

Chapter 15

Darwin's Theory of Evolution

Section 15–1 The Puzzle of Life's Diversity (pages 369–372)

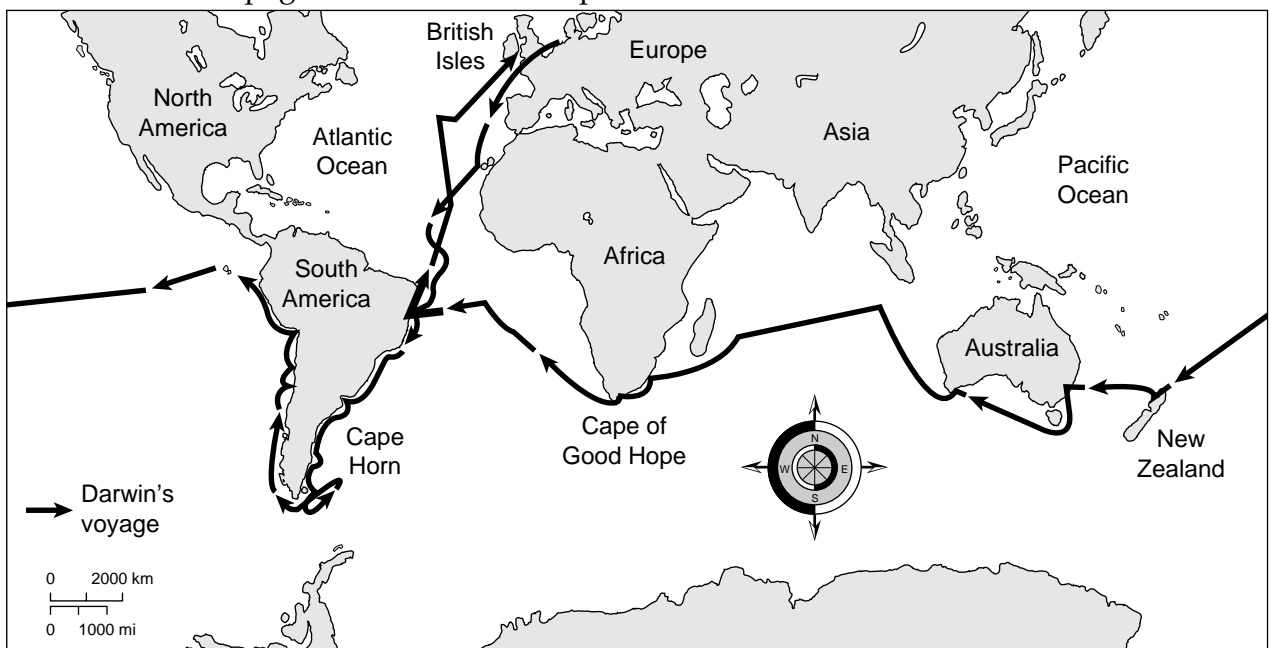
This section outlines Charles Darwin's contribution to science. It also describes the pattern of diversity he observed among organisms of the Galápagos Islands.

Introduction (page 369)

1. The process by which modern organisms have descended from ancient organisms is called _____.
2. A well-supported explanation of phenomena that have occurred in the natural world is a(an) _____.
3. Is the following sentence true or false? Charles Darwin contributed more to our understanding of evolution than anyone else.

Voyage of the *Beagle* (pages 369–370)

4. Circle the letter of each sentence that is true about Charles Darwin.
 - a. He was born in 1809.
 - b. He was an English naturalist.
 - c. He was 42 when he began the voyage on the *Beagle*.
 - d. The voyage lasted 5 years and took him around the world.
5. Label the Galápagos Islands on the map below.



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6. Is the following sentence true or false? Darwin was looking for a scientific explanation for the diversity of life on Earth.

