Chapter 2 Review

READING TOOLBOX

1. **Three-panel Flip Chart** Organize three examples of ethical issues that face society today in a three-panel flip chart.
2. **Concept Map** Construct a concept map that describes some applications of biology. Try to include the following terms in your concept map: *genetics, ecology, environmental science, vaccination, epidemiology,* and *genome.*

Using Key Terms

Use each of the following terms in a separate sentence.

3. *environmental science*
4. *genetic engineering*

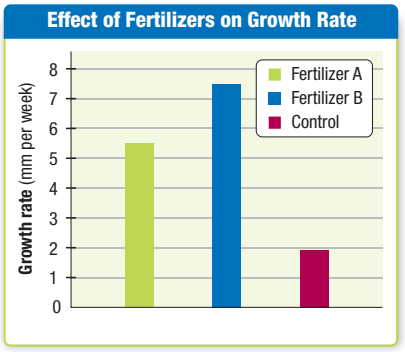
Write a definition for each of the following terms.

5. *vaccination*
6. *ecology*

Understanding Key Ideas

7. Cholera bacteria cluster
   - **a.** around the plankton where the copepods feed in the ocean water.
   - **b.** throughout the shells of both the male and female copepods.
   - **c.** only around the mouthparts of both male and female copepods.
   - **d.** around the mouthparts and egg casings of female copepods.
8. Define *battlefield medicine.*
   - **a.** amputation during surgery
   - **b.** the treatment of soldiers in or near an area of combat
   - **c.** the vaccination of soldiers prior to being deployed to a battlefield
   - **d.** the term used for military hospitals
9. What area of biology applications does genetic engineering *not* represent?
   - **a.** bioscience
   - **b.** biotechnology
   - **c.** biometrics
   - **d.** bioagriculture
10. Criminal investigators use biological factors for all of the following *except*
    - **a.** to determine a person's identity.
    - **b.** to determine how to keep the public safe.
    - **c.** to make detailed three-dimensional images of internal organs.
    - **d.** to determine the pattern of bands that would result in a fingerprint.

Use the graph to answer the following question.



11. Which of the following is the dependent variable in the experiment?
    - **a.** control
    - **b.** fertilizer A
    - **c.** fertilizer B
    - **d.** growth rate

Explaining Key Ideas

12. **Describe** why Rita Colwell focused on a low-tech solution to reduce the spread of cholera.
13. **Explain** the function of a vaccination in the human body.
14. **Investigate** the purpose for assistive technology.
15. **Describe** how biomolecular materials have influenced research studies.
16. **Describe** how to get an environmental club started at your school.
17. **Describe** how genetics is used to study and protect endangered animals.
18. **Describe** the impact of Bt corn when the corn is grown by farmers.

Assignment Guide

Section	Questions
1	5, 7, 8, 12, 13, 14, 19, 20, 26, 30
2	4, 9, 10, 11, 15, 18, 21, 22, 23, 25, 27, 28
3	3, 6, 16, 17, 24, 29

Review

Reading Toolbox

1. Check students' definitions for accuracy.
2. See previous page for Answer to Concept Map.

Using Key Terms

3. *Environmental science* includes principles from ecology.
4. The ability to alter genes is called *genetic engineering.*
5. *Vaccination* is the administration of all or a part of weakened or dead microbes or viruses to stimulate the immune response.
6. *Ecology* is the study of the interactions of livings things with each other and with their environment.

