6.1

## Assessment Answers

**1a.** Sample answer: Agriculture: benefit, food production; cost, impacts on fresh water and fertile soil. Development: benefit, higher standard of living; cost, production of lots of wastes. Industrial growth: benefit, conveniences of modern life; cost, requires lots of energy to produce and power products.

**1b.** Sample answer: More productive agricultural practices would increase a nation's population since there would be more food available. However, it would likely worsen the nation's environmental health.

**2a.** Sustainable development means using resources in an environmentally conscious way. It provides for human needs while preserving ecosystems that produce natural resources.

**2b.** Sample answer: Energy from the sun is renewable because it can be replaced (the sun will keep burning). However, natural processes cannot replenish oil supplies within a reasonable amount of time, so oil is a nonrenewable resource.

**2c.** Sample answer: If there were no wetlands to provide flood control, societies would have to build more dams and barriers to prevent excess water from flooding cities and agricultural land.

**WRITE ABOUT SCIENCE**

**3.** Answers will vary depending on the community. Students might mention the spread of housing developments, the building of malls and other shopping areas, and the construction of highways and then explain how these affect their local ecosystem by necessitating new sources of power and materials.

6.2

## Assessment Answers

**1a.** Sample answer: Soil erosion is caused when no roots are left to hold soil in place. When soil is badly eroded, organic matter and minerals that make it fertile are often carried away with the soil.

**1b.** Sample answer: Leaving stems and roots of the previous year's crop in the soil between plantings can help hold soil in place. Crop rotation can help prevent soil erosion. The practice of contour plowing can limit erosion.

**2a.** Sample answer: The water cycle naturally renews Earth's fresh water. In some places, though, freshwater supplies are limited.

**2b.** Some pollutants are more harmful to organisms at higher trophic levels because they undergo biological magnification and become more concentrated in the bodies of organisms at these levels.

**2c.** Sample answer: Agricultural chemicals are one source of water pollutants. We could reduce their effects by using as little fertilizer as possible.

**3a.** the oxygen we breathe, the ozone layer that absorbs harmful ultraviolet radiation, and the greenhouse gases that regulate global temperature

**3b.** The burning of fossil fuels releases pollutants of several kinds, including greenhouse gases, particulates, and the pollutants that produce smog and acid rain.

**ANALYZING DATA**

**4.** Producers, 0.004 ppm; small fish, 0.4 ppm; larger fish, 4 ppm; fish-eating birds, 40 ppm

6.3

## Assessment Answers

**1a.** Ecosystem diversity refers to the variety of habitats, communities, and ecological processes in the biosphere. Species diversity is the number of different species in the biosphere or in a particular area. Genetic diversity refers to the different forms of genetic information carried by individuals in a species or in the biosphere.

**1b.** Answers will vary. Students should mention specific benefits in medicine, agriculture, and ecosystem services.



**2a.** altering habitats, hunting, introducing invasive species, releasing pollution into food webs, and climate change

**2b.** Sample answer: The smaller the habitat size, the less species diversity there is. The reason is that smaller size limits the number of species that can live in the space.

**3a.** to reintroduce genetically diverse individuals to the wild

**3b.** Sample answer: The strategy is a good one because it will conserve a high concentration of endangered species with one directed effort.

**VISUAL THINKING**

**4.** Sample answer: The hot spots mostly occur in areas classified as tropical rain forests or temperate woodland and shrubland. The correlation with tropical rain forests is not surprising, because this biome contains the greatest biodiversity. The correlation with temperate woodland and shrubland is somewhat surprising, though these areas also contain great biodiversity.

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## Assessment Answers

**1a.** An ecological footprint describes the total area of functioning land and water ecosystems needed both to provide the resources an individual or population uses and to absorb and make harmless the wastes that an individual or population generates.

**1b.** The limitations are that there is no universally accepted way to calculate footprint size and footprints give only a "snapshot" of the situation at a particular point in time. Ecologists can best use them to make comparisons among different populations.

**2a.** It absorbs harmful UV radiation from sunlight.

**2b.** Physical evidence: Data show that Earth's temperatures are getting warmer, its sea ice is melting, and its sea levels are rising. Biological evidence: Data confirm that many species are responding as though they are experiencing rising temperatures.

**2c.** Sample answer: A solution would be to place strict, worldwide limits on catching all types of fishes for many years. This would help by giving fish populations time to increase to sustainable levels. The challenge in implementing such limits would be to persuade all countries to go along with the plan. Incentives for fishing companies would likely be needed.

**3.** Big idea Sample answer: The burning of fossil fuels is adding more carbon dioxide to the atmosphere and depleting it from fossil fuel reservoirs. Since carbon from the atmosphere can dissolve in water, it is also increasing the amount of carbon in bodies of water.