

Unit 7 Study Guide (Chapters 18 & 19)

The chapter 18 study guide is on page 531 of your book. The chapter 19 study guide is on page 565. Anything from chapters 18 and 19 is fair game for your test. I recommend completing the benchmark review questions at the end of the chapters.

Here are some short answer questions for you to think about:

1. Compare the gradualist and the punctuated equilibrium models of species evolution. What would the fossil record of speciation look like if it supported the gradualist model? What would it look like if punctuated equilibrium was the case? Why?
2. Australia is famous for its many marsupials – mammals that are born at an early stage in development and then mature in the mother’s pouch. Koalas, kangaroos, wombats, and opossums are all marsupials. Marsupials are considered offshoots of an earlier type of mammal than the more familiar placental mammals, whose young remain longer in the uterus, connected to the mother by the placenta. Marsupials are found elsewhere, but in most places most marsupials have been displaced by the more ‘efficient’ placentals. Why have the marsupials managed to hang on in Australia?
3. Why do extensive adaptive radiations often follow mass extinctions?
4. Molecular comparisons indicate that the vultures of Africa and America are more closely related to separate ancestors than they are to each other. If the two groups of vultures are not closely related, why do you think they look so much alike?
5. Homologous structures – similar structures derived from the same structure in a common ancestor – tell us about phylogenetic relationships among organisms. But convergent evolution can make unrelated organisms look alike; their similarities may be analogous, not homologous. Fortunately, we can dig beneath surface similarities and compare biological molecules to measure relatedness between species. Imagine that you have sequenced mitochondrial DNA for six species of rodents, A – F. All the rodents are thought to have evolved from a common ancestor, X. The number of differences in mitochondrial DNA sequence are compiled in the table below. Use the differences in sequence to place species A- F on the phylogenetic tree. (Hint: Don’t get too mathematical; just “eyeball” overall numbers.)

A						
B	10					
C	4	11				
D	9	5	10			
E	14	16	15	15		
F	10	2	10	6	16	
	A	B	C	D	E	F

6. The convergence in external traits of sharks, penguins, and porpoises is attributed to
 - a. reduced genetic variability in these groups.
 - b. selection pressures that are common to these groups.
 - c. reproductive isolation of these groups.
 - d. identical genes in all three groups.

7. All of the following could be indicators of phylogenetic relatedness EXCEPT
- a. a. base sequences in DNA.
 - b. b. similar ecological requirements.
 - c. c. amino acid sequences in a protein.
 - d. d. similar embryonic development.
8. In an undisturbed rock column, the fossils in the lowest layer are the
- a. a. youngest
 - b. b. oldest
 - c. c. best preserved
 - d. d. least preserved
9. Most fossils are found in
- a. a. sand
 - b. b. ice
 - c. c. sedimentary rock
 - d. d. amber
10. Upon close examination of the skeleton of an adult python, leg bones can be observed. These are an example of
- a. a. artificial selection
 - b. b. vestigial structures
 - c. c. homologous structures
 - d. d. comparative embryology
11. The half life of carbon -14 is 5770 years. A fossil that has one-eighth the normal proportion of carbon-14 to nitrogen-12 (the decay product) found in living organisms is probably
- a. a. 1442 years old
 - b. b. 2885 years old
 - c. c. 11540 years old
 - d. d. 17310 years old