

Name _____ Period _____

Chapter 40: Basic Principles of Animal Form and Function

Concept 40.1 Animal form and function are correlated at all levels of organization

1. Animals need to exchange materials with their environment. This process occurs as substances dissolved in an aqueous medium move across the plasma membrane of each cell. For each of the following organisms, explain how this is possible:

amoeba

hydra

tapeworm

whale

2. What is *interstitial fluid*?

3. What is a *tissue*?

4. There are four types of tissues. For each, give examples, the general function, and where you would find each type.

Tissue Type	Examples	General Function	Locations
Epithelial	<i>cuboidal</i> <i>simple columnar</i> <i>simple squamous</i> <i>stratified squamous</i>		
Connective	<i>cartilage</i> <i>adipose</i> <i>blood</i> <i>bone</i> <i>fibrous connective</i> <i>loose connective</i>		
Muscle	<i>skeletal</i> <i>smooth</i> <i>cardiac</i>		

Nervous	Cell types: <i>neurons</i> <i>glial cells</i>		
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Concept 40.2 Feedback control loops maintain the internal environment in many animals

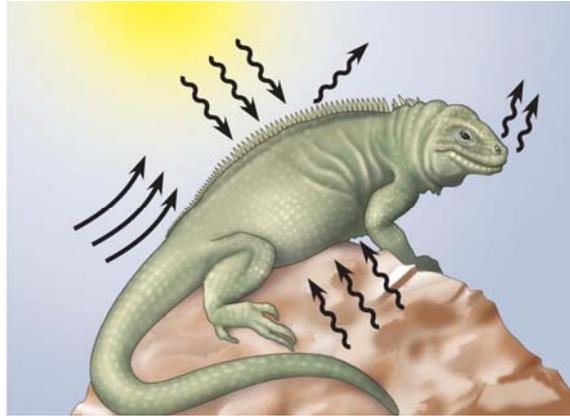
5. Explain the difference between animals that are *regulators* and those that are *conformers*.
6. The example in the text is related to temperature regulation. Would ectotherms be regulators or conformers?
7. Throughout the text, a common theme has been regulation of homeostasis by feedback loops. We discuss feedback loops again as we look at hormone levels. What is meant by a *set point*?
8. Describe an example of a *negative feedback loop*. Clearly identify the *set point*, the *stimulus*, and the *response*.
9. We sometimes say that in negative feedback “more gets you less,” and in positive feedback “more gets you more.” Describe an example of a *positive feedback loop*.

Concept 40.3 Homeostatic processes for thermoregulation involve form, function, and behavior

10. What is *thermoregulation*?
11. Describe the difference between *endothermy* and *ectothermy*, and give an animal that exhibits each.

Property	Description	Example
<i>Endothermy</i>		
<i>Exothermy</i>		

12. What are the four processes by which heat is exchanged with the environment? Use this figure to name and explain each process.



13. Discuss how each of the following are involved in thermoregulation:

fur/feathers

adipose tissue

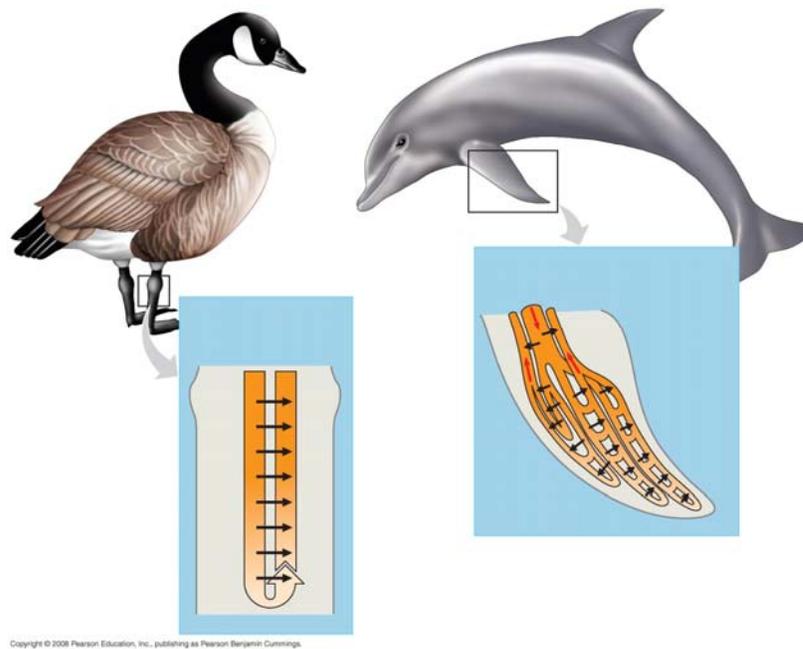
goose bumps

vasodilation/vasoconstriction

panting/sweating

burrowing/sunning

14. Heat loss in extremities is reduced by *countercurrent exchange*. Use this figure to explain how *countercurrent exchange* works.



15. What is the role of the *hypothalamus* in temperature regulation?

Concept 40.4 Energy requirements are related to animal size, activity, and environment

16. What is the *metabolic rate*? In what units is it usually measured?
17. What is *basal metabolic rate (BMR)*?
18. What is the relationship between *BMR* and body mass?
19. What are the evolutionary advantages of *torpor* and *hibernation*?

20. If a mouse and a small lizard of the same mass (both at rest) were placed in experimental chambers under identical environmental conditions, which animal would consume oxygen at a higher rate? Explain.

Testing Your Knowledge: Self-Quiz Answers

Now you should be ready to test your knowledge. Place your answers here:

1. _____ 2. _____ 3. _____ 4. _____ 5. _____ 6. _____