

**SECTION 33-1 REVIEW**

**CHORDATE EVOLUTION**

**VOCABULARY REVIEW Define the following terms and explain its importance.**

- 1. nonvertebrate chordate \_\_\_\_\_  
\_\_\_\_\_
- 2. notochord \_\_\_\_\_  
\_\_\_\_\_
- 3. adaptive radiation \_\_\_\_\_  
\_\_\_\_\_
- 4. convergent evolution \_\_\_\_\_  
\_\_\_\_\_
- 5. *Pikaia* \_\_\_\_\_  
\_\_\_\_\_

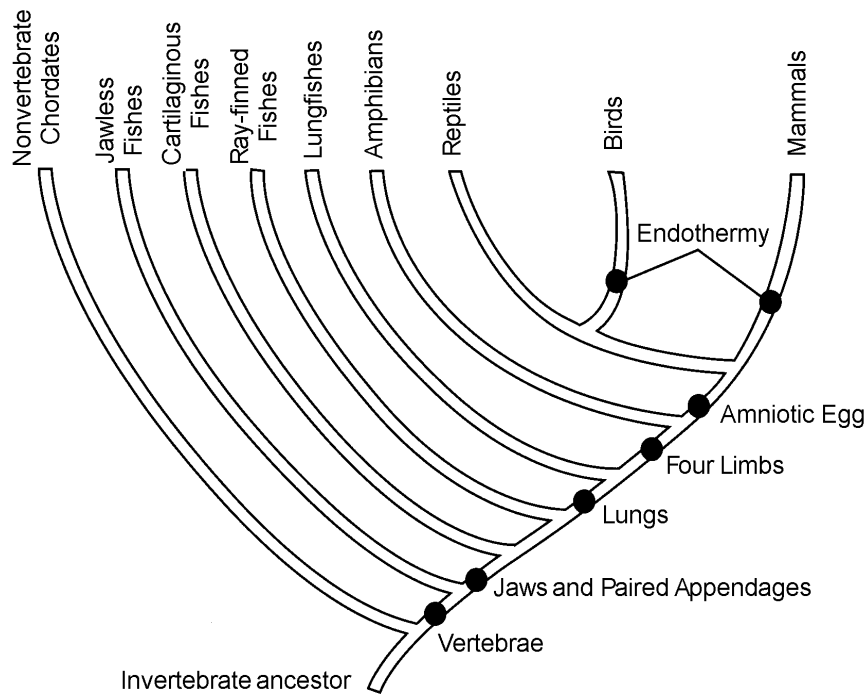
**MULTIPLE CHOICE Write the correct letter in the blank.**

- \_\_\_\_\_ 1. Which characteristic is unique to chordates only?  
a. cold blooded      b. diffusion      c. response to light      d. a notochord
- \_\_\_\_\_ 2. Which of the following has an amniotic egg?  
a. birds      b. frogs      c. fishes      d. salamanders
- \_\_\_\_\_ 3. Scientists now consider *Pikaia* the first chordate because it  
a. was an ectotherm.      c. was an endotherm.  
b. had adaptive radiation.      d. had a notochord.
- \_\_\_\_\_ 4. Which of the following is not an adaptation that appeared during the course of chordate evolution?  
a. endothermy      b. radial symmetry      c. four limbs      d. four chambered heart
- \_\_\_\_\_ 5. The rapid appearance of new species as they adapt to different conditions is known as  
a. a cladogram.      c. adaptive radiation.  
b. fitness.      d. a mass extinction.

**SHORT ANSWER Answer the questions in the space provided.**

1. What characteristics do tunicate larvae have in common with other chordates? (p.849) \_\_\_\_\_  
 \_\_\_\_\_
2. Why do scientists consider *Pikaia* to be an early chordate and not a worm? (p.849) \_\_\_\_\_  
 \_\_\_\_\_
3. If two extinct but unrelated species of chordates shared many adaptations, what can you infer about the environmental conditions those organisms encountered? (p.851) \_\_\_\_\_  
 \_\_\_\_\_
4. List the following adaptations in the order in which they appeared during chordate evolution: lungs, jaws, vertebrae, endothermy, and four limbs. (p.850) \_\_\_\_\_

