

EnvS 001: Introduction to Environmental Issues

Spring 2007; Trulio

FINAL EXAM REVIEW SHEET

Below, you will find a list of the material that will be the basis for Midterm 3 (the Final), as well as typical questions that will be found on the exam.

Material Covered

- *Water Resources*: Chapters 14
- *Air Resources*: Chapters 19 and 20
- *Energy Resources*: Chapters 16 and 17
- *Environmental Policy*: Chapter 25
- *Sustainable Cities*: Chapter 23 (If we don't get to this, it will not be on the final)
- *Lectures*: My lectures since Midterm 2

I. Water Resources

- How much of the earth's water is available to us as fresh water?
- What four processes result in water cycling through the hydrologic cycle?
- What is an aquifer? Draw a diagram showing the connection between surface waters and different aquifer types.
- Describe how we make fresh water available to areas of water scarcity.
- In areas, such as Santa Clara County, where groundwater is removed, what is an unexpected side effect of that groundwater removal? (Hint: See figure 15-16 in Miller). What are we doing in Santa Clara County to reverse this problem?
- What and where is the Ogallala aquifer? Why is it being drained?
- What three sectors compete for fresh water in the U.S.? Which one uses the most water?
- List four problems of surface and groundwater in Santa Clara County.
- What are three sustainable approaches to solving water use problems?
- Describe eutrophication. Where do the pollutants originate? What are the effects of this process on fish and other aquatic organisms?
- The Clean Water Act has been effective at controlling point sources. What other major source of pollutants has the Act been less successful at controlling?
- According to Miller, what three strategies must be implemented to achieve a more sustainable water future?

II. Air Resources

- What is the troposphere and where is it located?
- What are the major constituents of the atmosphere and in what percentages do they occur naturally?
- What are the three major problems facing air resources? All three are attributable to the same general human-caused effect on the atmosphere. What is this effect?

- What federal law regulates air quality, what is the regulating agency and what are two regulated air pollutants?
- What are the primary sources of air pollutants?
- What is acid rain, how does it form and why is it a problem?
- Define externality and explain how this economic concept applies to air pollution.
- One approach to controlling emissions is a strategy called emissions trading. Describe how this principle works with factories that emit a pollutant for which there is a regulatory standard. Include a graph.
- If outdoor air quality worries you, is staying inside the answer? Why or why not? Explain your answer
- What is the ozone hole and why is it a problem?
- Describe the reaction between CFC and an ozone molecule?
- How has the problem of ozone loss been handled by the international community?
- What is the greenhouse effect and why is it important?
- List the primary greenhouse gases. By what amount has CO₂ increased in the atmosphere since about 1800 and why is this cause for concern?
- Give two facts about global warming that are NOT in dispute. Given these facts, why is there debate about whether we should reduce our output of carbon dioxide?
- Draw a graph illustrating the change in temperature and CO₂ levels for the earth's atmosphere over the last 160,000 years. How were these data collected? What is the implication of these data for the current warming trend?
- List four effects of global warming.
- What can be done to combat our contribution to global warming?
- How does the problem of ozone loss differ from global warming?

III. Energy Resources

- What is net energy? What percent of energy is wasted unnecessarily?
- What four factors should be considered when determining what energy sources to use to meet our national energy needs?
- Discuss the pros and cons of oil as a primary energy source.
- Nuclear energy may be making a comeback as an energy source. What issues have discouraged Americans from building any new reactors for the last 30 years?
- Which of the four nonrenewable energy resources used in the US is actually abundant here? What are the pros and cons of depending on this resource?
- What is energy efficiency? What are the efficiencies of florescent and incandescent light bulbs?
- What measures can be taken to make transportation more efficient?
- If new cars got an average of 40 mpg, by what percentage would we reduce our fossil fuel use in the US?
- What measures can be taken to make buildings more efficient?

- By the year 2050, how much of the U.S. energy needs could come from renewable resources and what are those resources?
- What is passive solar heating versus active solar heating?
- What are the pros and cons of hydrogen as an energy source?
- What do you think is the most promising renewable energy resource for the future and why?
- What important steps can we take *as individuals* to move our society toward a more sustainable energy future?

IV. **Environmental Policy**

- What is the definition of “environmental policy”?
- How did environmental laws passed during first environmental revolution (1890s-1930s) differ from those passed in the 1960s-1980s?
- Discuss an environmental law you feel is doing a good job at protecting the environment. When was it passed, what is the jurisdictional agency, and what is its mandate?
- What is the role of citizen’s groups in environmental policy?
- What two actions are needed to ensure environmental laws are passed that benefit the public good?

V. **Sustainable Cities**

- What percentage of the world’s population lives in urban centers now compared to 1850? What factors draw people to cities?
- In the US, what percentage of the population lives in urban and suburban areas compared to the mid 1800s? How have US cities changed in quality over this period?
- What is urban sprawl, what factors contribute to it, and what are the problems?
- Concentrating people in cities has some advantages. What are they?
- Most cities are unsustainable. Discuss this problem in terms of cities’ ecological footprints and material inputs and outputs.
- What is smart growth and how can it be used to protect natural areas in and near urban centers? Name two other tools of new urbanism being used to promote sustainability.
- Discuss two principles of Green Cities and how these principles promote sustainability.

VI. **Summary Questions**

- Sustainability is a central theme in environmental studies. What does sustainability mean? How does it relate to concept of fisheries and aquatic resources? What do you believe are the most effective ways for individuals and societies to move toward sustainable fisheries and food production, in general?

- A basic principle of ecology is that all things are related. Given this, explain why the effects of pollutants on other species, such as the bald eagle or grizzly bears, should be of concern to humans.
- By replacing current internal combustion engine cars with alternative energy technologies, we could reduce our use of fossil fuels by more than 50%. Discuss the science, societal, economic, and policy aspects of making this change. In your opinion, which aspect needs the most attention to make this change a reality?
- Environmental debates are often characterized as the environment *versus* the economy. But, this is an unimaginative way to view the world. Describe ways that experts, such as Paul Hawkin, recommend to achieve BOTH a healthy environment and a healthy economy.
- Human population growth is a tremendous problem facing the environment but is a complex societal issue. What are the primary social and cultural factors that affect whether a country can control its population?
- Based on their ecological footprint, describe the impact of the developed (affluent) nations, with 20% of the world's population, versus the developing (less affluent) nations on the world's resources. What are the large and small-scale solutions to achieving sustainability in both types of nations?
- Global warming and global climate change are issues of international environmental importance, but are the source of significant controversy. What economic, scientific and social factors result in this controversy? What are we most certain about with respect to global warming and what is uncertain? Given the uncertainties attending this issue, what do you recommend as a logical way to move forward?
- After experiencing this course, what environmental issue do you find the most personally compelling and why? What will you do to become part of the solution?