



Chapter 29 Exercises

Review Questions

- Which of the following is *not* contained in phylum Chordata?
 - Cephalochordata
 - Echinodermata
 - Urochordata
 - Vertebrata
- Which group of invertebrates is most closely related to vertebrates?
 - cephalochordates
 - echinoderms
 - arthropods
 - urochordates
- Hagfish, lampreys, sharks, and tuna are all chordates that can also be classified into which group?
 - craniates
 - vertebrates
 - cartilaginous fish
 - cephalochordates
- Members of Chondrichthyes differ from members of Osteichthyes by having (a) _____.
 - jaw
 - bony skeleton
 - cartilaginous skeleton
 - two sets of paired fins
- Members of Chondrichthyes are thought to be descended from fishes that had _____.
 - a cartilaginous skeleton
 - a bony skeleton
 - mucus glands
 - slime glands
- A marine biologist catches a species of fish they have never seen before. Upon examination, they determine that the species has a predominantly cartilaginous skeleton and a swim bladder. If its pectoral fins are not fused with its head, to which category of fish does the specimen belong?
 - rays
 - Osteichthyes
 - sharks
 - hagfish
- Which of the following is *not* true of Acanthostega?
 - It was aquatic.
 - It had gills.
 - It had four limbs.
 - It laid shelled eggs.
- Frogs belong to which order?
 - Anura
 - Urodela
 - Caudata
 - Apoda
- During the Mesozoic Period, diapsids diverged into _____.
 - pterosaurs and dinosaurs
 - mammals and reptiles
 - lepidosaurs and archosaurs
 - Testudines and Sphenodontia
- Squamata includes _____.
 - crocodiles and alligators
 - turtles
 - tuataras
 - lizards and snakes
- Which of the following reptile groups gave rise to modern birds?
 - Lepidosaurs
 - Pterosaurs
 - Anapsids
 - Archosaurs
- A bird or feathered dinosaur is _____.
 - Neornithes
 - Archaeopteryx*
 - Enantiornithes
 - Paleognathae

13. Which of the following feather types helps to reduce drag produced by wind resistance during flight?
- a. flight feathers
 - b. primary feathers
 - c. secondary feathers
 - d. contour feathers
14. Eccrine glands produce _____.
- a. sweat
 - b. lipids
 - c. scents
 - d. milk
15. Monotremes include which of the following?
- a. kangaroos
 - b. koalas
 - c. bandicoots
 - d. platypuses
16. The evolution of which of the following features of mammals is hardest to trace through the fossil record?
- a. jaw structure
 - b. mammary glands
 - c. middle ear structure
 - d. development of hair
17. Which of the following is *not* an anthropoid?
- a. lemurs
 - b. monkeys
 - c. apes
 - d. humans
18. Which of the following is part of a clade believed to have died out, leaving no descendants?
- a. *Paranthropus robustus*
 - b. *Australopithecus africanus*
 - c. *Homo erectus*
 - d. *Homo sapiens sapiens*
19. Which of the following human traits is *not* a shared characteristic of primates?
- a. hip structure supporting bipedalism
 - b. detection and processing of three-color vision
 - c. nails at the end of each digit
 - d. enlarged brain area associated with vision and reduced area associated with smell

Critical Thinking Questions

20. What are the characteristic features of the chordates?
21. What is the structural advantage of the notochord in the human embryo? Be sure to compare the notochord with the corresponding structure in adults.
22. What can be inferred about the evolution of the cranium and vertebral column from examining hagfishes and lampreys?
23. Why did gnathostomes replace most agnathans?
24. Explain why frogs are restricted to a moist environment.
25. Describe the differences between the larval and adult stages of frogs.
26. Describe how metamorphosis changes the structures involved in gas exchange over the life cycle of animals in the clade Anura and what evolutionary advantage this change provides.
27. Describe the functions of the four extraembryonic membranes present in amniotic eggs.
28. What characteristics differentiate lizards and snakes?
29. Based on how reptiles thermoregulate, which climates would you predict to have the highest reptile population density and why?
30. Explain why birds are thought to have evolved from theropod dinosaurs.
31. Describe three skeletal adaptations that allow for flight in birds.
32. How would the chest structure differ between ostriches, penguins, and terns?
33. Describe three unique features of the mammalian skeletal system.

34. Describe three characteristics of the mammalian brain that differ from other vertebrates.
35. How did the evolution of jaw musculature allow mammals to spread?
36. How did archaic *Homo sapiens* differ from anatomically modern humans?
37. Why is it so difficult to determine the sequence of hominin ancestors that have led to modern *Homo sapiens*?