

Directed Reading

Section: Themes of Biology

Read each question, and write your answer in the space provided.

1. What is biology?

2. What is a living organism? What are the main characteristics of organisms?

Complete each statement by writing the correct term or phrase in the space provided.

- 3. The smallest unit capable of all life functions is the _____ .
- 4. Organisms make more of their own by _____ .
- 5. The sum of all the chemical reactions carried out in an organism is called _____ .
- 6. The maintenance of a stable internal condition in spite of changes in the external environment is _____ .
- 7. The passing of traits from parent to offspring is _____ .
- 8. The change in the inherited traits of species over long periods of time is called _____ .

Directed Reading

Section: Biology in Your World

Read each question, and write your answer in the space provided.

1. How has scientific research helped people to preserve the environment?

2. Name three desirable traits that are being transferred into genetically engineered food crops. How might these traits help to increase world food supplies?

In the space provided, write the letter of the description that best matches the term or phrase.

- | | |
|-------------------------------|--|
| _____ 3. HIV | a. breakdown of the mechanism that controls cell division |
| _____ 4. gene therapy | b. buildup of thick mucus in many organs |
| _____ 5. West Nile virus | c. introducing "healthy" genes into people with hereditary disorders |
| _____ 6. Human Genome Project | d. emerging disease affecting birds, horses, and humans |
| _____ 7. cancer | e. destroys the immune system |
| _____ 8. cystic fibrosis | f. caused by eating the body parts of infected animals |
| _____ 9. mad cow disease | g. sequencing the entire contents on a human cell's chromosomes |

Skills Worksheet

Directed Reading

Section: Scientific Processes

Read each question, and write your answer in the space provided.

1. What is observation?

2. What observation did John Harte make about tiger salamanders?

Complete each statement by underlining the correct term or phrase in the brackets.

- 3. John Harte questioned why the number of salamanders was [increasing / decreasing].
- 4. A [prediction / hypothesis] is an educated guess that can be tested by experimentation.
- 5. John Harte made a [prediction / hypothesis] when he said “there is enough acid in the snow to harm salamanders.”

Read each question, and write your answer in the space provided.

6. What was John Harte’s hypothesis about what was making the snow acidic?

7. What did John Harte’s data show about the pH of the ponds after the snow melted?

Directed Reading *continued*

Complete each statement by writing the correct term or phrase in the space provided.

8. A planned procedure to test a hypothesis is called a(n) _____ .
9. In an experiment, a group that receives no treatment is called a(n) _____ group.
10. In an experiment, the factor that is varied is called the _____ variable.
11. In an experiment, the factor that is measured is called the _____ variable.

Study the following steps in a scientific investigation. Determine the order in which the steps commonly take place. Write the number of each step in the space provided.

- _____ 12. forming a hypothesis
- _____ 13. asking a question
- _____ 14. collecting observations
- _____ 15. drawing a conclusion
- _____ 16. confirming a prediction (with experiments when needed)

Complete each statement by writing the correct term or phrase in the space provided.

17. A(n) _____ unites and explains a broad range of observations.
18. Scientists routinely make _____ and attempt to confirm them by testing one or more alternative hypotheses.
19. Future _____ may cause a theory to be revised or discarded.
20. The word _____ is used differently by scientists than by the general public.

Vocabulary Review

In the space provided, explain how the terms in each pair differ in meaning.

1. cell, metabolism

2. heredity, mutation

3. natural selection, evolution

4. hypothesis, prediction

5. independent variable, dependent variable

6. theory, observation

7. cystic fibrosis, gene

Vocabulary Review *continued*

In the space provided, write the letter of the description that best matches the term or phrase.

