

Human Ecology Study Guide I – Summer 2008

Introduction: Scientific Methods and Ecosystems

1. Explain how ecology, environmental science, and conservation are related and how they differ.
2. Can you give an example of how the scientific method might be applied to the study of a problem related to the environment? What is a hypothesis? How would scientists use inductive and deductive reasoning to draw conclusions from their studies? Explain the difference between controls and treatments.
3. What does the term theory mean to scientists? What are scientific laws and how do they differ from theories. What does the term theory mean to the general public?
4. Can you define these terms: species, population, community, ecosystem, biosphere, lithosphere, atmosphere, and hydrosphere? What are the major components of an ecosystem? How do chemosynthetic and photosynthetic autotrophs differ? What is a holozoic organism? What is the difference between the two types of detritivores?
5. What are food chains, food webs, and trophic levels? Explain how the movement of inorganic nutrients (chemicals) and energy in ecosystems differ.

Home Range, Territory

1. What is a stability mechanism? What is meant by a dynamic equilibrium? Why do animals claim territories? Define home range and territory. How do organisms claim their territories?
2. Explain why selection of territory reduces competition between members of the same species, insures that not all individuals will be successful breeders, and improves the quality of a species. If in social animals (e.g. wolves and lions) the group (pack or pride) claims a territory, how does this ensure that not all individual will have the same likelihood of producing offspring?
3. Humans have fixed and floating territorial species. How do these two forms of territory differ?
4. Explain how current national boundaries can be equated to tribal space associated with hunting and gathering societies. How would a sociobiologist explain defense of tribal space by an individual?
5. Why would male animals congregate on a lek to attract females for the purpose of mating with them?
6. Describe the difference between niche and habitat. Why are adaptations associated with a specific environment (habitat)?
7. Using the two barnacles on the Scottish coast as an example, can you explain the differences between fundamental and realized niches? How does niche selection by species increase the efficiency of resource utilization? Why does niche selection reduce competition between species and increase ecosystem stability?
8. Explain why more than one species cannot occupy the same niche? What is a guild? If a community had 100 species, how many niches would be present in the community?
9. What is a keystone species? How does the purple star fish enhance species diversity in the inter-tidal zone on the pacific coast?

Organism interaction

1. Can you define and give examples of the kinds of organism interactions discussed in class: competition, predation symbiosis, mutualism, commensalism, and parasitism?
2. What is meant by a limiting resource and why is this concept included in the definition of competition?
3. Explain why a relationship between two species might be mutualistic under some conditions and parasitic under others. Biologists think that some cell organelles, such as chloroplast and mitochondria,

may have been independent organisms that were incorporated into the cells of other organisms. How would this relationship support the idea that relationships between organisms can change over time so an antagonistic relationship between two organisms can change over time to the mutual benefit of both organisms?

4. Biologists think that some mutualisms may have started as parasitic relationships. Explain how a parasitic relationship may have evolved into mutualism.
5. How do ants and acacia trees, ants and aphids, and cattle and cellulose digesting bacteria benefit each other?
6. What is the difference between a parasite and a pathogen? How do eukaryotic and prokaryotic organisms differ? Note: The definition of a pathogen that was given in lecture and the one provided in the textbook are somewhat different. Use the definition given in lecture.
7. Define carrying capacity and give examples of mechanisms that prevent organisms from exceeding their carrying capacity.

Date of Exam: Thursday June 19, 2008

Examination format will be multiple choice questions and it is worth 50 points.

Reading Assignments from the textbook included on this examination are: Pages 1-23, 46-48, 64-87.