualism, and commensalisms.
- 38.53.14 (B) Explain why it is difficult to determine what factor is most important in structuring a community.
- 39.53.15 (A)* Distinguish between primary succession and secondary succession.
- 40.53.16 (B) Explain how inhibition and facilitation may be involved in succession.
- 41.53.17 (A)* Describe how natural and human succession can affect community succession.
- 42.53.18 (B) Explain how the intensity of disturbances can affect equilibrium and species diversity.
- 43.53.19 (B) List the factors involved in limited a species to a particular range.
- 44.53.20 (C)* Describe the mechanisms which contribute to the global clines in diversity.
- 45.53.21 (B) Explain the factors which determine what species eventually inhabit islands.

Chapter 54: Ecosystems

- 46.54.1 (B)* Explain the importance of autotrophic organisms with respect to energy flow and nutrient cycling in ecosystems.
- 47.54.2 (B)* List and describe the importance of the four consumer levels found in an ecosystem.
- 48.54.3 (B) Explain how gross primary productivity is allocated by the plants in an ecosystem.
- 49.54.4 (A)* List the factors that can limit productivity of an ecosystem.
- 50.54.5 (A)* Explain why productivity declines at each trophic level.
- 51.54.6 (C)* Diagram an energy pyramid and biomass pyramid, and explain each.
- 52.54.7 (C)* Diagram and explain the water cycle.
- 53.54.8 (C)* Diagram and explain the carbon cycle.
- 54.54.9 (C)* Diagram and explain the nitrogen cycle.

- 55.54.10 (C)* Diagram and explain the phosphorus cycle.
- 56.54.11 (B) Explain why the soil in tropical forests contains lower levels of nutrients than soil in temperate forests.
- 57.54.12 (A) Explain how agricultural practices can interfere with nitrogen cycling.
- 58.54.13 (A) Explain how deforestation can affect nutrient cycling within an ecosystem.
- 59.54.14 (B) Explain how the carbon cycle differs in terrestrial and aquatic ecosystems.
- 60.54.15 (B)* Explain how “cultural eutrophication” can alter freshwater ecosystems.
- 61.54.16 (B)* Explain why toxic compounds usually have the greatest effect on top-level carnivores.
- 62.54.17 (B)* Describe how increased atmospheric concentrations of carbon dioxide could affect the Earth.
- 63.54.18 (A)* Describe how human interference might alter the biosphere.

Chapter 55: Conservation Ecology

- 64.55.1 (C)* List the major threats to biodiversity and give an example of each.
- 65.55.2 (A)* Describe why biodiversity is important to humans.
- 66.55.3 (A) List the three concepts upon which the field of biodiversity emerged.
- 67.55.4 (A)* Describe the goal of conservation biology.
- 68.55.5 (A) Describe how biodiversity is distributed.
- 69.55.6 (A)* Define the term “biodiversity hot spot.”
- 70.55.7 (B)* Describe the problems presented to conservation by migratory species.
- 71.55.8 (C) Describe how the biodiversity crisis extends throughout the hierarchy of biological organization.
- 72.55.9 (B)* Describe how habitat fragmentation affects population dynamics.
- 73.55.10 (C)* Define “source habitat” and “sink habitat” and discuss how these terms relate to conservation efforts.

- 74.55.11 (C) Describe how population viability analysis as well as estimates of minimum viability size and effect population size are used to evaluate the chances of a species persisting or becoming extinct.
- 75.55.12 (B) Give examples of how predictive models are being used in conservation efforts.
- 76.55.13 (B) Describe the conflicting demands that arise in conservation management plans.
- 77.55.14 (B)* Explain how edges and corridors influence landscape biodiversity.
- 78.55.15 (C) Discuss why nature reserves are important to preserving biodiversity and why conservation efforts will involve working in landscapes dominated by humans.
- 79.55.16 (C)* Describe why restoring degraded areas is an important part of conservation biology and how bioremediation and augmentation play a role in restoration efforts.
- 80.55.17 (C)* Describe how sustainable development goals are reorienting ecological research and will require changes in some human values.