Chapter 15, Darwin's Theory of Evolution (continued)

Darwin's Observations (pages 370–372)

7. Circle the letter of each observation that Darwin made.
- a. An enormous number of species inhabit Earth.
 - b. Many organisms seem to be poorly suited to their environment.
 - c. The same sorts of animals are always found in the same ecosystems in different parts of the world.
 - d. Some species that lived in the past no longer live on Earth.
8. The preserved remains of ancient organisms are called _____.
9. As Darwin studied fossils, what new questions arose? _____

10. Is the following sentence true or false? Of all the *Beagle's* ports of call, the one that influenced Darwin the most was the Galápagos Islands. _____
11. Circle the letter of each choice that is true about the Galápagos Islands.
- a. The islands are far apart.
 - b. The smallest, lowest islands are hot and wet.
 - c. The higher islands have more rainfall.
 - d. All the islands have the same amount of vegetation.
12. How did Darwin explain differences in shell shape of tortoises from Hood Island and Isabela Island? _____

13. Darwin observed that small brown birds on the Galápagos Islands differed in the shape of their _____.

The Journey Home (page 372)

14. What did Darwin think about on his journey home to England? _____

15. After he returned to England, what hypothesis did Darwin develop to explain his findings? _____

Reading Skill Practice

You can focus on the most important points in a section by turning the headings into questions and then trying to find the answers as you read. For each heading in Section 15–1, first write the heading as a how, what, or why question. Then, find and write the answer to your question. Do your work on a separate sheet of paper.

Section 15–2 Ideas That Shaped Darwin’s Thinking (pages 373–377)

This section describes the theories of other scientists who influenced Darwin, including Hutton, Lyell, Lamarck, and Malthus.

An Ancient, Changing Earth (pages 374–375)

1. Two scientists who helped Darwin and others recognize how old Earth is were _____ and _____.
2. Circle the letter of each idea that was proposed by James Hutton.
 - a. Earth is a few thousand years old.
 - b. Layers of rock are moved by forces beneath Earth’s surface.
 - c. Most geological processes operate extremely slowly.
 - d. The processes that changed Earth in the past are different from the processes that operate in the present.
3. Circle the letter of each sentence that is true about Lyell’s work.
 - a. His book, *Principles of Geology*, was published after Darwin returned from his voyage.
 - b. His work explained how awesome geological features could be built up or torn down over long periods of time.
 - c. His publications helped Darwin appreciate the significance of the geological phenomena that he had observed.
 - d. He stressed that scientists must explain past events in terms of processes that they can actually observe.
4. In what two ways did an understanding of geology influence Darwin? _____

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Lamarck’s Theory of Evolution (page 376)

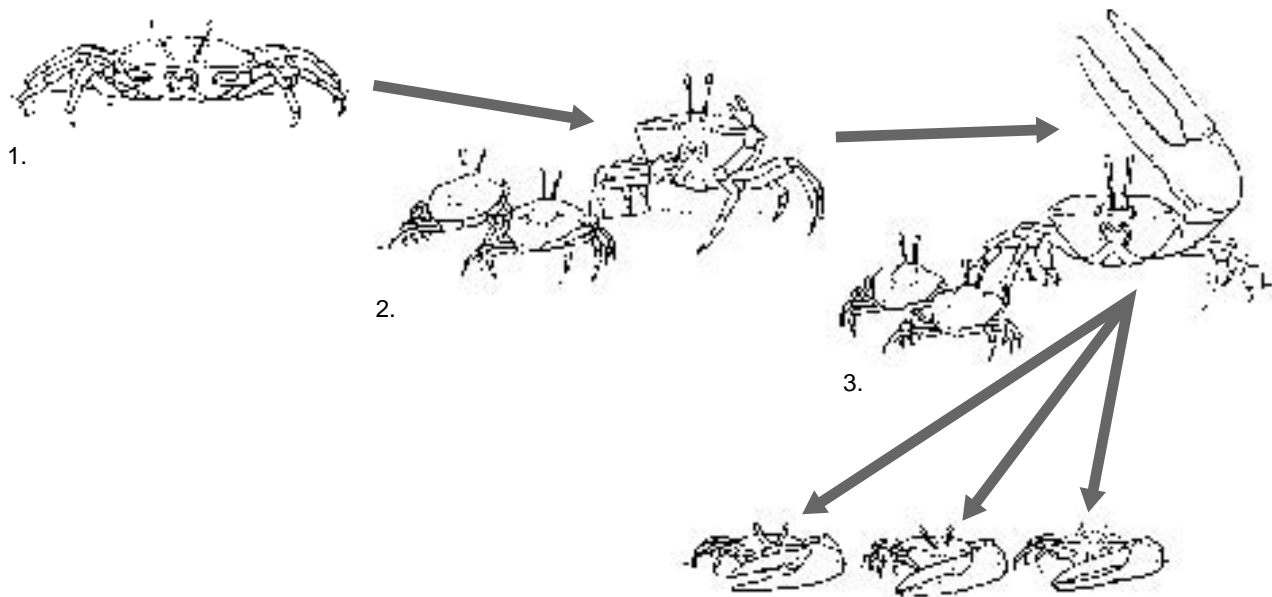
5. Is the following sentence true or false? Lamarck was among the first scientists to recognize that living things have changed over time. _____

