Chapter 14 Review Sheet

Water Pollution

Opening Case Study- The Chesapeake Bay

The Chesapeake Bay is the largest estuary in the U.S. but also faces some of the biggest environmental challenges. 272 million kg of nitrogen and 14 million kg of phosphorous are dumped into the bay through discharge from sewage treatment facilities, animal waste produced from manure that makes its way to nearby streams and rivers, and fertilizer. When these nutrients reach the bay algal bloom occurs which is an explosion population growth of algae. Increased sediments also cloud the water and kill the habitats of the fish and blue crabs. Anthropogenic chemicals also enter the bay through pesticides and pharmaceutical drugs have been found too. In 2000 the surrounding states formed the Chesapeake Bay Action Plan to reduce impacts of pollution to the Chesapeake. There was a reduction in nitrogen, increase in water clarity, and an increase in # of blue crabs. This story serves as an excellent example of the wide variety of pollutants that can impact aquatic ecosystems and of effective efforts made when all parties work together towards a common goal.

Key Ideas

1. Point Source Pollution- distinct locations such as a particular factory that pumps its waste into a nearby stream of a sewage treatment plant that discharges its wastewater from a pipe into the ocean. Nonpoint Source Pollution- more diffuse areas such as an entire farming region, a suburban community with many lawns and septic systems, or storm runoff from parking lots.
2. Human wastewater can cause water pollution because wastewater dumped into bodies of water naturally undergoes decomposition by bacteria, which creates large demand for oxygen in the water. Second, the nutrients that are released from wastewater decomposition can make the water more fertile, and wastewater can carry a wide variety of disease-causing organisms.
3. The two most widespread systems for treating human sewage are septic systems and sewage treatment plants. With septic systems no electricity is needed. Sewage treatment plants are for greater pop. Densities and little open land. Manure lagoons are large, human-made ponds lined with rubber to prevent the manure from leaking into the groundwater.
4. The major inorganic compounds that are of concern for water pollution are mercury, arsenic, and acids. Most arsenic occurs in well water through natural processes, but pollution from mercury, acid precipitation, and acid mine drainage largely occurs as a result of human industrial activities. The major organic compounds composing water pollution are pesticides and their inert ingredients; pharmaceuticals, including hormones; and industrial compounds, including PCBs.
5. Oil spills occur both from tankers that transport oil as well as from offshore drilling platforms that leak during oil extraction. There is a general agreement about containing and removing the oil slicks that float on the surface of the water. However, scientists still debate whether oil spills that hit the coastline should be

remediated by washing the coastline with hot water or leaving it to recover without human intervention.

6. Though nonchemical pollutants receive much less attention, they can be very harmful. These pollutants include sediments, heat, noise, and solid waste such as garbage.
7. Most modern nations have experienced periods of industrialization and widespread pollution followed by greater affluence that allows an improvement in the quality of their waterways. Developed countries have resources to address pollution issues. Many developing countries are still in the phase of rapid industrial growth and consequently have poor water quality.

Important Vocab Words and Legislation

- Water Pollution- contamination of streams, lakes, oceans, or groundwater with substances produced through human activities that negatively affect organisms.
- BOD (biological oxygen demand)- amount of oxygen a quantity of water uses over a period of time at a specific temp.
- Eutrophication- phenomenon in which a body of water becomes rich in nutrients.
- Dead Zone- areas of little or no oxygen so little life.
- Indicator Species- organism that indicates whether or not disease-causing pathogens are likely to be present.
- Clean Water Act- 1972 Legislation supporting the protection and propagation of fish, shellfish, and wildlife and recreation in and on the water.
- Safe Drinking Water Act- (1974, 1986, 1996) sets the national standards for safe drinking water.

Multiple Choice Questions

1. Human wastewater results in which of the following water-pollution problems?
   I. The organic matter decomposes and reduces dissolved oxygen levels.
   II. Decomposition of organic matter releases great quantities of nutrients.
   III. Pathogenic organisms are carried into surface waters.
   (a) I only
   (b) II only
   (c) III only
   (d) I and III only
   (e) I, II, and III

2. All of the following are nonchemical forms of water pollution except
(a) Industrial waster
(b) Solid waste or garbage
(c) Sediments
(d) Noise
(e) Thermal pollution

3. Which of the following inorganic substances is naturally occurring in rocks, soluble in groundwater, and toxic at low concentrations?
(a) Mercury
(b) Lead
(c) PCBs
(d) Copper
(e) Arsenic

Free Response Question

- Anything to do with reading graph of water pollution trends or possible ways to clean up water pollution in a certain area with work or legislation.