

Human Ecology Study Guide 3 Summer 2008

The Third Examination will be given on July 3, 2008. The examination will be worth 100 points and will have multiple choice questions.

Biological Magnification

1. Define biological magnification.
2. Why is biological magnification more detrimental to organisms at the top of food chains and trophic levels than to those occurring at lower levels in food chains and trophic levels?
3. Does the **total** amount of toxic material increase from lower to higher trophic levels as the result of biological magnification?
4. Compare the amount of biological magnification associated with short terrestrial, fresh water, and marine food chains. What determines the amount of biological magnification that occurs in food chains?
5. Explain why materials like PCBs, which have not been manufactured in this country since the 1970s, and DDT, which is no longer used in the United States, are still in our food chains.
6. What are sources of mercury that get into the environment? What is the largest source of man-made mercury? What is a major source of mercury that gets into the human diet?
7. What is methyl mercury? Which groups of humans are at greatest risk from mercury in the environment?
8. Explain why eating fish from Lake Michigan may be hazardous to your health even if you only consume the fillet (muscle) of the fish. How are standards set for human consumption of fish that are contaminated with toxic material, such as PCB's and mercury? What criteria do states use to set recommended limits for consumption of fish in various bodies of water?
9. Explain why there was a marked decline in the reproductive success of fish eating and scavenging birds associated with application of DDT even though adult birds were not being killed from DDT poisoning. Why was DDT banned for most uses in the United States?
10. What are endocrine disruptors? Why are organisms at the top of food chains more seriously affected by endocrine disruptors than organisms at lower trophic levels?
12. Why can endocrine disruptors be effective at low concentrations in the environment and in the body of the organism? Why can the adult organism of a species appear to be healthy and functioning normally when they are exposed to hormone disruptors? Why was DES given to pregnant women? What kinds of problems occurred in the children of women that received DES?

Biogeochemical Cycles and Global Warming

1. Define the term biogeochemical cycle.
2. What is the difference between active and storage pools for inorganic nutrients? Name the active and storage pools for carbon.
3. Why does the concentration of carbon dioxide in the atmosphere vary on a seasonal basis?
4. How do the oceans help regulate the concentration of atmospheric carbon dioxide?
5. How does carbon in the storage reservoirs (carbonate rock and fossil fuels) move into the active reservoirs? What is plate tectonics?
6. What are the causes for an increase in atmospheric carbon dioxide during the past 130 years? Approximately how much of the increase in atmospheric carbon dioxide is due to industrialization? How do young and more mature forests differ in terms of their net primary production and the amount of carbon they have accumulated? Why does cutting forests, and converting them to cropland, increase atmospheric carbon dioxide?
7. What is the greenhouse effect? How does atmospheric carbon dioxide act like greenhouse glass concerning absorption of solar radiation and heat being radiated from the earth's surface? Name the common greenhouse gases? Why is carbon dioxide the most important of the greenhouse gases even though it is less effective per molecule in causing global warming than the other greenhouse gases?

8. At the present time, which country produces the largest amount of greenhouse gases? What evidence is there for global warming?
9. What effect did the eruption of Mount Pinatubo in the Philippines have on the earth's temperature?
10. What is the Great Ocean Conveyor Belt? How could some areas of the world become cooler as the results of global warming?
11. Explain how ice deposits in the Antarctic can be used to determine changes in the concentration of carbon dioxide in the earth's atmosphere over a period of over 650,000 years back from the present time.
12. Why will the loss of the arctic ice sheet enhance global warming? What are some of the consequences of melting of land ice in Antarctica and Greenland associated with global warming?
13. Why does only the melting of "land ice" affect the level of the ocean? If the oceans warm, why would sea level rise even if land ice does not melt?
14. What kinds of climate changes are anticipated as the result of global warming?
15. How might global warming affect the amount of insect damage that occurs on plants?
16. What are some examples of tropical diseases that are spreading or might spread to higher latitudes as world temperatures increase?
17. How could global warming reduce biological diversity and encourage exotic species?
18. What effect is global warming expected to have on world crop production? What effect might increased atmospheric carbon dioxide have on plant growth, if temperatures are not increased and the plants are well supplied with moisture?
19. What is the Kyoto protocol? What does it propose to the nations of the world? What are carbon credits?
20. How can production of carbon dioxide be reduced? Is planting trees to absorb excess carbon dioxide an effective way to deal with this problem?
21. Why does the burning of biofuels not increase the amount of carbon dioxide in the earth's atmosphere but burning fossil fuels does?

