Chapter 54 Ecology and the Distribution of Life

54.1

1. What is the definition of ecology?
2. An understanding of ecology greatly improves our ability to do what?
3. What is environmentalism?
4. What is the difference between the biotic and abiotic components of an ecosystem?

Chapter 55 Population Ecology

55.1

1. What are demographics? Why is demography useful for population biologists?
2. True or false: Population sizes are often estimated from representative samples using statistical methods.
3. Explain the mark-recapture method of estimating population sizes.
4. Describe the three most common population dispersion patterns.
5. Which dispersion pattern do human populations demonstrate?
6. What is fecundity?
7. True or false: Fecundity schedules vary greatly among species not only because organisms differ in the number of offspring they produce, but also because they vary in the timing of reproduction. Give two examples.
8. Compare the three major survivorship curves that populations demonstrate: Type I, Type II, and Type III.

55.2

1. What is a life history strategy?
2. What is a population’s intrinsic rate of increase (r)?
3. How is population size changing if r>0, r<0, r=0?
4. What’s the difference between an iteroparous species and a semelparous species?

55.3

1. Recognize a pattern of exponential growth. (Figure 55.6)
2. What is the equation for exponential growth? (You will need to be able to use this equation.)
3. What types of conditions would allow for exponential growth?
4. What is an environment’s carrying capacity (K)?
5. Recognize a pattern of logistic growth. (Figure 55.7)
6. What is the equation for logistic growth? (You will need to be able to use this equation.)
7. List and describe some density-dependent population growth limiting factors.
8. List and describe some density-independent population growth limiting factors.
9. Compare and contrast r-strategists and K-strategists.
10. Explain why some newly introduced species reach high population densities. Give an example.

55.5

1. Describe an effective strategy for controlling a pest population. For example, how can you best control the rat population in a city?
2. Describe an example of successful biological control. Describe an example of unsuccessful biological control. (Cane Toads!)
3. List relevant observations about the growth of the human population from a historical and modern perspective.

Chapter 56 Species Interactions & Coevolution

56.1

1. Briefly describe the five categories of species interactions:
   1. Antagonistic interactions
   2. Mutualism
   3. Competition
   4. Commensalism
   5. Amensalism
2. What is reciprocal adaptation or coevolution? Give an example. What is a “coevolutionary arms race”?

56.4

1. True or false. Virtually no species enjoys exclusive access to any given resource; the vast majority must share at least some resources with other species.
2. What is competitive exclusion? Give an example.
3. What is resource partitioning? Give an example.
4. What is a species’ niche? What is the difference between a fundamental niche and a realized niche?

Chapter 57 Community Ecology

57.1

1. What is an ecological community?
2. True or false. Sunlight is the ultimate source of energy for most of Earth’s communities.
3. What are primary producers?
4. Explain this equation: NPP=GPP-R
5. What are trophic levels?
6. Refer to section 8.1 page 150. What is the first law of thermodynamics? What is the second law of thermodynamics?
7. On average, only about \_\_\_\_\_ percent of the energy of one trophic level is transferred to the next. Why?
8. Why can most communities only support three to five trophic levels?
9. Compare the energy flow and biomass pyramids shown in Figure 57.3.

57.2

1. What is a keystone species? Give an example.

57.4

1. What is succession?
2. What is primary succession? Give an example.
3. What is secondary succession? How is it different from primary succession? Give an example.
4. What is a climax community?

Chapter 58 Ecosystems & Global Ecology

58.3

1. What is a biogeochemical cycle?
2. Briefly describe the water cycle (the hydrologic cycle).
3. Briefly describe the carbon cycle.
4. Discuss some of the possible consequences of global climate change.
5. Briefly describe the nitrogen cycle.
6. What is eutrophication? What causes it? What are its negative consequences?
7. What causes acid precipitation? What are some of its effects?
8. Why is phosphorous important to living organisms?
9. What two elements are the main ingredients in fertilizers?
10. True or false. Excess phosphorous in water runoff can also cause eutrophication.
11. What are some other elements that are necessary for survival?

An additional resource:

Bozeman Science YouTube videos: Environmental matter exchange, Biotic and abiotic factors, Communities, Ecosystems, Cooperative interactions, Populations, Ecosystem change.