

CHAPTER 6—WISE USE OF OUR RESOURCES

MULTIPLE CHOICE

1. When the rate at which groundwater is used exceeds the rate at which it is recharged, the soil above the groundwater may collapse, forming a(n) _____.
 - a. reservoir
 - b. landfill
 - c. aquifer
 - d. sinkholeANS: D DIF: B OBJ: 6-3
2. Which of the following is a base?
 - a. vinegar, pH 2.9
 - b. pure water, pH 7.0
 - c. seawater, pH 8.5
 - d. orange juice, pH 3.5ANS: C DIF: B OBJ: 6-3
3. As you leave the surface of Earth, the layers of the atmosphere you pass through in order are _____.
 - a. thermosphere, mesosphere, stratosphere, troposphere
 - b. troposphere, mesosphere, thermosphere, stratosphere
 - c. stratosphere, troposphere, thermosphere, mesosphere
 - d. troposphere, stratosphere, mesosphere, thermosphereANS: D DIF: B OBJ: 6-3
4. That there are laws prohibiting the hunting and killing of certain species of animals is an example of _____.
 - a. preserving endangered species
 - b. conserving threatened species
 - c. preserving extinct species
 - d. conserving wildlife and wilderness areasANS: A DIF: B OBJ: 6-5
5. The substances in automobile exhaust that play a part in both acid precipitation and smog formation are _____.
 - a. nitrogen oxides
 - b. sulfur dioxide and water vapor
 - c. CFCs
 - d. carbon dioxide and carbon monoxideANS: A DIF: B OBJ: 6-3

6. The major cause of species extinction is _____.
 - a. hunting
 - b. pesticide use
 - c. habitat destruction
 - d. water and air pollutionANS: C DIF: B OBJ: 6-5

7. If the demand for a resource is much lower than its availability, the cost of that resource will most likely _____.
 - a. go up
 - b. fluctuate regularly
 - c. go down
 - d. be unaffectedANS: C DIF: B OBJ: 6-2

8. Topsoil is considered a nonrenewable resource because _____.
 - a. it is available in only limited amounts
 - b. it is recycled by natural processes
 - c. it takes several generations to replace
 - d. once it is used up, no more will be availableANS: C DIF: B OBJ: 6-1

9. Pesticides are classified as a _____.
 - a. nonrenewable resource
 - b. renewable resource
 - c. nonbiodegradable waste material
 - d. biodegradable waste materialANS: C DIF: B OBJ: 6-4

10. Cows are classified as a _____.
 - a. nonrenewable resource
 - b. renewable resource
 - c. recyclable waste materialANS: B DIF: B OBJ: 6-4

11. Phosphorus is classified as a _____.
 - a. nonrenewable resource
 - b. renewable resource
 - c. nonbiodegradable waste material
 - d. biodegradable waste materialANS: A DIF: B OBJ: 6-1

12. Oxygen is classified as a _____.
 - a. nonrenewable resource
 - b. renewable resource
 - c. nonbiodegradable waste material
 - d. biodegradable waste materialANS: B DIF: B OBJ: 6-1

13. Corn plants are classified as a _____.
- nonrenewable resource
 - renewable resource
 - nonbiodegradable waste material
 - biodegradable waste material

ANS: B DIF: B OBJ: 6-4

14. A plastic soda bottle is classified as a _____.
- nonrenewable resource
 - renewable resource
 - nonbiodegradable waste material
 - biodegradable waste material

ANS: C DIF: B OBJ: 6-4

15. Surface water is classified as a _____.
- nonrenewable resource
 - renewable resource
 - nonbiodegradable waste material
 - biodegradable waste material

ANS: B DIF: B OBJ: 6-1

16. Coal is classified as a _____.
- nonrenewable resource
 - renewable resource
 - nonbiodegradable waste material
 - biodegradable waste material

ANS: A DIF: B OBJ: 6-1

17. Pine lumber is classified as a _____.
- nonrenewable resource
 - renewable resource
 - recyclable waste material

ANS: B DIF: B OBJ: 6-4

18. Aluminum is classified as a _____.
- nonrenewable resource
 - renewable resource

ANS: A DIF: B OBJ: 6-4

COMPLETION

1. Setting aside parks and refuges is called _____, while _____ is the planned management of a natural area to prevent exploitation or destruction.

