

Name: _____

AP Biology


Chapter 23 Active Reading Guide **Broad Patterns of Evolution**

Overview

1. In the last chapter, you were asked about macroevolution. To begin this chapter, give some examples of macroevolution. Include at least one novel example not in your text.

Section 1

2. In what type of rock are fossils found? _____
3. What do we not know from analyzing rock strata?
4. Rocks and fossils are dated in several ways. Relative dating uses the order of rock strata to determine the relative age of fossils. Radiometric dating uses the decay of radioactive isotopes to determine the age of the rocks or fossils. It is based on the rate of decay, or half-life of the isotope. To determine the absolute age of a fossil, radiometric dating is used. Use Figure 23.3 to explain the concept of radiometric dating.
5. What is the age range for which carbon-14 dating may be used?
6. To date fossils outside the range of carbon-14 dating, researchers use indirect methods of establishing absolute fossil age. Explain how this could be done using radioisotopes with longer half-lives.
7. What are three groups of tetrapods?

8. Cite three ways of distinguishing mammal fossils from the other two groups of tetrapods.

Section 2

9. If you have not studied geology, you will find this concept introduces a fascinating look at the changes in our planet as explained by continental drift. Define continental drift. How can continents move?

10. Using Figure 23.8, where was India 65 million years ago?

11. See if you can answer each of these short questions (google):
 - a. What is the San Andreas Fault?

 - b. What caused the uplift of the Himalayas?

 - c. How can a fossil freshwater reptile be found in both Brazil and West Africa, areas separated today by a wide expanse of ocean?

 - d. Why are no eutherians (placental) mammals indigenous to Australia?

12. A mass extinction is the loss of large numbers of species in a short period, caused by global environmental changes. What caused the Permian mass extinction 250 million years ago (mya)? Summarize the species that were lost.

13. A second important mass extinction is the Cretaceous mass extinction that happened about 65 mya. Everyone's favorite group, the dinosaurs, was lost, along with more than half of all marine species. What caused it?

14. What are adaptive radiations?

15. Why did a large-scale adaptive radiation occur after each mass extinction?

Section 3

16. What two areas of biology are merged in the field of study commonly called evo-devo?

17. What is an evolutionary change in the rate or timing of developmental events?

18. Homeotic genes are master regulatory genes that determine the location and organization of body parts. Mutations in a homeotic gene can have a profound effect on morphology. Homeotic gene mutations can contribute to the potential for evolutionary change. The Hox genes are one class of homeotic genes. What do they control?

Section 4

19. When a structure that has evolved in one context becomes co-opted for another purpose, this event is called _____. Does exaptation imply that organisms are anticipating future needs? _____ Explain.