

Chapter 26 Study Guide

Study Tip

Divide the class into small groups, and ask each group to write a review question for each Key Concept and each Vocabulary term in one of the sections. When students have completed writing their questions, have the groups place their lists in a central location. Then, ask that each group pick up a list of questions for one of the other two sections. Groups should collaborate on answering the questions.

Thinking Visually

1. Bilateral symmetry
2. Many planes of symmetry

Chapter 26 Assessment

Reviewing Content

1. c 5. c 9. a
2. c 6. c 10. b
3. a 7. c
4. b 8. b

Understanding Concepts

11. All members of the animal kingdom are multicellular, eukaryotic heterotrophs whose cells lack cell walls. Animals are specialized to carry out the functions of feeding, respiration, circulation, excretion, response, movement, and reproduction.

12. The epithelial cells have a thin, flat structure through which gases diffuse easily.

13. Example: When a dog becomes too hot, it pants. Panting releases heat, and body temperature decreases.

14. The terms *anterior*, *posterior*, *dorsal*, *lateral*, *ventral*, *bilateral symmetry*, and *motile* should be used on the drawings of a fish. The terms *radial symmetry* and *motile* should be used as titles on the jellyfish. The term *sessile* should be used to label the sponge.

15. Because cephalization involves the location of sense organs and nerve cells that process information at its anterior end, the animal can respond to the environment more quickly and in more sophisticated ways than simpler animals can.

Chapter 26 Study Guide

26-1 Introduction to the Animal Kingdom

Key Concepts

- An animal is a multicellular, eukaryotic heterotroph whose cells lack cell walls.
- Animals are specialized to carry out the following essential functions: feeding, respiration, circulation, excretion, response, movement, and reproduction.
- In general, complex animals tend to have high levels of cell specialization and internal organization, bilateral body symmetry, cephalization, and a body cavity.

Vocabulary

invertebrate, p. 657
vertebrate, p. 657
feedback inhibition, p. 658
blastula, p. 661
protostome, p. 661
deuterostome, p. 661
anus, p. 661
endoderm, p. 661
mesoderm, p. 661
ectoderm, p. 661
radial symmetry, p. 662
bilateral symmetry, p. 662
cephalization, p. 663

26-2 Sponges

Key Concepts

- Sponges are classified as animals because they are multicellular, heterotrophic, have no cell walls, and contain a few specialized cells.
- The movement of water through a sponge provides a simple mechanism for feeding, respiration, circulation, and excretion.

Vocabulary

choanocyte, p. 665
osculum, p. 665
spicule, p. 665
archaeocyte, p. 665
internal fertilization, p. 666
larva, p. 666
gemmule, p. 667

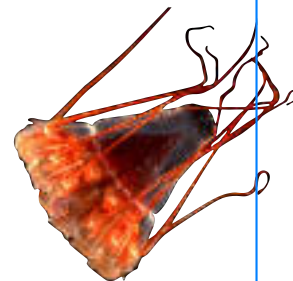
26-3 Cnidarians

Key Concepts

- Cnidarians are soft-bodied, carnivorous animals that have stinging tentacles arranged in circles around their mouth. They are the simplest animals to have body symmetry and specialized tissues.
- Cnidarians typically have a life cycle that includes two different-looking stages, a polyp and a medusa.
- Cnidarians include jellyfishes, hydras and their relatives, and sea anemones and corals.

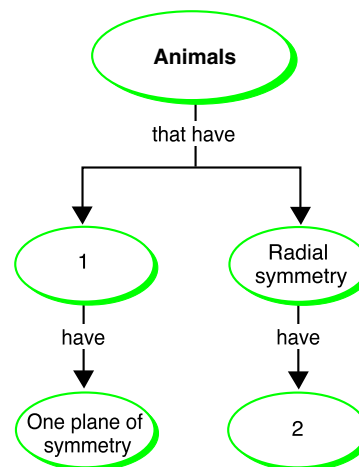
Vocabulary

cnidocyte, p. 669
nematocyst, p. 669
polyp, p. 670
medusa, p. 670
gastrovascular cavity, p. 671
nerve net, p. 671
hydrostatic skeleton, p. 671
external fertilization, p. 672



Thinking Visually

Complete the following concept map using information from the chapter:



CHAPTER RESOURCES

Print:

- **Teaching Resources**, Chapter Vocabulary Review, Graphic Organizer
- **Chapter Tests: Levels A and B**, Chapter 26 Test

Technology:

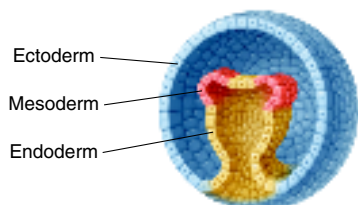
- **Computer Test Bank**, Chapter 26 Test
- **iText**, Chapter 26 Assessment

Chapter 26 Assessment

Reviewing Content

Choose the letter that best answers the question or completes the statement.

