Chapter 1

Answers to Mid-Section 1 Review

1. The two main types of interactions that environmental scientists study are how we use resources and how our actions affect the environment. A geologist might study how mineral resources are mined and used while a biologist might study insect populations to see how pesticides affect the population.

2. The five major fields of study are biology, the study of living organisms; Earth science, the study of Earth's nonliving systems and the planet; physics, the study of matter and energy; chemistry, the study of chemicals and their interactions; and social sciences, the study of human populations.

3. Answers may vary. Environmental science is a complex field and many different sciences are needed to understand the interactions of different parts of the environment.

4. Environmental science is the study of how humans interact with the environment. Ecology is the study of how living things interact with each other and the nonliving environment.

5. Answers may vary. Students might suggest that regulations limiting logging in ancient Troy could have reduced soil erosion.

Answers to Section 1 Review

1. Hunter-gatherers changed habitat to obtain food, introduced new plants to areas and in some areas overharvested plants and animals.

2. Sample answers: One effect of the agricultural revolution was the conversion of forest land into agricultural areas. This process removed the native plants and replaced them with crops and domesticated animals. The Industrial Revolution changed the environment by introducing pollution from industry and accelerating habitat destruction.

3. Environmental problems can be local, regional, or global based on the size of area they directly affect. A local problem may be a factory that releases air pollutants in a neighborhood. A regional problem might be contamination of a river that many cities depend on for drinking water. A global problem might be the releasing of greenhouse gases that contribute to global warming.

4. Sample answer: Food wastes are biodegradable pollutants.

5. Sample answer: Rates of population growth increased during the Industrial Revolution because of improvements in healthcare and increased food production.

6. Fossil fuels are considered nonrenewable resources because a human lifetime is the timeframe used to evaluate the replacement rate of resources. Fossil fuels take millions of years to form, and humans consume them much faster than they are formed.

Answers to Section Review

1. Answers may vary. Mexico has characteristics of developing and developed countries.

2. Answers may vary. Critical thinking is a skill that enables one to evaluate ideas and information.

3. The law of supply and demand states that the greater the demand for a limited supply of something is, the more the supply is worth. Oil is one example. When demand is high the price usually increases.

4. Answers may vary. There are many other factors that might affect the price of oil. The cost of shipping and transporting the oil may increase. The cost of finding and drilling wells may increase the price. Students may also note that the majority of oil producing nations are part of a trade organization called OPEC. OPEC can control the price and production of oil.

5. Answers may vary. "The Tragedy of the Commons" states that when land held in common is used for grazing, people tend to overgraze the land. When land is divided up and privately owned, people tend not to overgraze the land. To some extent this is accurate. People tend to care more for an area when it is under their direct control.

Chapter Review

Key Terms

1. Sample answer: Agriculture is the practice of growing, breeding and caring for plants and animals that are used for food, clothing, housing, transportation, and other purposes.

2. Sample answer: Natural resources are either renewable or nonrenewable.

3. Sample answer: Toxic chemicals released into the environment cause pollution.

4. Sample answer: A developed nation has an ecological footprint that is about four times

larger than a developing nation.
5. Sample answer: Sustainability is a goal of environmental science.
6. Industrial
7. renewable
8. Biodiversity

Understanding Key Ideas

9. b
10. d
11. b
12. b
13. b
14. c
15. b

Short Answer

16. Sample answer: Geology might be involved in environmental science because scientists might use geology to find out how different rock types might affect pollution flow. Chemistry might be involved in environmental science because scientists might use chemistry to identify how different chemicals interact in the environment.
17. Answers may vary. Biodegradable pollutants can cause environmental problems if they accumulate in the environment and they do not degrade quickly enough.
18. Sample answer: The Earth's resources are shared by everyone, if societies do not use resources responsibly, the resources can become depleted or polluted.
19. Answers may vary.
20. Answers may vary. Students might suggest looking at the sources for the information, the references provided, the presentation of data, or the credentials of the author.
21. Sample answer: A species can be a natural resource because a species is part of the environment.

Interpreting Graphics

22. Developing countries have a much higher rate of population growth than developed countries. Developed countries use about twice as much energy as developing countries, even though the populations of developed countries are much smaller.
23. Developing countries will probably consume a higher percentage of commercial energy over time, because population growth is increasing in developing countries.
24. The pie graph represents part of a total amount, while the chart of population size shows change over time.

Concept Mapping

25. Answers to the concept mapping questions are on pp. 715–720.

Critical Thinking

26. Sample answer: Humans are part of the environment because they are animals that use resources.
27. Sample answer: Fossil fuels were not widely used before the Industrial Revolution because there was not an efficient way to mine or transport the fuels and there were not many machines that could use fossil fuels.
28. Answers may vary. The sun is usually considered a renewable resource because it is expected to last for many, many future human generations.
29. Sample answer: Many of the effects of the Industrial Revolution were positive. Machines made many processes much more efficient and reduced the need for human labor and animal power to do many tasks. The Industrial Revolution also improved the standard of living.

Cross-Disciplinary Connection

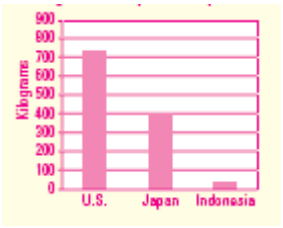
30. Answers may vary. The change in demographics will probably show change in population and income levels. The change may also show an increase in age. Increased population affects the resources used, and increased income probably translates to a larger ecological footprint.

Portfolio Project

31. Sample answer: Trees grow because they use the energy from the sun. Trees are cut down to burn as fuelwood. When wood is burned, the energy is released.

Math Skills

32.



33. U.S. 56,160 kg/mi2; Japan 331,600 kg/mi2; Indonesia 13,717 kg/mi2

34. The statement is false because the population density is high in Japan and Indonesia, yet the garbage produced per person is lower than the United States.

Writing Skills

35. Answers may vary.

36. Answers may vary.

37. Answers may vary.

Reading Skills

1. c

2. c

Standardized Test Prep

Answers

1. D

2. F

3. D

4. H

5. The two types of pollutants are biodegradable and nonbiodegradable.

6. Answers will vary. See Test Doctor for detailed scoring rubric.

7. D

8. Answers will vary. See Test Doctor for detailed scoring rubric.

9. F

Question 6 Full-credit answers should include the following points:

• as nonrenewable resources become scarce, their costs rise

• as the cost of a resource rises, people look for alternatives that are cheaper and more readily available

Question 8 Full-credit answers should include the following points:

• the agricultural revolution allowed populations to grow in localized areas

• the larger populations used more resources than the smaller hunter-gatherer groups

• using more resources put more pressure on the environment to replace, or find replacements for, the used resources