Chapter 15, Darwin's Theory of Evolution (continued)

6. Is the following sentence true or false? Lamarck proposed that all organisms have an innate tendency toward complexity and perfection. _____
7. How did Lamarck propose that species change over time? _____

8. How did Lamarck pave the way for the work of later biologists? _____

9. Which step in the diagram below shows the inheritance of acquired traits as proposed by Lamarck? _____



Population Growth (page 377)

10. Circle the letter of each sentence that is true about Thomas Malthus.
 - a. He was an important influence on Darwin.
 - b. He was an English naturalist.
 - c. He believed that war, famine, and disease limit the growth of populations.
 - d. His views were influenced by conditions in twentieth-century England.
11. Is the following sentence true or false? The overwhelming majority of a species' offspring survive. _____

Section 15–3 Darwin Presents His Case (pages 378–386)

This section explains the concepts of artificial selection, natural selection, and fitness. It also describes evidence for evolution.

Publication of *On the Origin of Species* (pages 378–379)

1. Is the following sentence true or false? When Darwin returned to England, he rushed to publish his thoughts about evolution.

2. The naturalist whose essay gave Darwin an incentive to publish his own work was _____.
3. Circle the letter of each sentence that is true about Darwin’s book, *On the Origin of Species*.
 - a. It was published in 1869.
 - b. It was ignored when it was first published.
 - c. It contained evidence for evolution.
 - d. It described natural selection.

Natural Variation and Artificial Selection (page 379)

4. Differences among individuals of a species are referred to as _____.
5. Is the following sentence true or false? Natural variation is found only in wild organisms in nature. _____
6. Circle the letter of each sentence that is true about artificial selection.
 - a. It is also called selective breeding.
 - b. It occurs when humans select natural variations they find useful.
 - c. It produces organisms that look very different from their ancestors.
 - d. It is no longer used today.

Evolution by Natural Selection (pages 380–382)

7. What was Darwin’s greatest contribution? _____

8. What does the phrase *struggle for existence* mean? _____

Match each term with its definition.

Term	Definition
_____ 9. fitness	a. Any inherited characteristic that increases an organism’s chance of survival
_____ 10. adaptation	b. Survival of the fittest
_____ 11. natural selection	c. The ability of an individual to survive and reproduce in its specific environment

Chapter 15, Darwin's Theory of Evolution (continued)

- 12. Is the following sentence true or false? Adaptations can be physical characteristics but not more complex features such as behavior. _____
- 13. Explain what Darwin meant by the phrase *survival of the fittest*. _____

