Chapter 15

The Theory of Evolution

Reinforcement and Study Guide

Section 15.1 Natural Selection and the Evidence for Evolution

In your textbook, read about Charles Darwin and natural selection.

For each statement, write true or false.

_____ **1.** H.M.S. *Beagle*, upon which Charles Darwin served as naturalist, set sail on a collecting and mapping expedition in 1831.

_____ **2.** The environments that Darwin studied exhibited little biological diversity.

_____ **3.** By careful anatomical study, Darwin found that the many species of plants and animals on the Galápagos Islands were unique and bore no relation to species seen in other parts of the world.

_____ **4.** The tortoises of the Galápagos Islands are among the largest on Earth.

_____ **5.** After returning to England, Darwin studied his collections for 10 years.

_____ **6.** Darwin named the process by which evolution proceeds *artificial selection*.

You are a naturalist who traveled to the Galápagos Islands. Below are excerpts from field notes. Next to each set of notes, write a heading. Use these choices: Overproduction of Offspring, Natural Selection, Struggle for Existence, Variation.

7.

Field Notes

Female finches found on the Galápagos Islands lay enormous numbers of eggs.

_____

8.

Field Notes

These finches compete for a particular species of insect that inhabits the small holes found in tree bark.

_____

9.

Field Notes

Some finches' beaks are long, some are short.The finches with long beaks are better adapted to remove the insects from the bark.

_____

10.

Field Notes

The finches with the long beaks survive and produce greater numbers of offspring with long beaks.

_____

Chapter 15 **The Theory of Evolution,** *continued*

Reinforcement and Study Guide

Section 15.1 Natural Selection and the Evidence for Evolution

In your textbook, read about natural selection and adaptations.

Identify the type of structural adaptation that the statement describes. If the statement applies to both, write both. Use these choices: mimicry, camouflage, both.

_____ **11.** Enable(s) an organism to blend in with its surroundings

_____ **12.** Provide(s) protection for an organism by copying the appearance of another species

_____ **13.** The coloration of a flounder that allows the fish to avoid predators

_____ **14.** Involve(s) changes to the external appearance of an organism

_____ **15.** A flower that looks like a female bee

In your textbook, read about evidence for evolution.

Complete the chart by checking the kind of evidence described.

Evidence	Type of Evidence				
	Homologous Structure	Analogous Structure	Vestigial Structure	Embryological Development	Genetic Comparisons
16. A modified structure seen among different groups of descendants					
17. In the earliest stages of development, a tail and pharyngeal pouches can be seen in fish, birds, rabbits, and mammals.					
18. Exemplified by forelimbs of bats, penguins, lizards, and monkeys					
19. Eyes in a blind fish					
20. DNA and RNA comparisons may lead to evolutionary trees.					
21. Bird and butterfly wings have same function but different structures					
22. A body structure reduced in original function but may have been used in an ancestor					

Chapter 15 **The Theory of Evolution,** ***continued***

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Section 15.2 Mechanisms of Evolution

In your textbook, read about population genetics and evolution.

Determine if the statement is true. If it is not, rewrite the italicized part to make it true.

1. *Adaptations* of species are determined by the genes contained in the DNA code. _____
2. When Charles *Mendel* developed the theory of natural selection in the 1800s, he did not include a genetic explanation. _____
3. Natural selection can act upon an individual's *genotype*, the external expression of genes. _____
4. Natural selection operates on *an individual* over many generations. _____
5. The entire collection of genes among a population is its *gene frequency*. _____
6. If you know the *phenotypes* of all the organisms in a population, you can calculate the allelic frequency of the population. _____
7. A population in which frequency of alleles *changes* from generation to generation is said to be in genetic equilibrium. _____
8. A population that is in *genetic equilibrium* is not evolving. _____
9. Any factor that affects *phenotype* can change allelic frequencies, thereby disrupting the genetic equilibrium of populations. _____
10. Many *migrations* are caused by factors in the environment, such as radiation or chemicals, but others happen by chance. _____
11. Mutations are *important* in evolution because they result in genetic changes in the gene pool. _____
12. Genetic *equilibrium* is the alteration of allelic frequencies by chance processes. _____
13. Genetic drift is more likely to occur in *large* populations. _____
14. The factor that can significantly change the genetic equilibrium of a population's gene pool is *mutation*. _____
15. The type of natural selection by which one of the extreme forms of a trait is favored is called *disruptive selection*. _____

In your textbook, read about the evolution of species.

Complete each statement.

16. _____ can occur only when either interbreeding or the production of fertile offspring is prevented among members of a population.

17. _____ occurs when formerly interbreeding organisms are prevented from producing fertile offspring.

18. Polyploid speciation is perhaps the fastest form of speciation because it results in immediate _____ .

19. The hypothesis that species originate through a slow buildup of new adaptations is known as _____ .

20. This hypothesis is supported by evidence from the _____ record.

21. The hypothesis of _____ states that speciation may occur rapidly.

In your textbook, read about patterns of evolution.

Answer the following questions.

22. What happened to the ancestor of the honey creeper when it left the mainland and encountered the diverse niches of Hawaii?

_____

_____

23. What is adaptive radiation?

_____

_____

24. Adaptive radiation is one example of divergent evolution. When does divergent evolution occur?

_____

_____

_____

25. When will convergent evolution occur?

_____

_____