**STRUCTURES AND FUNCTIONS** The cladogram below shows the relationships between modern chordates. Some important adaptations that have occurred during chordate evolution are indicated. Follow the directions to analyze the cladogram. Color the bar for chordates without vertebrae **red**. Color the bars for chordates that have jaws but no lungs **blue**. Color the bars for chordates that have lungs **yellow**. Color the bars for chordates that can produce an amniotic egg **green**. (p.850)



1. Which chordates are warm-blooded? \_\_\_\_\_
2. Which chordates are most closely related to reptiles? \_\_\_\_\_

**SECTION 33-2 REVIEW**

**CONTROLLING BODY TEMPERATURE**

**VOCABULARY REVIEW** Define the following terms and explain its importance.

- 1. homeostasis \_\_\_\_\_  
\_\_\_\_\_
- 2. metabolism \_\_\_\_\_  
\_\_\_\_\_
- 3. ectotherm \_\_\_\_\_  
\_\_\_\_\_
- 4. endotherm \_\_\_\_\_  
\_\_\_\_\_
- 5. Gila monster \_\_\_\_\_  
\_\_\_\_\_

**MULTIPLE CHOICE** Write the correct letter in the blank.

- \_\_\_\_\_ 1. The main source of heat in ectotherms is
  - a. their high metabolic rate.
  - b. their own bodies.
  - c. the environment.
  - d. their food.
- \_\_\_\_\_ 2. A characteristic of endotherms is that they
  - a. control body temperature through behavior.
  - b. obtain heat from outside their bodies.
  - c. control body temperature from within.
  - d. have relatively low rates of metabolism.
- \_\_\_\_\_ 3. Panting is a behavior that is seen most often in
  - a. endotherms that need to cool down.
  - b. ectotherms that need to warm up.
  - c. endotherms that need to warm up.
  - d. ectotherms that are at their ideal temperature.
- \_\_\_\_\_ 4. Which of the following help animals retain their body heat?
  - a. hair and sweat glands
  - b. hair and down feathers
  - c. bones and sweat glands
  - d. body fat and sweat glands
- \_\_\_\_\_ 5. Which organisms have relatively high metabolic rates?
  - a. all animals
  - b. all vertebrates
  - c. ectotherms
  - d. endotherms

**SHORT ANSWER Answer the questions in the space provided.**

1. What are the three important features that all vertebrates incorporate into controlling body temperature? (p.854)

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2. Give examples of how a lizard would adjust to changes in environmental temperature. (p.855)\_\_\_\_\_

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3. How are the temperature regulating systems of birds and mammals similar? (p.855)\_\_\_\_\_

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4. Name one advantage and one disadvantage of endothermy. (p.856)\_\_\_\_\_

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5. Match each description with the method of controlling body heat. Methods may be used more than once. (p.855)

	<b>Description</b>	<b>Method</b>
_____	1. An animal whose body temperature is controlled from within.	a. Ectotherm
_____	2. Examples include reptiles, fishes, and amphibians.	b. Endotherm
_____	3. Warm up by basking in the sun.	c. Both
_____	4. High metabolic rates that generate a significant amount of heat.	d. Neither
_____	5. An animal whose body temperature is mainly determined by the temperature of its environment.	
_____	6. Have feathers, body fat, or hair for insulation.	
_____	7. Easily lose heat to the environment.	
_____	8. Low metabolic rate.	
_____	9. Cools off by panting or sweating.	
_____	10. Cools down by going in a burrow.	

**SECTION 33-3 REVIEW**

**FORM AND FUNCTION IN CHORDATES**

**VOCABULARY REVIEW Distinguish between the terms in each of the following groups of terms.**

- 1. trachea, alveoli \_\_\_\_\_  
\_\_\_\_\_
- 2. single-loop circulation, double-loop circulation \_\_\_\_\_  
\_\_\_\_\_
- 3. optic lobe, olfactory bulb \_\_\_\_\_  
\_\_\_\_\_
- 4. ammonia, urea \_\_\_\_\_  
\_\_\_\_\_
- 5. cerebrum, cerebellum \_\_\_\_\_  
\_\_\_\_\_

