

Chapter 22 Guided Reading: Descent with Modification: A Darwinian View of Life
10ed

1. Define *evolution* broadly and then give a narrower definition, as discussed in the overview.
2. Evolution can be viewed as a pattern and as a process. The pattern is a fact; how is the pattern revealed?
3. What is the process of evolution?
4. How did each of the following sources view the origin species?

Aristotle and Scala Naturae

The Old Testament

Carolus Linnaeus

5. Explain the role of *fossils* in *rock strata* as a window to life in earlier times.
6. How would Georges Cuvier have explained the appearance of the record of life shown in the rock strata?
7. James Hutton and Charles Lyell were geologists whose ideas strongly influenced Darwin's thinking. What were the ideas each of them contributed?

James Hutton

Charles Lyell

8. What is the importance of the principle of *uniformitarianism*?
9. *Jean-Baptiste de Lamarck* proposed a mechanism for how life changes over time. Explain the two principles of his mechanism.

Use and disease

Inheritance of acquired characteristics

10. Although Lamarck's mechanism of evolution does not explain the changes in species over time, his thinking has been influential. What is considered to be the importance of his ideas?
11. Charles Darwin proposed that the mechanism of evolution is *natural selection* and that it explains how *adaptations* arise. What are *adaptations*? Give two examples of them.
12. Explain the process of *natural selection*.

13. Let's try to summarize Darwin's observations that drive changes in species over time:

Observation	Cite and Example
1. Variations in traits exist.	
2. These variations (traits) are heritable.	
3. Species overproduce.	
4. There is competition for resources; not all offspring survive.	

14. From these four observations, what two inferences did Darwin make?

Inference #1

Inference #2

15. How does *differential reproductive success* affect the match between organisms and their environment?

16.

17. _____ do not evolve. _____ evolve.

18. Use Inquiry Figure 22.13 in your text to **explain** how research with soapberry bugs demonstrate observable evolutionary change. **Describe** what each group shows, and the method used to determine mean beak length prior to introduction of a new food source. **What** evidence was given to indicate that natural selection can occur very rapidly?

19. What is MRSA?

20. How did MRSA become so dangerous? **Explain** the evolution of MRSA's resistance to methicillin.

21. Do antibiotics *cause* bacteria to become resistant? Explain your response.

22. The primary headings of this concept list four areas of important evidence for evolution. List these, and then give an example that supports each type of evidence.

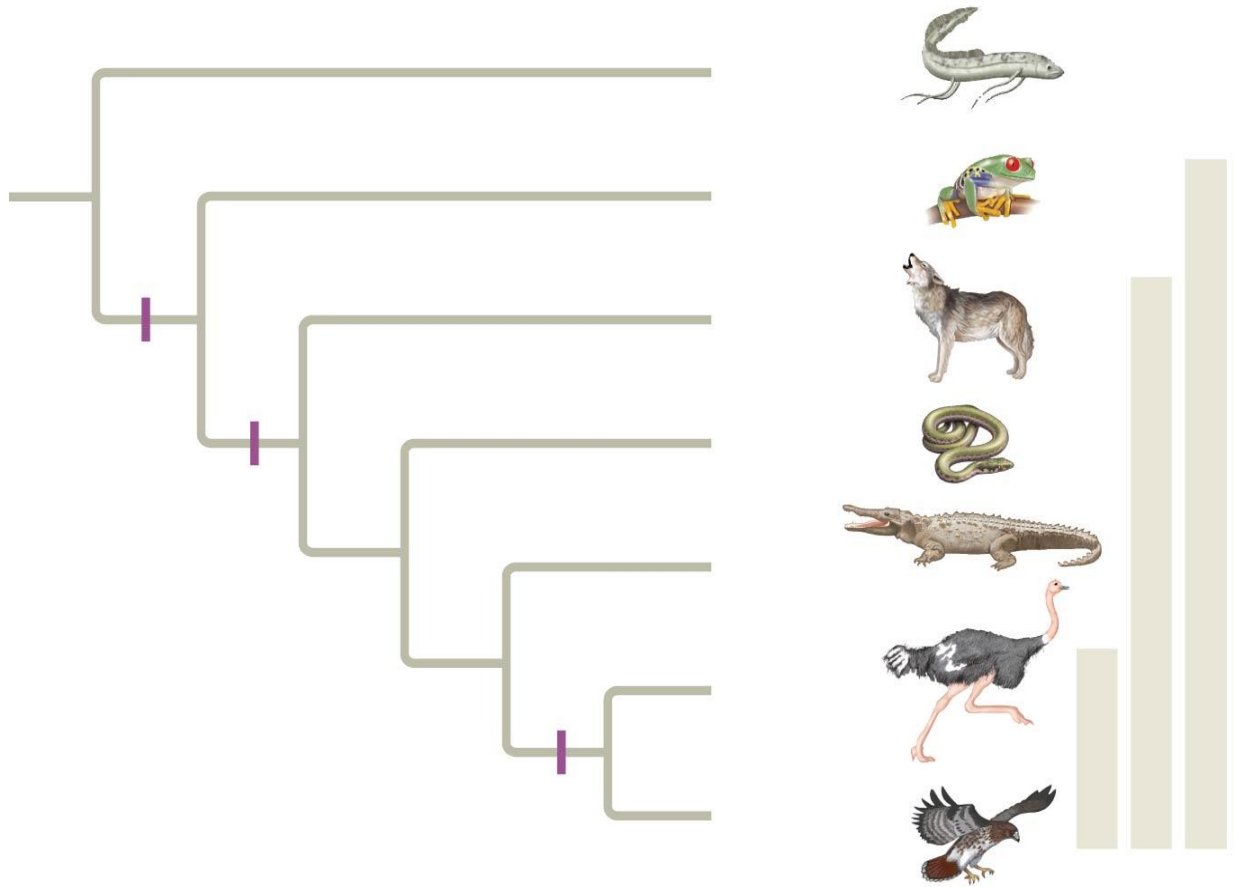
Evidence for Evolution	Example

23. How does the fossil record give evidence for evolution?

24. What is meant by each of the following terms? Give an explanation and example of each.

Term	Explanation/Example
Homologous structures	
Vestigial structures	
Analogous structures (see p.475)	

25. Figure 22.17 in your text shows an evolutionary tree. **Label** the branches and the grouping descriptions. **What** is indicated by each branch point in the following figure? **Mark** each branch point. **What** is indicated by the hatch marks?



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26. What number represents the common ancestor of mammals and birds?
 _____ Why are mammals more closely related to birds than to amphibians?

27. Use the tree in questions 24 to answer this question: Are crocodiles more closely related to lizards or to birds? **Explain** your response.

28. To develop an evolutionary tree, what are two distinct types of evidence that are used?

29. Organisms that are only distantly related can resemble each other. Explain *convergent evolution*, and describe how *analogous structures* can arise.

30. Define convergent AND give an example.

31. What is *biogeography*? How is the concept of biogeography supported by *continental drift* and the presence of *endemic species*?