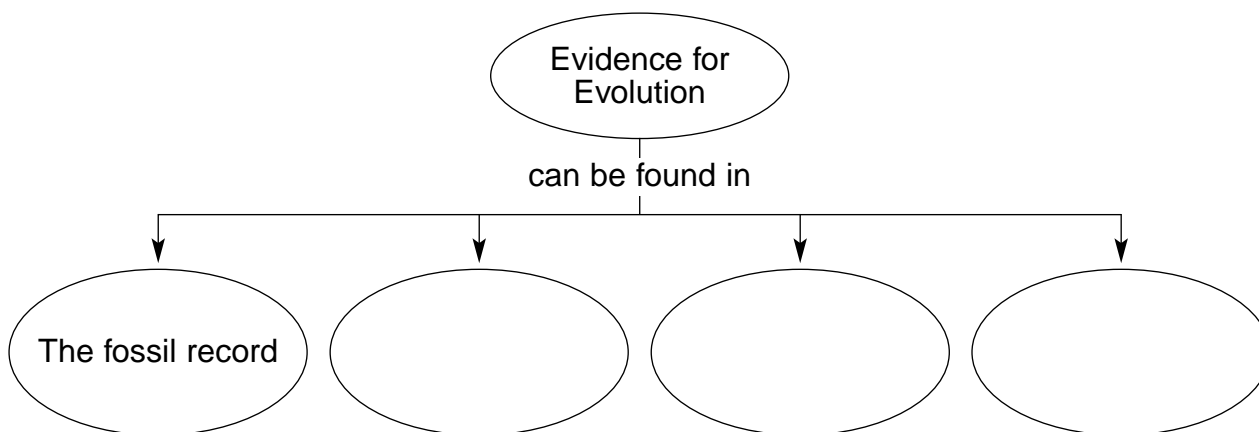
- 14. Circle the letter of each sentence that is true about natural selection.
 - a. It selects traits that increase fitness.
 - b. It takes place without human control.
 - c. It can be observed directly in nature.
 - d. It leads to an increase in a species' fitness.
- 15. The principle that living species descend, with changes, from other species over time is referred to as _____.
- 16. Is the following sentence true or false? Descent with modification implies that all living organisms are related to one another.

- 17. The principle that all species were derived from common ancestors is known as _____.

Evidence of Evolution (pages 382–385)

- 18. Is the following sentence true or false? Darwin argued that living things have been evolving on Earth for thousands of years.

- 19. Complete the concept map.



- 20. How do fossils that formed in different rock layers provide evidence of evolution? _____

21. Circle the letter of the way Darwin explained the distribution of finch species on the Galápagos Islands.
- a. They had descended with modification from a common mainland ancestor.
 - b. They had descended with modification from several different mainland ancestors.
 - c. They had remained unchanged since arriving on the Galápagos from the mainland.
 - d. They had become more similar to one another after arriving on the Galápagos.
22. How did Darwin explain the existence of similar but unrelated species? _____

23. Structures that have different mature forms but develop from the same embryonic tissues are called _____.
24. Is the following sentence true or false? Homologous structures provide strong evidence that all four-limbed animals with backbones have descended, with modifications, from common ancestors. _____
25. Organs that are so reduced in size that they are just vestiges, or traces, of homologous organs in other species are called _____.

Summary of Darwin's Theory (page 386)

26. Is the following sentence true or false? Darwin's theory was profoundly different from anything known in nineteenth century England. _____
27. What is the status of Darwin's theory today? _____

28. Circle the letter of each idea that is part of Darwin's theory of evolution.
- a. There is variation in nature.
 - b. Fewer organisms are produced than can survive.
 - c. There is a struggle for existence.
 - d. Species change over time.
29. According to Darwin's theory, what happens to individuals whose characteristics are not well suited to their environment? _____

30. Darwin believed that all organisms on Earth are united into a single tree of life by _____.

Chapter 15, Darwin's Theory of Evolution *(continued)*

WordWise

Test your knowledge of vocabulary terms from Chapter 15 by completing this crossword puzzle.

Clues across:

1. The type of selection that humans control
3. The ability to survive and reproduce in a specific environment
5. Change over time
9. The kind of structures that have different mature forms but develop from the same embryonic tissues
10. Any inherited characteristic that increases an organism's chance of survival

Clues down:

2. The preserved remains of ancient organisms
4. A well-supported explanation of phenomena that have occurred in the natural world
6. The type of selection that increases an organism's fitness in its environment
7. The kind of organs that are so reduced in size they are just traces of homologous organs in other species
8. The type of descent that explains why all species are linked in a single tree of life