Population Ecology

Population = a group of organism of the same species occupying a given area

1. What is demography?
2. Know the meaning of the terms net birth rate, net death rate, and net population increase.
3. Population growth can be expressed as birth rate, death rate, and rate of natural increase per 1,000 individuals in the population. What is the advantage of using these expressions of growth over net birth rate, net death rate, and net population increase?
4. What is the difference between J-shaped" or exponential growth curve and growth that produces an S-shaped" or sigmoid growth curve. How are the two growth curves related to ecological controls, diversity, and complexity of food webs.
5. Know the following terms and how they relate to population growth: geometric growth, intrinsic rate of growth or biotic potential, environmental resistance, and carrying capacity.
6. What are age structure diagrams? How do age structure diagrams differ for expanding, stabilizing, and diminishing populations?
7. What is total fertility rate? How did the total fertility rate of the United States change in the last century?
8. What kind of age structure diagram does the population of United States have? What are some of the consequences of the United States population becoming older? How will Social Security be effective by the aging of the USA population?

Human Population

1. What kind of a population growth curve does the human population have?
2. Know the reasons for the rapid growth of the human population:
 - A. Expansion of agricultural output

- B. Improved personal hygiene including the use of soap
 - C. Improved sanitation
 - D. Increased medical knowledge.
3. Know that the world population is growing because of declining death rates and not because of an increase in birth rates.
 4. Know the following information which is based on 2007 data: the approximate **size of the populations of the world (6.6 billion) and the United States (302 million), and growth rates of the United States (0.6%) and world population (1.2%). Which country has the largest population in the world and how many people are in that country?**
 5. Generally know the information given below: How does this information relate to the ability of the world to deal with increases in the size of the human population in the future?

Comparison of MDC's and LDC's (Economics and Demographics)

Category	<u>MDC's</u>	<u>LDC's</u>
1. % Growth	0.1%	1.5%
2. Life expectancy	76 years	65 years
3. Doubling Times	700 years	44 years
4. % of World Pop.	19.3%	80.7%
5. Per Capita GNP	\$27,790	\$4,950
6. Land Area (1,000mi²)	19,814	31,975
7. Population (billions)	1.216	5.339

6. How does HIV/AIDS effect the growth of the human population in Africa?
7. How do total fertility rates compare in more developed and less developed countries of the world?
8. How does birth rates relate to infant mortality?
9. Define the following terms infant mortality rate, doubling time, replacement-level fertility, total fertility level (read pages185-186 in your textbook).
10. Know about family planning in China and India (read pages 206 -207 in your textbook). Explain why China instituted a one-child family policy. Has the policy been effective? What were the potentially negative effects resulting from China's one-child family policy?
How has the family planning program in India changed since it was initiated in the 1950's?
11. What is the demographic transition (read textbook pages 186-187)?
12. Compare the impact on world resources and environmental quality of nations that have slow or negative population growths but high per capita rates of consumption of natural resources and environmental degradation with nation that have rapid population growth but low per capita rates of natural resource consumption and environmental degradation.
13. How does the role of women in society effect birth rates? How does education of women effect birth rates? (read textbook pages 202-203).

Reading Assignment: Textbook: pages 86-91, 154-157, 475, 477, 540, Chapters 8, and 22 – Supplemental Readings: Endocrine Disruptors National Institute of Environmental Health Sciences.