16 Assessment

16.1 Darwin's Voyage of Discovery

Understand Key Concepts

1. Who observed variations in the characteristics of plants and animals on different islands of the Galápagos?
   a. James Hutton **c.** Charles Darwin
   b. Charles Lyell **d.** Thomas Malthus

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

3. What pattern of variation did Darwin observe among rheas, ostriches, and emus?

4. What connection did Darwin make between the Galápagos tortoises and their environments?

Think Critically

5. **© Craft and Structure** Explain what the term *evolution* means, and give an example.

6. **Relate Cause and Effect** Why was Darwin's trip aboard the *Beagle* so important to his development of the theory of natural selection?

7. **Infer** Why was Darwin puzzled by the fact that there were no rabbits in Australia?

16.2 Ideas That Shaped Darwin's Thinking

Understand Key Concepts

8. Which of the following ideas proposed by Lamarck was later found to be incorrect?
   a. Acquired characteristics can be inherited.
   b. All species are descended from other species.
   c. Living things change over time.
   d. There is a relationship between an organism and its environment.

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

10. What accounts for the presence of marine fossils on mountaintops?

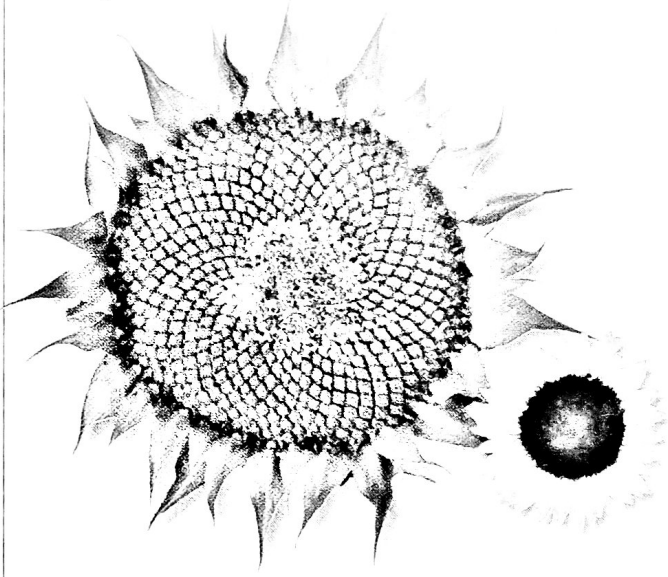
11. **© Text Types and Purposes** How did Lyell's *Principles of Geology* influence Darwin?

12. According to Malthus, what factors limit population growth? Why did Malthus's ideas apply to other organisms better than they did to humans?

13. What is artificial selection? How did this concept influence Darwin's thinking?

Think Critically

14. **Relate Cause and Effect** A sunflower produces many seeds. Will all the seeds grow into mature plants? Explain your answer.



15. **© Text Types and Purposes** Explain why Lamarck made a significant contribution to science even though his explanation of evolution was wrong.

16.3 Darwin Presents His Case

Understand Key Concepts

16. An inherited characteristic that increases an organism's ability to survive and reproduce in its specific environment is called a(n)
   a. vestigial structure. **c.** speciation.
   b. adaptation. **d.** analogous structure.

17. How well an organism survives and reproduces in its environment can be described as its
   a. fitness. **c.** common descent.
   b. homologies. **d.** analogies.

18. **Craft and Structure** How does natural variation affect evolution?

19. **Production and Distribution of Writing** Write a paragraph explaining in your own words the following statement: "Descent with modification explains the diversity of life we see today." Refine your explanation by rewriting with your audience in mind.

20. Describe the conditions necessary for natural selection to occur.

Think Critically

21. **Apply Concepts** How would Darwin explain the long legs of the water bird in **Figure 16–6**? How would Darwin's explanation differ from Lamarck's explanation?

22. **Craft and Structure** Distinguish between fitness and adaptation. How are the two concepts related?

23. **Infer** How does the process of natural selection account for the diversity of organisms that Darwin observed on the Galápagos Islands?

24. **Infer** Many species of birds build nests in which they lay eggs and raise the newly hatched birds. How might nest-building behavior be an adaptation that ensures reproductive fitness?

16.4 Evidence of Evolution

Understand Key Concepts

25. Structures that have different mature forms but develop from the same embryonic tissue are called
    a. analogous.
    b. adaptations.
    c. homologous.
    d. fossils.

26. Intermediate fossil forms are important evidence of evolution because they show
    a. how organisms changed over time.
    b. how animals behaved in their environments.
    c. how the embryos of organisms develop.
    d. molecular homologies.

27. How does the geographic distribution of organisms support the theory of evolution?

28. How do vestigial structures indicate that present-day organisms are different from their ancient ancestors?

29. How do DNA and RNA provide evidence for common descent?

solve the CHAPTER MYSTERY

SUCH VARIED HONEYCREEPERS

The ʻIʻiwi and other Hawaiian honeycreepers resemble Galápagos finches in a number of ways. They are species of small birds found nowhere else on Earth. They live on islands that are separated from one another by stretches of open sea and that are hundreds of miles from the nearest continent. They are also related to finches!

There are more than 20 known species of Hawaiian honeycreeper. Like the species of Galápagos finches, the honeycreeper species are closely related to one another. This is an indication that they are all descended, with modification, from a relatively recent common ancestor. Experts think the ancestor colonized the islands between 3 million and 4 million years ago. Many honeycreepers have specialized diets, evolutionary adaptations to life on the particular islands they call home. Today, habitat loss is endangering most of the honeycreepers. In fact, many species of honeycreeper are thought to have become extinct since humans settled on the islands.

1. **Infer** Suppose a small group of birds, not unlike the modern honeycreepers, landed on one of Hawaii's islands millions of years ago and then reproduced. Do you think all the descendants would have stayed on that one island? Explain your answer.

2. **Infer** Do you think that the climate and other environmental conditions are exactly the same everywhere on the Hawaiian Islands? How might environmental conditions have affected the evolution of honeycreeper species?

3. **Text Types and Purposes** Explain how the different species of honeycreepers in Hawaii today might have evolved from one ancestral species.

4. **Connect to the Big Idea** Why are islands often home to species that exist nowhere else on Earth?