Section 17.1 A Voyage of Discovery

1. According to the ideas of Charles Darwin, which kinds of modern organisms evolved from a common ancestor?
   a) only members of the same species
   b) only organisms that live in the same place
   c) only specific groups of organisms, such as plants and animals
   d) all organisms

2. In addition to observing living organisms, Darwin studied the preserved remains of ancient organisms called
   a) fossils.
   b) adaptations.
   c) homologies.
   d) vestigial structures.

3. In your own words, define the term evolution.
   Evolution is the process by which modern organisms have descended from ancient organisms.
   Evolution is the process of change over time in organisms.

4. What was explained by Darwin’s theory of biological evolution?
   Darwin’s theory of biological evolution explains the diversity of life, how it is connected, and why it is where it is.

5. Describe two birds that provide evidence that species vary globally.
   Ostriches and rheas are large, flightless birds with long necks and legs, that live in grasslands in Africa and South America.
   Finches on the Galapagos Islands varied so much that Darwin mistook them for wrens, warblers, and blackbirds.

6. What connection did Darwin make between the Galapagos tortoises and their environment?
   Galapagos tortoises had different traits (shell shape is an example) depending on which island they lived.
7. Many scientists had proposed that life could change over time. How was Darwin’s work different?
   
   Darwin provided evidence for his idea that there was a natural process that operates like artificial selection.

Section 17.2 Ideas the Influenced Darwin

8. According to Malthus, what would occur if the human population grew unchecked?
   a) evolution of a new species
   b) extinction of humans
   c) disease, war, or famine
   d) development of new traits in humans

9. Which of the following would an animal breeder use to increase the number of cows that give the most milk?
   a) overproduction
   b) genetic isolation
   c) acquired characteristics
   d) artificial selection

10. Describe an example of selective breeding.
    Answers will vary. Breeding only the fastest racehorses.

11. The curved beak of a flamingo is useful for scooping up water and filtering it for food. According to Lamarck’s ideas, how could the flamingo have acquired its curved beak?
    The flamingo feeds by scooping water into its mouth and filtering out tiny crustaceans. According to Lamarck’s ideas, if the flamingo curved its beak more, it could potentially scoop and hold more water and food.

12. According to Lyell, how did geologic processes of the past compare to geologic processes today?
    Lyell thought that because the laws of nature are constant over time, the processes we see today are the same processes that shaped Earth millions of years ago.
Section 17.3 Darwin’s Theory: Natural Selection

13. The akiapola’au uses its long top bill to probe for insects in trees. This beak is an example of
   a) an adaptation.
   b) fitness.
   c) an acquired characteristic.
   d) a variation.

14. During the process of natural selection, what determines which organisms survive and reproduce?
   a) number of adaptations
   b) variety of adaptations
   c) environmental fitness
   d) population size

15. What is the principle of common descent?
   The principle of common descent states that all species—living and extinct—are united by descent from ancient common ancestors, and exhibit diversity due to natural selection and adaptation.

16. According to the principle of common descent, what explains the diversity among organisms today?
   Natural selection and adaptation

17. Do all adaptations involve body structures? Give an example to support your answer.
   No. Animals can change their food source, or the time of day or year they are active, such as nocturnal or hibernating animals.

Section 17.4 Evidence of Evolution

18. The wing of a bat and the front leg of a dog are examples of
   a) analogous structures.
   b) homologous structures.
   c) vestigial structures.
   d) unrelated structures.
19. The wing of a bat and the wing of a bee are examples of
   a) analogous structures.
   b) homologous structures.
   c) vestigial structures.
   d) unrelated structures.

20. What evidence for evolution is provided by the hip bones of a dolphin?
   Dolphin hip bones are vestigial structures left over from when the ancestors of marine mammals walked on land on four legs, providing evidence that their ancestors had terrestrial locomotion.

21. How do homologous structures develop?
   Homologous structures arise from adaptations to different selective pressures as the result of descent with modification from a common ancestor.

22. What evidence at the molecular level supports the theory of evolution?
   At the molecular level, overwhelming similarities in the genetic code of all organisms, along with homologous genes and molecules, provide evidence of common descent. All living cells use DNA and RNA to carry information from one generation to the next and to direct protein synthesis. This genetic code is nearly identical in almost all organisms. The widespread distribution of homologous Hox genes have been inherited from ancient common ancestors.

23. What evidence for evolution did Peter and Rosemary Grant provide?
   The Grant’s study supported two important hypotheses: that natural selection takes place in wild finch populations frequently, and sometimes rapidly; and that variation is essential for a species to adapt to and survive in variable environmental conditions.