PWS 150: Environmental Biology

Exam IV Review

Covering Chapters 13-17

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**Chapter 13: Energy Resources**

1. What is net energy yield and why is it important? (Figure 13.2)

a. Total energy produced - energy required to produce it

b. Scientists view it as the best measurement for assessing long-term usefulness of an energy resource

1. Examples: electricity= coal (high) vs. nuclear power (low), transportation= gasoline (high) vs. ethanol from corn/biofuels (low)
2. What are the advantages/disadvantages of using fossil fuels? (Page 316)
3. Understand the relative amounts of energy used by source (Figure 13.3)
4. Be familiar with energy alternatives (tar sands and oil shales, natural gas, solar, wind, biofuels, geothermal) and why they could be beneficial or detrimental to us and the environment.
5. What are the trade-offs for the development and use of conventional oil? (Figure 13.5) How about those for natural gas? (Figure 13.9)
6. What is fracking?
7. How is coal formed? Why is coal efficient yet highly disadvantageous? (Figure 13.15)
8. What are the concerns regarding nuclear power? Are these concerns worth the risk?
9. What is energy efficiency and what are some practical ways to increase it?
10. Measure of work from each unit of energy, meaning that we need to work more for less energy
11. Cogeneration (heat + power), make electric car motors more efficient, recycle, connect power sources to grids, include hidden costs in market pricing, tax breaks/subsidies for consumers who buy smaller, fuel efficient vehicles, improve mass transit
12. How can you save energy in your home? How about in transportation, or at work?
13. Why are we struggling to use renewable energy sources?
14. Differentiate passive vs active solar heating systems (Page 340)
15. What are solar thermal systems and PV cells (solar cells)?
16. Compare the pros and cons in use of solar cells compared to hydropower.
17. What are liquid biofuels and what is their tradeoffs? (Figure 13.39). How about geothermal energy and wind energy? (Figure 13.41)

**Chapter 14: Environmental Hazards and Human Health**

1. Understand risk assessment and risk management and how they work together when considering environmental hazards. (Figure 14.2)
2. What are the main types of hazards that we face? Give an example
3. Biologic, chemical, natural, cultural, lifestyle
4. Why can viruses be deadly? What are bacteria and parasites? (Page 361)
5. How do humans spread ecological diseases? (disease connection between humans and animals). What is TB, HIV/AIDS, Malaria and their impact on human populations?
6. Clearing and fragmenting forests for cities
7. Hunting wild game for food
8. Illegal international trade of wild species
9. Industrialized meat production (E. coli)
10. What are some solutions to infectious disease prevention?
11. Reduce poverty and malnutrition, improve drinking water quality, reduce unnecessary use of antibiotics, immunize children against major viral diseases
12. Regarding chemical hazards, what are carcinogens, mutagens and teratogens?
13. What effects can harmful chemicals (hormone disrupters) have on the endocrine system? What can you do to reduce these risks?
14. Who are the most sensitive groups to any kind of harmful chemicals, pollutants or diseases? Who has the greatest health risk? (Page 377)
15. Children, elderly, sick. Greatest health risks come from poverty, gender and lifestyle choices
16. The poor
17. What are some sources of potentially harmful chemicals in your home?
18. Imported fruit (pesticides), baby bottles and toys (bisphenol A and pthalates, TVs and computers (flame retardants on plastic wiring)
19. What is a dose-response curve? (Figure 14.11)
20. Why do we know so little about the harmful effects of chemicals?
21. “Toxicologists know a great deal about a few chemicals, a little about many, and next to nothing about most” – all testing methods have serious limitations. Only 10% of registered synthetic chemicals have been tested for toxicity
22. Know the difference between pollution prevention vs. precautionary principle.

