APES Ch. 20 Water Pollution Reading Q's

I. **Using Nature to Purify Sewage**
   a. Describe how plants are used to purify sewage.

II. **Water Pollution: Sources, Types, and Effects**
   a. Water Pollution and its sources
      i. Compare and contrast point sources with nonpoint sources and provide 3 examples of each.
   b. Major Water Pollutants and Their Effects
      i. List and describe 7 types of water pollutants, including examples and major sources.
      ii. List and describe 6 common water borne diseases.
      iii. Explain how the level of dissolved oxygen relates to the pollution level of water.
      iv. How are GMO's being used with water pollutants?

III. **Pollution of Freshwater Streams**
   a. Water Pollution Problems of Streams
      i. Describe, in detail, an oxygen sag curve.
   b. Stream pollution in developed countries
      i. Explain what happened to the Cuyahoga River and how it was fixed.
      ii. What are 3 causes of fish kills and contaminated drinking water?
   c. Global Outlook: Stream Pollution in Developing Countries
      i. Describe 3 major sources of pollution in developing countries.
   d. Case Study: India's Ganges River: Religion, Poverty, and Health
      i. Describe the pollution level of the Ganges.
      ii. What is the Ganges used for in India?
      iii. How can the Hindu belief in cremating the dead cause water pollution?
      iv. How is India planning on cleaning up the Ganges?

IV. **Pollution in Freshwater Lakes**
   a. Pollution Problems of Lakes: Too little Flow and Mixing
      i. List 2 reasons why dilution of pollutants is less effective in lakes.
      ii. Explain how toxic chemicals can enter lakes and contaminate them.
   b. Cultural Eutrophication: Too Much of a good thing.
      i. What is cultural eutrophication?
      ii. How does it result in fish kills?
      iii. List 4 ways to prevent eutrophication.
      iv. List 4 ways to clean up eutrophication.
   c. Case Study: Pollution in the Great Lakes
      i. What happens in Lake Eire each August?
      ii. Where do most of the pollutants in the great lakes come from?

V. **Pollution of Groundwater**
   a. The Threat from Groundwater Pollution
      i. List 5 common groundwater pollutants.
      ii. How long does it take for groundwater to clean itself? Why?
   b. Extent of Groundwater Pollution: A Hidden Threat
      i. What is MTBE and why is it a threat to groundwater?
      ii. What happens to babies if they consume nitrates?
   c. Case Study: Arsenic in Groundwater
      i. What can arsenic do to people?
   d. Solutions: Protecting Groundwater: Think Prevention
      i. Why is prevention better than cleanup?

VI. **Ocean Pollution**
   a. How Much Pollution can the Oceans Tolerate?

i. Why can oceans hold more pollutants than other water sources?

b. Pollution of Costal Waters
   i. What is the largest source of coastal pollution? List 3 problems this can cause.
   ii. Describe a harmful algal bloom and some of the problems they cause.
   iii. What is a dead zone? What causes them?

c. Case Study: Oxygen Depletion in the Northern Gulf of Mexico
   i. Where are the worlds 3 larges oxygen depleted zones?
   ii. List 3 ways this oxygen depletion zone can be prevented?

d. Case Study: The Chesapeake Bay- an Estuary in trouble
   i. Describe the sources of pollution to the Chesapeake Bay?
   ii. How has the integrated coastal management program helped clean up the bay?

e. Ocean Oil Pollution
   i. Describe the Exxon Valdez oil spill.
   ii. What is the largest source of oil pollution?
   iii. List 3 environmental problems associated with oil spills.
   iv. List 3 ways to clean up oil spills.

f. Solutions: Protecting Coastal Waters
   i. List 8 ways to prevent coastal water pollution and 4 ways to clean up coastal water pollution.

VII. **Preventing and Reducing Surface Water Pollution**

a. Solutions: Reducing Surface Water Pollution from Nonpoint Sources
   i. List 6 ways farmers can reduce nonpoint water pollution.

b. Laws for Reducing Water Pollution from Point Sources
   i. What are 2 laws that set water pollution standards?
   ii. What is a discharge trading system?

c. Reducing Water Pollution through Sewage Treatment
   i. Describe how a septic tank cleans household sewage.
   ii. What is a sewage treatment plant?
   iii. Describe primary sewage treatment.
   iv. Describe secondary sewage treatment.
   v. Describe advanced or tertiary sewage treatment.
   vi. What are the US laws regarding municipal sewage treatment plants?
   vii. What can happen if cities have combined sewer lines and runoff lines?
   viii. What happened to sewage treatment laws in 2005 and what can this cause?
   ix. What are 4 consequences of releasing partially treated wastewater into surface water rather than fully treated wastewater?

d. What should we do with Sewage Sludge?
   i. List 3 places sludge ends up?
   ii. Which is the best place for sludge ecologically? What is the problem with this?

e. Using Prevention along with Sewage Treatment
   i. List and describe 2 ways we can eliminate toxic chemicals from our water before they reach sewage treatment plants.
   ii. Describe a composting toilet system.

f. Solutions: Using Wetlands to Treat Sewage
   i. Describe how wetlands can treat sewage.

g. Reducing Water Pollution from Point Sources in the US
   i. List 5 benefits of the Clean Water Act.
   ii. List 3 things that still need to be improved in US water sources.

h. Should the US Clean Water Act Be Strengthened or Weakened?
   i. List 3 improvements that could be made to the Clean Water Act.
   ii. List 2 reasons why people feel that the clean water act should be weakened.

VIII. **Drinking Water Quality**

a. Purifying Urban Drinking Water
   i. Describe how most developed countries provide clean drinking water.
   ii. List 2 ways you can purify drinking water in a developing tropical country.

b. Case Study: Protecting Watersheds instead of building Water Purification Plants
   i. Describe how New York has maintained pure drinking water without a purification plant.

c. Using Laws to Protect Drinking Water Quality
   i. Describe the US Safe Drinking Water Act.
   ii. List 3 ways to ensure every American can have pure drinking water.
   iii. List 3 ways water polluting industries pressure elected officials to weaken the Safe Drinking Water Act.

d. Is Bottled Water the Answer
   i. How much more does bottled water cost than tap water?
   ii. Is bottled water cleaner than tap water?
   iii. List 3 environmental problems that can be caused by bottled water.

e. Solutions: Reducing Water Pollution—the road ahead.
   i. List and describe 9 ways we can reduce water pollution.