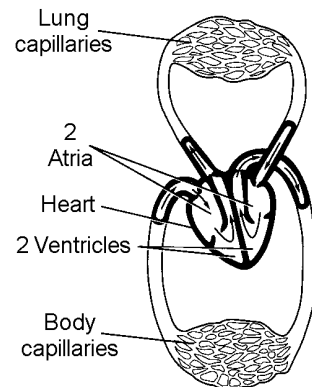
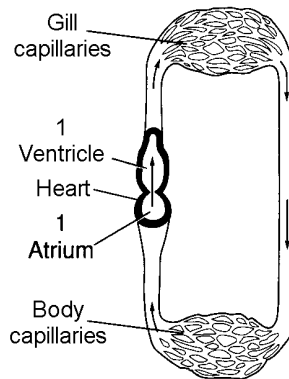
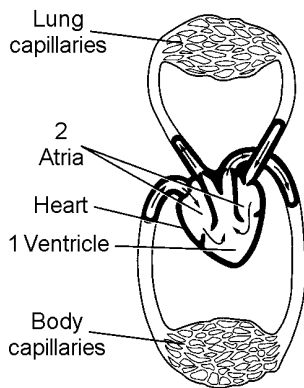
**MULTIPLE CHOICE Write the correct letter in the blank.**

- \_\_\_\_\_ 1. The thinking region of the chordate brain is the  
a. medulla.                      b. cerebrum.                      c. cerebellum.                      d. spinal cord.
- \_\_\_\_\_ 2. An excretory organ composed of small tubes that filter wastes from the blood is the  
a. kidney.                      b. cloaca.                      c. ureter.                      d. gill.
- \_\_\_\_\_ 3. All fish use gills for respiration and have a(n)  
a. double-loop circulatory system.                      c. accessory lungs.  
b. single-loop circulatory system.                      d. four chambered heart.
- \_\_\_\_\_ 4. The most efficient respiratory systems are found in  
a. mammals.                      b. birds.                      c. reptiles.                      d. amphibians.
- \_\_\_\_\_ 5. Colonies of bacteria in the intestines of a cow are helpful in  
a. digesting tough cellulose fibers in plants.                      c. producing enzymes for digesting meat.  
b. straining plankton from the water.                      d. All of the above are correct.

**SHORT ANSWER Answer the questions in the space provided.**

1. List two functions of a vertebrate kidney. (p.861) \_\_\_\_\_  
\_\_\_\_\_
2. Describe the functions of the optic lobes and olfactory bulbs in a vertebrate brain. (p.862) \_\_\_\_\_  
\_\_\_\_\_
3. Describe the major differences among the chambers of the heart in the five main groups of vertebrates: (p.861)
  - a. fish - \_\_\_\_\_
  - b. amphibian - \_\_\_\_\_
  - c. reptile - \_\_\_\_\_
  - d. bird - \_\_\_\_\_
  - e. mammal - \_\_\_\_\_
4. What is the general function of the chambers and partitions in the heart? (p.861) \_\_\_\_\_  
\_\_\_\_\_
5. Describe the differences in the digestive tracts of carnivores and herbivores. (p.858) \_\_\_\_\_  
\_\_\_\_\_
6. What are the two respiratory structures typically found in chordates? (p.858) \_\_\_\_\_  
\_\_\_\_\_

**STRUCTURES AND FUNCTIONS** Classify the three circulatory systems found below as either that of a mammal, fish, or amphibian. (p.860)