1. A multicellular eukaryotic heterotroph whose cells lack cell walls is a(an)
 - a. protist.
 - b. virus.
 - c. animal.
 - d. plant.
2. The process by which animals take in oxygen and give off carbon dioxide is known as
 - a. circulation.
 - b. reproduction.
 - c. respiration.
 - d. response.
3. Animals that have a backbone, also called a vertebral column, are known as
 - a. vertebrates.
 - b. prokaryotes.
 - c. protostomes.
 - d. invertebrates.
4. Many animals have body symmetry with distinct front and back ends. This type of symmetry is
 - a. radial.
 - b. bilateral.
 - c. circular.
 - d. dorsal.
5. The developing embryo shown below is a _____, a group that includes _____.
 - a. protostome; simple invertebrates
 - b. protostome; vertebrates
 - c. deuterostome; echinoderms and chordates
 - d. deuterostome; invertebrates



6. An animal whose mouth is formed from the blastopore is a
 - a. deuterostome.
 - b. detritivore.
 - c. protostome.
 - d. carnivore.
7. Animals in the phylum Porifera include
 - a. chordates.
 - b. sea stars.
 - c. sponges.
 - d. sea anemones.
8. A concentration of sense organs and nerve cells in the anterior end of the body is known as
 - a. fertilization.
 - b. cephalization.
 - c. symmetry.
 - d. anteriorization.

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9. The sessile body form of a cnidarian is a
 - a. polyp.
 - b. medusa.
 - c. planula.
 - d. nematocyst.
10. A soft-bodied animal with stinging tentacles arranged around its mouth is a
 - a. spicule.
 - b. cnidarian.
 - c. vertebrate.
 - d. choanocyte.

Understanding Concepts

11. Describe the characteristics that all members of the animal kingdom share.
12. How is the structure of the epithelial cells that line an animal's lungs related to their function?
13. Describe an example of how an internal feedback mechanism helps an animal maintain homeostasis.
14. Draw a fish, a jellyfish, and a sponge. Label each drawing, using as many of the following terms as appropriate: radial symmetry, bilateral symmetry, anterior, posterior, dorsal, lateral, ventral, sessile, motile.
15. Explain the advantages that cephalization confers on an animal.
16. Distinguish between a protostome and a deuterostome.
17. During the early development of many animals, cells differentiate into three germ layers. Name these layers and give an example of a body structure that develops from each layer.
18. What are archaeocytes?
19. Briefly describe the physiological processes of nutrition, respiration, and excretion in a sponge.
20. Describe the mutually beneficial relationships that exist between many sponges and certain photosynthetic organisms.
21. What is the function of statocysts?
22. Describe the process of feeding in cnidarians.
23. Describe two ways in which budding occurs in polyps.
24. Describe the life cycle of *Aurelia*, a common jellyfish. Be sure to include how the polyp form alternates with the medusa form.



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(Continued from page 678)

16. A protostome is an animal whose mouth is formed from the blastopore, and a deuterostome is an animal whose anus is formed from the blastopore.
17. The endoderm is the innermost layer of tissue, which develops into the linings of the digestive tract and much of the respiratory system. The mesoderm is the middle layer of tissue, which develops into the muscular system and much of the circulatory, reproductive, and excretory systems. The ectoderm is the outermost layer of tissue, which develops into sense organs, nerves, and the outer layer of the skin.
18. Specialized cells that move around within the walls of sponges
19. Choanocytes trap and engulf food particles sifted from water that flows into the pores, and digestion is completed by archaeocytes. From water that flows inside the body cavity, oxygen diffuses into the cells, and wastes, including carbon dioxide, are carried away.
20. Many sponges have photosynthetic organisms in their tissues. These photosynthetic organisms provide food and oxygen for the sponge, and the sponge provides a protected area for the photosynthetic organisms.
21. Statocysts in cnidarians help determine the direction of gravity.
22. The cnidarian paralyzes its prey and pulls it into its gastrovascular cavity.
23. In one type, a bud grows from the side of an existing polyp. In another type, polyps produce tiny medusas that become new individuals.
24. Male and female medusas produce eggs and sperm. After external fertilization, the zygote grows into a larva that eventually becomes a polyp. The polyp buds to release young medusas.