**Chapter 15: Air Pollution, Climate Change, and Ozone Depletion**

1. What is the significance of the Greenland ice sheet melting? (Page 388)
2. Know the atmospheric layers. Where does weather happen? Where is ozone? (Page 391)
3. What does outdoor air pollution include? Indoor? What are their sources?
4. What is the difference between primary and secondary pollutants?
5. What are some of the major pollutants in our atmosphere? Know the difference between industrial and photochemical smog (Page 392)
6. What is acid deposition? What are some problems and solutions? (Figure 15.6)
7. Acidic compounds (sulfuric acid, nitric acid, sulfur dioxide from power plants and transportation emissions) are released into the air and are dispersed, can be in the form of wet deposition (acid rain, cloud vapor) or dry deposition (acidic particulate matter)
8. Problems: harms crops and plant productivity, leaches essential nutrients from the soil, contributes to human respiratory disease, leaches toxic chemicals into the environment that get biomagnified in the food web. Solutions: prevention is the best.
9. Air pollution is a major killer and contributor to respiratory disease and illness. What are some ways we can control air pollution?
10. Outdoor: laws and regulations (Clean Air Act), emissions trading, prevention. Indoor: transition to better vented stoves and furnaces (in less developed countries), ban indoor smoking, set stricter standards, use naturally-based cleaning products
11. Know weather vs. climate. Realize that as the earth’s average temperature rises, some areas get warmer while some get cooler.
12. Understand climate change and evidence supporting it.
13. How do oceans and forests mediate the greenhouse effect?
14. What are some possible effects of a warmer atmosphere?
15. Flooding, rising sea levels, shifts in cropland locations and availability, wildlife habitats, more extreme weather, health effects, altered ecosystems
16. What is the albedo effect? What are the outcomes of ice melting?
17. Darker land surfaces absorbing more light, freshwater changing ocean chemistry
18. Realistically, the worst case scenario of ice melting is a three-foot rise in sea level. What impacts would this have?
19. degradation/destruction of coastal wetlands, estuaries and deltas, coral reefs, destruction of coastal fisheries, flooding of low lying cities and countries, erosion of barrier islands, saltwater invasion of coastal aquifers
20. What are Cap and Trade policies and how are they associated with carbon and energy taxes (Page 491)
21. What causes ozone depletion? Why does this matter to us?

**Chapter 16: Solid and Hazardous Waste**

1. What are the problems related to solid and hazardous waste?
2. How can we change our views about solid waste and what we should do with it?
3. Know the terms: toxic and radioactive. What are examples of each?
4. What is the best way to deal with solid waste?
5. Burying vs. burning vs shipping
6. Waste reduction and disposal
7. Know the 4 R’s of managing solid waste. Why are these so important and how do we apply these concepts?
8. What are the 6 industrial/community strategies for reducing resource use and waste?
9. What have we dealt with waste in the past vs. what we should be doing.
10. What are ways to more effectively reuse items instead of throwing away?
11. Case study: Denmark, Finland, and Canada
12. What are the different types of approaches to recycling? What are the advantages and disadvantages to recycling? (Figure 16.11) How do these compare to incineration? (Figure 16.13)
13. How is composting used to recycle? How is it done?
14. What are the advantages and disadvantages to burning or burying solid waste? (Figure 16.15)
15. What is the best way to deal with hazardous waste? What is integrated management of hazardous waste?
16. Physical and chemical methods for detoxification
17. Bioremediation
18. Define phytoremedication, plasma gasification.
19. What are the best methods and issues of storing hazardous waste?
20. What factors hinder our ability to reuse or recycle materials?
21. Understand the influence of government channels on waste reduction
22. Basel convention treaty (1992)
23. Stockholm Convention on Persistent Organic Pollutants

**Chapter 17: Environmental Worldview**

[**https://quizlet.com/174860572/chapter-17-environmental-economics-politics-and-worldviews-flash-cards/**](https://quizlet.com/174860572/chapter-17-environmental-economics-politics-and-worldviews-flash-cards/)

1. Understand how economic systems are related to the biosphere
2. What is a market-based economy and free-market economy?
3. What is a free-market economic system and how does it influence natural capital? (Figure 17.4).
4. Distinguish between natural, human, and manufactured capital. What impact do pollution taxes and fees have? (Figure 17.7)
5. What is the principle of sustainability? (Page 460)
6. What determines economic growth and its impact on environmental sustainability?
7. Differentiate neoclassical, ecological, and environmental economies
8. How can economic tools be used to deal with environmental problems?
9. Full-cost pricing
10. Subsidies
11. What is gross-domestic product and what information does it provide?
12. Compare GDP with environmental economic indicators (GPI)
13. Is there a benefit to taxing pollution and waste? How is green tax applied? What effect does this have on innovation to be green?
14. What makes environmental policies difficult to implement?
15. Think about environmental discrimination
16. The text discusses 7 principles used to make environmental policy. Understand what these are used for.
17. What role do citizen environmental groups play in environmental issues? How about educational institutions?
18. How does environmental security influence hazardous waste issues?
19. Understand that major environmental world views require environmental literacy and active environmental citizens as well as the development of ethical guidelines for developing environmentally sustainable societies.