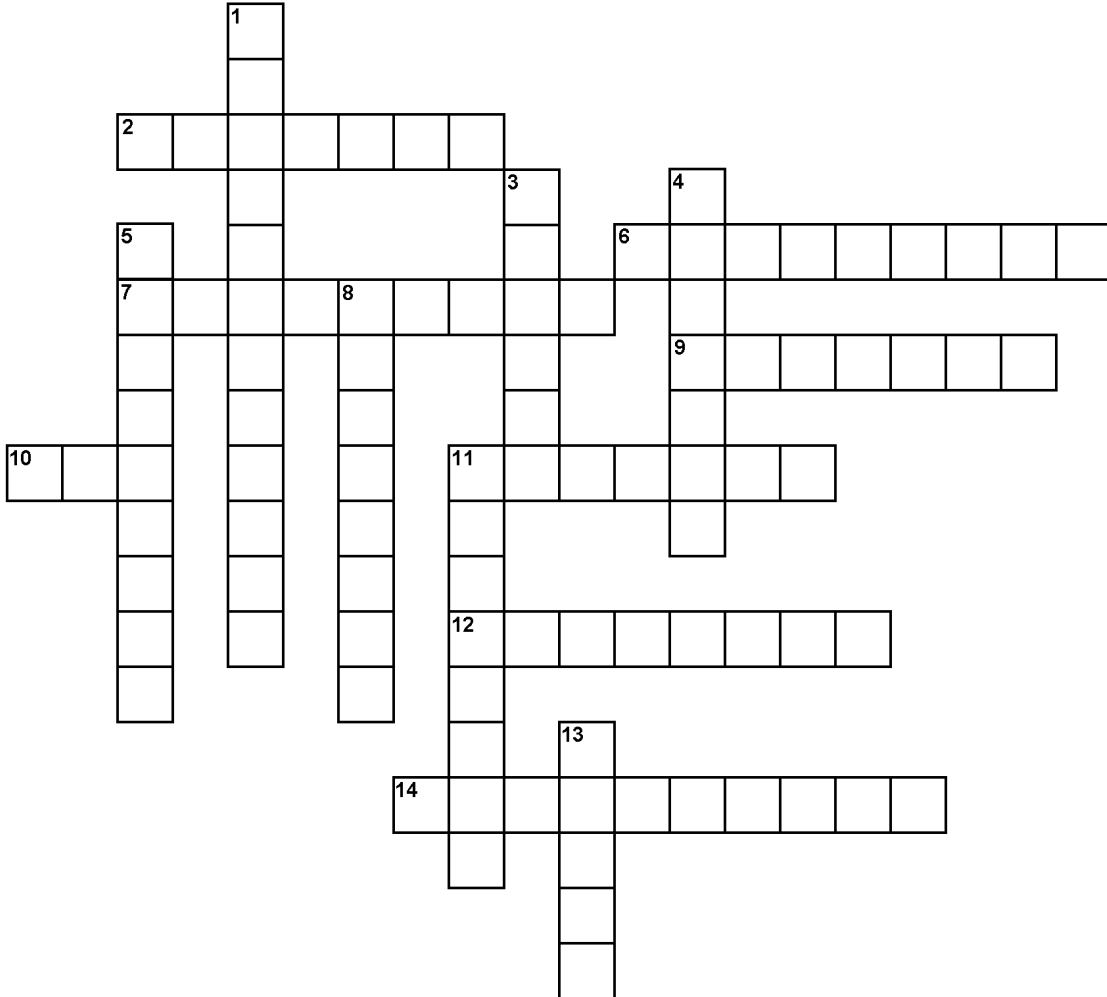


1. \_\_\_\_\_ 2. \_\_\_\_\_ 3. \_\_\_\_\_

4. Which animal would have a heart with only blue (deoxygenated) blood flowing through it? \_\_\_\_\_
5. Which heart would have a mixture of both red (oxygenated) and blue (deoxygenated) blood in its ventricle?  
\_\_\_\_\_

**VOCABULARY - CHAPTER 33**

The crossword puzzle is a simple way to master some of the more important vocabulary terms in this chapter.



Across

- 2. air pockets in a mammals lungs
- 6. sharks have a skeleton made of this material
- 7. a supporting rod found in all chordates at some point in their development
- 9. the wind pipe of a human
- 10. subcutaneous \_\_\_\_\_ helps keep mammals warm
- 11. a very poisonous nitrogen substance that the liver converts into urea; NH<sub>3</sub>
- 12. fertilization in reptiles, birds, and mammals is always \_\_\_\_\_ , never external
- 14. the term for giving live birth as most mammals do

Down

- 1. the lancelet is an \_\_\_\_\_ chordate
- 3. a heart chamber that receives blood
- 4. \_\_\_\_\_ is what dogs do to cool down
- 5. ectotherm is being cold-blooded; \_\_\_\_\_ is the term for being warm-blooded
- 8. the “thinking” part of the human brain
- 11. the type of egg that reptiles, birds, and mammals produce
- 13. respiratory structures in aquatic organisms