

1

The Origin of Species

—Charles Darwin

Synopsis

The Origin of Species is Charles Darwin's explanation of his theory that life on Earth is the result of an evolutionary process of natural selection. It is considered to be one of the world's great books, and it revolutionized scientific thought. Darwin was an amateur naturalist who wrote in simple, straightforward English. This major work, considered to be his most important, can be easily understood by anyone capable of following a logical argument.

In the 1830s, Darwin served as a ship's naturalist on the surveying sloop H.M.S. *Beagle*. He collected specimens and recorded observations of the various fauna and flora that he encountered on his voyage around the world. Although Darwin wrote a brief sketch of his data analysis and conclusions in 1844, he did not publish a complete account of his findings until 1859. He did so under pressure from friends who were concerned that another naturalist had drawn similar conclusions.

Chapter by chapter, Darwin sets forth his argument in a logical progression. He discusses species variation as it occurs both in nature and domestication; the struggle of species to survive and natural selection as the dominant feature of that struggle; problems with and objections to his theory; sterility in hybrids; geological evidence; geographical dispersal of related species; and the relationship of all animals at the embryonic level. He concludes by again addressing objections to his theory and by speculating about the effect his book will have in relation to other sciences.

Student Focus

You should appreciate the author's use of the literary elements of narration, description, and exposition in this highly readable book. Pay close attention to the types of evidence amassed and the use of logic to draw viable conclusions from that evidence. Evolution cannot be directly observed and can only be deduced from indirect evidence. What were the social implications of Darwin's theory?

Correlation to Subject Matter

Evolution, Genetics, Mutations, Reproduction, Ecology, Botany, and Embryology

Analyzing the Book

Identifying Facts

1. What is the principle of natural selection?

2. Name three arguments that are necessary to support the principle of natural selection.

3. What "serious objection" to the theory of natural selection was offered by professors Bronn and Broca?

4. What does Darwin believe is the cause of the wingless condition of many Madeira beetles? Explain.

The Origin of Species

Date _____ Class _____

5. Darwin refers to *The Origin of Species* as an “abstract,” rather than as a full account of his work. Why did he publish this book before his work was complete?

6. Explain the objection to the theory of natural selection raised by the geological record of Darwin’s time.

The Origin of Species

7. Did Darwin believe that each species was created in multiple locations or just in one area? How does his experience with the beaks and feet of birds support his opinion?

8. Both Lamarck and Darwin believed that organisms have a tendency to adapt and improve, yet throughout the world the lowest forms of life still exist. How does Lamarck explain this apparent contradiction? What is Darwin's explanation?

The Origin of Species

Date _____

Class _____

9. The Malthusian theory of population growth holds that if growth went unchecked, the population would double every 25 years in geometric progression, leading to a disastrous struggle for existence. How was this doctrine of Malthus applied by Darwin?

10. Darwin could not directly prove that a complex organ like the human eye was formed by natural selection. What was his indirect proof?

11. How do natural selection and instinct account for the honeycombed structure of beehives?

The Origin of Species

- 12.** What are rudimentary organs? According to Darwin, how do organs become rudimentary? What problem does a minuscule rudimentary organ pose for natural selection?

- 13.** How does the example of a swim bladder support natural selection?

- 14.** What role does Darwin assign to the Creator in the origin of the species?

- 15.** Why do you think Darwin felt compelled to complete his work when he learned that Wallace had drawn similar conclusions regarding the origin of species?

**Interpreting
Meanings**

The Origin of Species

Date _____ Class _____

16. Why does the existence of rudimentary organs present a problem to adherents of "the old doctrine of creationism"?

17. Why did Darwin devote so much space to addressing criticisms of his theory?

18. Can evolution be proven through direct observation? If not, how did Darwin prove his theory?

19. Why do you think Darwin failed to directly address the origin of human beings in *The Origin of Species*?

The Origin of Species

20. What is the significance of analogous variations, as evidenced by the Swedish turnip and rutabaga plants?

21. Would the struggle for life be most severe between two species of hawks or between hawks and sparrows?

22. Why would natural selection not result in the modification of species solely for the benefit of another species?

Applying Meanings

23. Explain how the domestication of animals and plants was applied to the theory of natural selection.

Writing About the Book

On a separate sheet of paper, write the answer to each of the following.

Extending the Book

1. Charles Darwin did not discuss how his theory of natural selection applied to humankind. Write a supplement to *The Origin of Species* that sets forth the reasons why the theory is applicable to human origins.

Thinking About Assumptions

2. Darwin knew that gaps in the geological record did not support his theory. He assumed that subsequent research would reveal that the gradual, intermediate stages of change that he proposed had occurred. Modern paleontology, however, shows that forms are often abruptly, not gradually, replaced. Does this prove or disprove Darwin's theory? Why or why not?

Responding to a Review

3. In his preface to *The Darwin Reader* (W.W. Norton & Co., Inc. New York, 1987), Mark Ridley states that "Darwin remains one of . . . the most profoundly original and important of thinkers. And I know, from experience, how he can delight the modern reader coming to him for the first time." Write an essay in which you react to this last statement. Did you enjoy reading the book? Did you find it difficult to understand? Explain.

Evaluating Characters

4. Although Mr. St. George Mivart is seen only through the author's eyes, compare and contrast the character and backgrounds of Mivart and Darwin. Whose arguments do you find the most convincing? Why?

Writing a Journal Entry

5. Imagine that you are aboard the H.M.S. *Beagle* serving as an assistant to Charles Darwin. One of your duties is to keep your own record of the various fauna and flora encountered on your voyage. Write a journal entry describing plants or animals you observed, and explain your observations in relation to the origin of species.

Analyzing Scientific Observations

6. Darwin chose the domestic pigeon to study as a special group. What species would you have chosen? Why? Based on the subchapter on domestic pigeons, write an analysis of Darwin's findings. Do you think Darwin's conclusions were correct? Why or why not?

Testing on the Book

On a separate sheet of paper, write the answer to each of the following.

Critical Thinking and Writing

1. The Doctrine of Malthus is cited by Darwin to support his observations regarding the struggle of life. Malthus actually believed that social reforms would increase suffering by increasing the general population and that war, starvation, and disease should be allowed to take their normal course. As a Malthusian, explain why natural selection supports your views.
2. In 1867, Fleeming Jenkin maintained that a favorable variation would disappear as the changed individual interbred with unchanged members of the same species, because the genetic factors would be distributed in ever-decreasing amounts. How would this affect natural selection if true? Are genetic factors divisible or indivisible? How does your answer affect natural selection?
3. Creationism has enjoyed a resurgence in recent years. Write an essay entitled "We Are Not Monkeys," in which you discuss the major objections cited by Darwin in order to support your creationist point of view. What would be Darwin's reply?
4. What are the leading facts about embryos noted by Darwin in the field of embryology? How are these facts explained by natural selection?
5. In Chapter IV, Darwin presents a diagram that demonstrates the action of natural selection on descendants of a common ancestor. What does the diagram resemble? Use this image to explain Darwin's view of evolution.