ANS: preservation; conservation

DIF: B OBJ: 6-5

2. Wastes that are not easily broken down, such as toxic metals and nuclear material, may be disposed of by _____.

ANS: burial in geologically stable areas

DIF: B OBJ: 6-4

3. Solid wastes such as wood, food, dead leaves, and animal wastes are all classified as _____.

ANS: biodegradable

DIF: B OBJ: 6-4

4. Air pollutants enter the atmosphere from _____, _____, and _____.

ANS: burning of fossil fuels, volcanic eruptions, forest fires, and evaporation of volatile chemicals

DIF: B OBJ: 6-3

5. Competition for a resource increases when _____ exceeds _____.

ANS: demand; supply

DIF: B OBJ: 6-2

6. The more people that live on Earth, the more demand there is for _____.

ANS: food, water, living space, clothing, transportation, and other essentials

DIF: B OBJ: 6-2

7. Decreasing the supply of a product tends to increase the _____.

ANS: price

DIF: B OBJ: 6-2

8. Increasing the supply of a product that has a fixed demand generally affects the price by _____.

ANS: decreasing it

DIF: B OBJ: 6-2

SHORT ANSWER

1. Because the Bengal tiger is highly endangered, both preservation and conservation methods have been undertaken to protect the species. Discuss these methods as they relate to endangered species in general.

ANS: Preservation is the act of keeping an area or organism from harm or destruction, while conservation is the planned management of a natural area to prevent exploitation. Freezing sperm and embryos and maintaining organisms in zoos are examples of preservation. Protecting organisms in areas such as national parks and forests or enacting laws to control hunting of species are examples of conservation.

DIF: A OBJ: 6-5

2. Discuss the differences between the biodegradation of oil and plastic, a by-product of oil.

ANS: Oil is biodegradable in the natural environment, but plastics are nonbiodegradable. There are microbes that have the natural ability to change oil into compounds that can be recycled by living things. Plastics, on the other hand, will remain unchanged by living organisms.

DIF: A OBJ: 6-4

3. Suppose that a cartel of countries declares an embargo on shipments of a required raw material to the United States and other Western countries. Although shipments never decline much, the average price of the material triples in two years. What is likely to be the result in ten years?

ANS: In such instances, there will likely be a search for substitutes. Whether or not substitutes for the material can be found, demand for the material is likely to be reduced dramatically for the short term.

DIF: A OBJ: 6-2

4. Fossil fuels, such as peat, are being produced naturally in bogs. Other fossil fuels, such as oil and coal, are also being produced naturally. Discuss why fossil fuels are considered to be nonrenewable.

ANS: Nonrenewable resources are available in only limited amounts and are not quickly replaced or recycled by natural processes. The rate at which fossil fuels are being used is far greater than that at which they are being produced. Although peat, oil, and coal are being replaced by natural processes, it takes so long that they are considered nonrenewable.

DIF: A OBJ: 6-1

5. How do atmospheric sulfur dioxide and nitrogen oxides contribute to the pollution of Earth's waters?

ANS: In the presence of sunlight, these substances can combine with water vapor in the atmosphere to form sulfuric acid and nitric acid, respectively, which fall to Earth as rain or snow. This acid precipitation pollutes our water by falling directly into rivers, lakes, and other bodies of water; running off the land into bodies of freshwater or salt water; or by seeping down through the soil and entering the groundwater supply.

DIF: A OBJ: 6-3

6-5

6. Explain how ozone in the atmosphere can be both helpful and harmful.

ANS: Ozone in the troposphere is harmful because it causes lung damage and contributes to the formation of smog. Ozone in the upper stratosphere is helpful because it prevents harmful ultraviolet radiation from reaching Earth's surface.

DIF: A OBJ: 6-3

7. Explain why paper, wood, food, and other biodegradable wastes often do not break down when they are buried in landfills.

ANS: Bacteria and other decomposers require oxygen to break down biodegradable substances; when wastes are buried in landfills, there is often not enough oxygen available to support these organisms.

DIF: A OBJ: 6-1

8. When a dam is built across a river, the dam creates an artificial lake or reservoir. Dams are useful because they hold river water and collect and store runoff. How could the building of the dam affect farmland below the dam?

ANS: By disrupting the flow of the river, the amount of nutrient-rich water and sediments the land would receive would be reduced. The land would probably become less productive and support fewer organisms.

DIF: A OBJ: 6-3

9. When a dam is built across a river, the dam creates an artificial lake or reservoir. Dams are useful because they hold river water and collect and store runoff. How could the building of a dam just downstream of a shorebird habitat cause a species of shorebirds to become threatened?

ANS: Answers may vary. The reservoir created by the dam could drown the land around that part of the river where the shorebirds make their home and obtain their food. The birds themselves may be killed by the flooding or eventually decline in numbers because of these changes to their habitat and the decreased food supply.

