

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 others 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, please give specific and accurate information, correct terminology, and concrete examples.

Information Covered in this Midterm (Lectures 1-11)

- *Sustainability*
- *Green Plans* (video)
- *Laws of Matter and Energy*
- *Ecology and Biomes*
- *Matter and Energy in Nature*
- *Animal Population Growth*
- *Human Population Growth*
- *Food Resources and Sustainable Agriculture*
- *Diet for a New America* (video)
- *Information from the Microthemes*

Exam includes
all readings as
given on the
Greensheet

Typical Questions on Sustainability

- Define sustainability. Explain the relationship of the principle of living on the interest of “natural capital” to sustainability.
- What is meant by the “scientific consensus”?
- 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).
- 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 how this can be, 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 basic elements go into calculating an ecological footprint?
- What is the difference between nonrenewable and renewable resources? Give an example of each. 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?
- Collections of similar ecosystems occur over large areas of the earth. What are they called by ecologists and what two major factors result in their distribution around the globe?
- What is the difference between climate and weather?
- Although all scientists may not yet agree on the primary causes of global warming, what three facts about global warming are *not* disputed?
- How might global warming affect biomes and why should we care?

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 are the crude birth rates and death rates in developing and developed countries? To what extent will these two groups of nations contribute to global population growth in the next few decades?

- Define “replacement rate”. What are the estimates for this rate in developing versus developed countries?
- Draw the Demographic Transition Model and explain why the human population expands so rapidly in the transitional stage.
- What social 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?
- Is there enough food produced in the world to feed all 6.6 billion people that are alive right now? Is everyone in the world well fed? Why or why not?
- 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 (aka “green revolution”) methods and why are they considered “high-input” methods?
- Although efficient at producing large amounts of food now, industrial agriculture is ultimately unsustainable. List 2 costs to people and 3 to the environment of modern agriculture techniques.
- What is sustainable agriculture? What are some benefits of sustainable agriculture and how might individuals and society promote this form of agriculture?
- Humans are large creatures as animals go, and in nature, large animals are typically not very numerous. However, humans, at 6.6 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?