Understanding Key Ideas

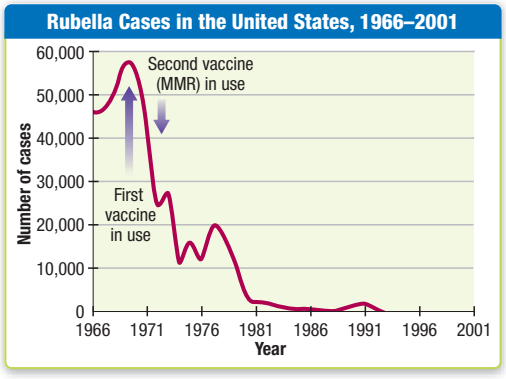
7. d 8. b 9. c 10. c
11. d

Explaining Key Ideas

12. A low-tech solution is easier to implement in regions of the world where poverty is prevalent.
13. All or part of a dead or weak pathogen is introduced to the human body so that the immune system can learn to fight it.
14. to help people with debilitating injuries, diseases, or disabilities to accomplish everyday tasks.
15. Scientists are using this knowledge in creating new materials for human use.
16. Students might identify a list of local environmental issues and discuss this list with a science teacher or club sponsor. Then, develop a plan of how to entice members and become involved in identifying an issue and finding a solution.
17. Wildlife agents are using DNA fingerprinting to identify poachers. Biologists are also collecting the DNA of endangered animals for study if the animals become extinct. Some believe that the DNA samples could be used to clone extinct animals.
18. The use of Bt corn enables farmers to use less chemicals on the crops to control pests. However, the pollen from this corn has a negative impact on Monarch butterflies.

Using Science Graphics

Use the graph to answer the following question.



19. What happened after the second vaccine license became a triple vaccination for mumps, measles, and rubella (MMR)?

Critical Thinking

20. Explaining Relationships Which areas of the world should scientists focus on in order to identify and prevent cholera epidemics? Explain why you think this is the case.

21. Predicting Consequences Future breakthroughs in science may alter the genes that affect aging in humans, and might allow some people to live longer lives. What are some possible environmental consequences if this type of technology is developed? What are some possible social consequences of this technology?

22. Logical Reasoning Insect populations may develop resistance to pesticides or other chemical compounds. When a population is resistant, the chemical can no longer kill the insect pest. Could insect populations develop resistance to Bt corn? If so, what could scientists do to control the resistant populations?

23. Finding Evidence What kind of scientific experiments would you want to perform in order to ensure that a genetically modified crop was safe for people and the environment?

24. Applying Information Describe how new technologies could be used to manage and protect an endangered species like the timber wolf.

25. Forming Hypotheses Describe how iris scans are considered a more reliable form of biometric identification than fingerprint analysis is. Explain your reasoning.

26. Cholera and Technology What kind of new technology would be most useful for studying the connection between cholera and ocean temperatures? Explain your answer.

Alternative Assessment

27. Design a Product Develop a new product that is based on one aspect of an organism or biological system. Create a brochure that describes the product and shows how it works. In the brochure, also describe how the product's design is inspired by nature.

Writing for Science

28. Outline Ethical Issues Create an outline that summarizes the many ethical issues surrounding the use of biometric technology for public safety. Then, write a letter to your congressperson to express your concerns about or support for this technology.

Methods of Science

29. Forming Models A geographic information system (GIS) uses computerized map layers to compare data. Construct a paper model that shows how a GIS would compare the areas that are important to you (such as your house, school, natural areas, and shopping areas) to the areas that are important to a friend and the areas that are important to one of your caregivers.

Math Skills

30. Using Percentages Filtering water through a few layers of sari cloth can reduce the number of cholera bacteria by 99%. If a sample of water contained 2.5 million cholera bacteria, how many bacteria would be left in the water after filtration?

Using Science Graphics

19. The greatest decrease in rubella cases came after the second vaccine, the MMR, was licensed.

Critical Thinking

20. Scientists should focus on preventing cholera epidemics in coastal areas of the world that are close to the equator.

21. If people live longer, human populations will increase. More people means a greater demand for natural resources. Increased resource use could damage Earth's environment. Longer lives might lead to greater overcrowding or changing social structures.

22. Insects could develop resistance to the toxic properties of the corn. Controlling resistant populations would require additional research to develop a different pesticide.

23. Lab tests would be needed to determine whether the food caused any adverse effects in mammals. The crop's soil and runoff from that soil should be examined to check for toxins. Lab tests should also be run to see if the crop was toxic to any beneficial insects.

24. Satellite tagging could be used to track wolf movements. GIS could be used to overlay those movements with maps of vegetation to discover and protect the best wolf habitat. DNA fingerprinting could be used to identify poachers.

25. Iris scans are considered more reliable because they can detect any changes or alterations to a person's iris.

26. GIS technology could help scientists overlay maps of ocean temperatures with maps of cholera concentrations to see if there is a connection.

Alternative Assessment

27. Student brochures should describe how the product works and how it is based on an organism or biological system.

Writing for Science

28. Answers will vary.

Methods of Science

29. The model should show three layers that map the same area. The model could be constructed from three sheets of tracing paper so that connections can be seen between the data layers.

Math Skills

30. 1% = 0.01; 0.01 × 2,500,000 = 25,000 cholera bacteria