DIF: A OBJ: 6-3

10. Suppose that fertilizers are being used by a farmer to add nutrients to depleted soil. At present, a nearby lake is a healthy ecosystem: floating algae and lake plants are growing in balance with the fish and other lake inhabitants; aerobic (oxygen-using) bacteria in the lake are the major decomposers. How might fertilizer pollution affect the organisms in the lake?

ANS: An excess of nutrients could produce an increase in algae and plant growth. More plants and algae would grow than would die off naturally or be eaten by the first-order consumers. The algae could grow and cover the lake and so prevent light and air from reaching the organisms in the lake. An excess of nutrients could also result in an increased number of aerobic bacteria, which makes less oxygen available. As a result, many lake organisms could die.

DIF: A OBJ: 6-3

6-6

11. Suppose that fertilizers are being used by a farmer to add nutrients to depleted soil. At present, a nearby lake is a healthy ecosystem: floating algae and lake plants are growing in balance with the fish and other lake inhabitants; aerobic (oxygen-using) bacteria in the lake are the major decomposers. Under what conditions could fertilizer become a pollutant? Which part of the environment would be affected?

ANS: Answers may vary. If it rains hard soon after the fertilizer is applied and the fertilizer has not had a chance to be well incorporated into the soil, much of it will wash away into the lake. An excess of nutrients in the lake would be considered water pollution.

DIF: A OBI: 6-3

You are an environmental scientist who has been called in as a consultant by the management of a nuclear power plant to help them decide how and where to store their radioactive waste materials. The power plant is located along the coast of the ocean, close to several large cities and towns. Although some of the waste is stored on site at the plant, most of it has been sealed in steel storage tanks that have been buried a few feet under the soil surface of a nearby open field. Some people have suggested that the tanks be taken out to deep sea and lowered to the bottom of the ocean. Another group has suggested building a permanent storage area deep under the surface, away from living things.

12. In order to determine the possible effects of building such a site in a particular area, what preliminary steps would you recommend?

ANS: Answers will vary. Population studies of the organisms in the area should be conducted over a period of years to understand the patterns of growth, behavior, and interactions of the organisms that would be affected. Geological histories also should be studied.

DIF: A OBI: 6-3

13. What biotic factors would need to be considered?

ANS: Answers may vary. The types of organisms (species diversity) in the area and the number of organisms must be considered. The possibilities of relocating organisms should also be taken into account.

DIF: A OBI: 6-3

14. What abiotic factors would need to be considered in choosing a deep, underground site?

ANS: Answers may vary. Location of earthquake faults and rock structure (impermeability and permeability of surrounding rock) must be considered.

DIF: A OBI: 6-3

15. What environmental problems could deep-sea burial present?

ANS: Answers may vary. Salt water might eventually corrode the containers, causing leakage into the ocean. The pollution will kill many organisms and would persist for a long time. As radioactive water from the ocean moves through the water cycle, the radioactivity could be carried and fall to Earth, affecting organisms hundreds of miles away. Furthermore, burying the tanks on the ocean bottom does not protect them from undersea earthquakes or volcanoes.

DIF: A OBI: 6-3

16. What are some of the limitations of the present method of shallow burial?

ANS: Answers may vary. The site is not protected from natural disasters, such as floods, hurricanes, or earthquakes. Leakage from the tanks could penetrate and pollute the soil, local groundwater supplies, and the air. Because the tanks are buried near the surface, they could be accidentally dug up and damaged if the field becomes a construction site.

DIF: A OBI: 6-3

17. Why is the disposal of radioactive wastes such a problem?

ANS: Answers may vary. Because they are nonbiodegradable, they remain dangerous to organisms and the environment for thousands of years.

DIF: A OBI: 6-4

OTHER

If the underscored word or phrase makes the sentence true, write "true" in the space provided. If the underscored word or phrase makes the sentence false, write the correct term or phrase in the space provided.

1. Pollution is the contamination of the environment by an excess of waste materials.

ANS: true DIF: B OBI: 6-3

2. African elephants are an endangered species.

ANS: true DIF: B OBI: 6-5

3. Extinction is the disappearance of a species when the last of its members dies.

ANS: true DIF: B OBI: 6-5

4. Renewable resources are replaced or recycled by human activities.

ANS: natural processes DIF: B OBI: 6-1

5. Resources that are not replaced or recycled by natural processes and are available in only limited quantities are nonbiodegradable.

ANS: nonrenewable DIF: B OBI: 6-1

6. Fossil fuels are substances composed of the remains of dead organisms that have been buried for millions of years.

ANS: true DIF: B OBI: 6-1