

### MIDTERM 1 Review Sheet

This review sheet provides typical questions I will ask on the exam. I may use some of these questions or ask other questions related to these. The purpose of this review sheet is to point out the topics that are most important so that you can focus your studying. The best way to use this study guide, is to review and learn the course information, then try to answer these questions. When answering these questions or those on the exam, please give specific data, accurate information, correct terminology, and concrete examples.

#### Topics and Information Covered in this Midterm

- Lectures 1 – 11
- Sustainability: Ch. 1; Green Plans (video)
- Environmental Worldviews: Ch. 26
- Laws of Matter and Energy: Ch. 2
- Ecology, Matter and Energy Flow through the Ecosphere: Ch. 3
- Animal Population Growth: Ch. 8
- Human Population Growth: Ch. 9
- Food Resources: Ch. 13; Diet for a New America (video)

#### Typical Questions on Sustainability

- Define sustainability. Explain the relationship of the principle of living on the interest of “natural capital” to sustainability.
- According to Hawken, what is the current relationship between existing economies and natural resources?
- What is the size of the current world human population and what term describes the population growth pattern? Draw a graph showing this growth pattern (label the axes).
- Many environmental issues are controversial and have at least two sides. How can an average citizen determine which position has the most scientific validity?
- What features should you look for, as an informed consumer of environmental information, in articles that purport to provide accurate technical information?
- Define ecological footprint. According to Miller (2007) and Venetoulis and Talberth (2005), we are approximately 20% over the earth’s ability to support us. Explain this from the standpoint of natural capital. What are the two BIG human-caused drivers of this overshoot and the global environmental problems we face today?
- What is the rate of consumption of the average U.S. citizen compared to the average citizen of India? What does this mean in terms of Paul Ehrlich’s simple model for human impact on the planet?
- In Chapter 28, Miller discusses the planetary management and environmental wisdom worldviews. What is the difference between these concepts? How might proponents of each view approach human population growth?
- List three elements of a sustainable economy as given by Paul Hawken.
- What is the difference between nonrenewable and renewable resources? How can each be used sustainably?
- What is environmental studies?
- Scientists have shown that Canadian bears who eat salmon have higher levels of pollutants in their systems than bears that eat primarily berries. Why should this fact cause Americans to worry about their own health?

- According to the video *Green Plans*:
  - How are the Netherlands approaching environmental sustainability for their country?
  - How did New Zealand solve its environmental log-jam over forest protection?
  - How might some of these lessons be applied in the US?

### **Typical Questions on Ecology, Laws of Matter and Energy, and Scientific Methods**

- What two Laws of Thermodynamics structure the way the planet operates?
- What law of matter determines how matter moves through ecosystems? Give an example of how one element or compound is used in nature.
- Where did the energy in fossil fuels come from?
- Draw a diagram showing the flow of energy through the trophic levels of a food chain. How efficient is each trophic level?
- Compare the flow of materials through earth's natural ecosystems and human-made systems. What natural principles should human systems follow to be sustainable?
- What are the four parts of the earth's planetary systems?
- How is the sun's energy captured by the earth's biosphere?
- If food webs are so inefficient, how is the earth able to support so many people?
- What are the 5 levels in the ecological hierarchy?

### **Typical Questions on Animal and Human Population Growth**

- Define demography.
- Define carrying capacity. What happens if a population exceeds the carrying capacity?
- Draw a graph of a population undergoing logistic growth and one undergoing exponential growth. What ultimately happens to populations growing exponentially?
- What is the equation for the annual rate of population change ( $r$ )? For a population in which there is no emigration or immigration, what are the only two ways  $r$  can be reduced?
- What factors promote and limit the growth of animal populations?
- What is the current rate of global human population growth? What is the rate in developed versus developing countries?
- What are the crude birth rates and death rates in developing and developed countries? How are these two groups of nations contributing to global population growth?
- Define "replacement rate". What are the estimates for this rate in developing versus developed countries?
- Draw an age structure diagram for a rapidly growing population and one for a declining population.
- Explain why, even if the human population achieved the replacement rate tomorrow, the human population will continue to grow for 50 years.
- Draw the Demographic Transition Model and explain why the human population expands so rapidly in the transitional stage.
- What factors result in declining birth rates in post-industrial societies? If we plan to control global population, what is the message of the Demographic Transition Curve?

### **Typical Questions on Food and Agriculture**

- How has the amount of food produced from the 1950s to the present changed and how was this change achieved?
- What is traditional agriculture?

- How much of our food comes from grain and how much from livestock? How much of the earth's land surface is devoted to each of these activities?
- What are the features of modern industrial agricultural methods and why are they considered "high-input" methods?
- List 2 costs to people and 3 to the environment of modern agriculture techniques.
- What is desertification and how does it occur?
- What is sustainable agriculture? What are some benefits of sustainable agriculture and how might society promote this form of agriculture?
- Humans are large creatures as animals go, and in nature, typically large animals are not very numerous. However, humans, at 6.4 billion and rising, are extremely numerous. How is it that we are able to produce enough food for this huge population?
- According to *Diet for a New America*:
  - What are four human health problems caused by our American diet?
  - What are three environmental impacts of the cattle industry?
  - What are the impacts of industrial agriculture on the environment?
  - What is the most memorable piece of information you learned from John Robbins?
- If you want to eat food that has relatively low impacts on the environment, what sort of features would you look for in that food?

**A Brief Message on Extra Credit:**

Did you know that you can earn 6 points of extra credit, 3 points a piece for two activities? Are you ready to do one? If so, see the Acterra website at [www.acterra.org](http://www.acterra.org) for local environmental action opportunities you can do. When you find something, clear it with Dr. Trulio and she'll tell you how to document the activity and get extra credit.