- | | |
|-------------------------------|---|
| _____ 8. biology | a. a group of organisms that are genetically similar and can produce fertile offspring |
| _____ 9. control group | b. state of constant internal conditions |
| _____ 10. homeostasis | c. the study of living things |
| _____ 11. species | d. receives no experimental treatment |
| _____ 12. reproduction | e. organisms make more of their own kind |
| _____ 13. ecology | f. the study of the interactions of living organisms |
| _____ 14. experiment | g. planned procedure to test a hypothesis |
| _____ 15. HIV | h. relative measure of the hydrogen ion concentration within a solution |
| _____ 16. cancer | i. virus that causes AIDS |
| _____ 17. pH | j. a breakdown of the mechanism that controls cell division |

Science Skills

SEQUENCING/RELATING INFORMATION

Scientists at a major university became concerned by recent reports of severe insomnia in a number of people with previously normal sleep patterns. These scientists decided to undertake a scientific investigation to try to determine the cause of this behavior. This scientific investigation had six stages. The paragraphs below, labeled A–F, describe the stages of this investigation, but the sequence of the stages is incorrect.

Sequence the stages properly by listing the letters of the paragraphs below in the correct order in the chart on the next page. Then decide which step in the scientific process each paragraph describes. In the space provided in the chart, write the step next to the number.

- A.** The scientists gathered 35 volunteers who agreed to eat 3 meals a day while living at the university research center for 30 days. These volunteers had no previous history of insomnia. They were aware that the meals would be made up of some foods containing the fat substitute, and they had been informed of the potential risks involved. Within 14 days, 17 of the volunteers were having trouble sleeping at night, and within 21 days, the entire group was showing signs of insomnia.
- B.** The scientists stated that if the chemical in the fat substitute was reacting with chemicals in the brain to cause the insomnia in the subjects being investigated, it should have a similar effect on other people.
- C.** The scientists gathered 80 volunteers who agreed to eat 3 meals a day while living at the university research center for 60 days. These volunteers had no previous history of insomnia. They were aware that the meals would be made up of some foods containing the fat substitute, and they had been informed of the potential risks involved. The scientists divided the volunteers into two groups. Group A consisted of 40 volunteers who were fed meals with foods containing the fat substitute. Group B consisted of 40 volunteers who were fed meals that did not contain the fat substitute. At the end of 60 days, the 40 volunteers in Group A were suffering from insomnia; the 40 volunteers in Group B were sleeping normally. Moreover, within 7 days of discontinuing the diet containing the fat substitute, the sleep patterns of the members of Group A returned to normal.
- D.** Because the fat substitute contained a chemical not typically found in the human diet, the scientists thought that this chemical caused the insomnia by reacting with other chemicals in the brain.
- E.** The scientists agreed that the chemical in the fat substitute was causing insomnia in people who ate foods containing this additive.

Science Skills *continued*

F. The scientists began to track the personal habits of 127 people who had recently reported the onset of insomnia, hoping to find a clue to the cause of this sleep disorder. Information about previous and current sleep patterns, exercise routines, stress at home and work, eating habits, and other criteria was gathered over a 6-month period. The only common element in the lives of all of the subjects was the consumption of foods containing a new fat substitute.

Correct order**Step in the scientific process**

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

Test Prep Pretest *continued*

Complete each statement by writing the correct term or phrase in the space provided.

- 11. A scientist collects data to test a(n) _____ .
- 12. All living things pass on genetic information from parent to offspring through a process known as _____ .
- 13. The change in a species' inherited traits over time is called _____ .
- 14. The _____
has succeeded in sequencing all human chromosomes.
- 15. The basic unit of all organisms that can carry out all life processes is the _____ .

Read each question, and write your answer in the space provided.

- 16. Explain what role DNA plays in an organism.

- 17. Give an example of how a gene mutation can be beneficial.

- 18. Why is reproduction an essential part of living?

- 19. Define the first stage of a scientific investigation-observation.

- 20. Harte's research supported his hypothesis that acid in melting snow killed salamanders. Why is this hypothesis not yet accepted as a theory?

Test Prep Pretest *continued*

21. Describe interdependence in a biological community.

22. What is the role of metabolism in life?

23. Briefly describe how scientific research has contributed to the efforts to increase world food production.

24. Briefly describe recent scientific advances in finding a vaccine for HIV.

25. If the results of an experiment do not support the hypothesis that the experiment was designed to test, was the experiment a waste of time? Explain.