HOMEWORK GUIDE

Section:	Questions:
Section 26-1	1-6, 8, 11-17, 32
Section 26-2	7, 18-20, 25, 26, 33, 35
Section 26-3	9, 10, 21-24, 27-31, 34

Critical Thinking

25. Like other animals, sponges are multicellular, are heterotrophic, have some specialized cells, and lack cell walls. Unlike most other animals, sponges have pores all over their bodies and are sessile, and most lack symmetry.

26. Sample answers: How long can the gemmules survive without water? How long can the gemmules survive being kept in a freezer at 0°C? How long does it take gemmules that have survived drought or freezing to grow when moved to a favorable environment?

27. Cnidarians have radial symmetry. Since radially symmetrical animals lack a front end, they do not usually move forward in one direction.

28. Many of the comb jelly's characteristics are similar to those of cnidarians, but cnidarians do not have an anal opening. Therefore, the comb jelly should not be classified as a cnidarian.

29. Sample answer: Governments might pass laws that restrict the use of fertilizers and insecticides in coastal areas with coral reefs in the ocean nearby. These laws might make it difficult for farmers to make a living.

30. Sample answer: The life cycle is more complex in a cnidarian. In most cnidarian species, larvae that form as a result of fertilization develop into polyps. The polyps then reproduce asexually, forming medusas that reproduce sexually to complete the life cycle. In a sponge, there is no asexual stage in a complete life cycle, although pieces of adult sponges can reproduce asexually.

31. The nerve net enables cnidarians to detect external stimuli. Cnidocytes are activated by an external stimulus such as a brush against the cnidarian's tentacles.

32. Just as an inventory clerk maintains an even supply of merchandise, internal feedback mechanisms maintain homeostasis. When supplies run low, the clerk orders more supplies. Similarly, when the body runs low on food, for instance, an animal becomes hungry and eats. When the store's supply is adequate, the clerk stops ordering supplies. Similarly, when the

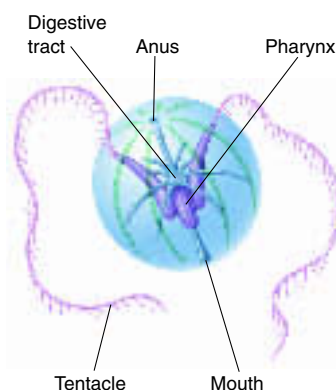
Critical Thinking

25. Comparing and Contrasting Explain how sponges are similar to most other animals. How are they different?

26. Asking Questions The gemmules of some sponges can survive periods of severe drought or freezing. Suppose you have the opportunity to study gemmules. Write three different questions you could investigate.

27. Inferring Most cnidarians do not swim toward their prey. Instead, they capture prey carried by water currents. How is this behavior related to their body plan?

28. Classifying The comb jelly below has a body made of two layers separated by mesoglea. Its digestive system includes an anal opening through which wastes can pass. Radiating around its body are eight "combs" of cilia, which produce movement. A pair of tentacles enable it to capture food. Should this animal be classified as a cnidarian? Explain.



29. Making Judgments Choose one human activity that can harm coral reefs. Describe measures that people might take to reduce the damage. Then, evaluate the impact the measures might have on human society.

30. Applying Concepts Would you say that the life cycle of most cnidarians is more or less complex than the life cycle of sponges? Give details to justify your answer.

31. Inferring How might the nerve net of a cnidarian be related to the functioning of the cnidarian's cnidocytes?

body no longer needs food, hunger ceases and the animal stops eating.

33. Choanocytes are specialized cells that use flagella to move a steady current of water through the sponge.

34. Both a hydra and a Portuguese man-of-war are cnidarians of the class Hydrozoa. They differ in that a hydra lives as a solitary polyp and is found in fresh water, while a Portuguese man-of-war is a colony of polyps and is found in salt water.

32. Comparing and Contrasting An inventory clerk is a store employee who checks to make sure the store has an adequate supply of merchandise. If the supply of an item is running low, the inventory clerk orders more of the item. Explain how the job of an inventory clerk is similar to internal feedback mechanisms in an organism.

33. Applying Concepts How is the anatomy of a sponge's choanocytes an adaptation that enables the choanocytes to perform the physiological function of moving water through the sponge?

34. Comparing and Contrasting Compare a hydra to a Portuguese man-of-war. Explain how they are both similar and different.

35. Connecting Concepts In Chapters 10 and 11, you learned about the processes of mitosis and meiosis. Compare these two processes, and explain how each is involved in the reproduction of sponges.

Writing in Science

Write a paragraph explaining the symbiotic relationship that exists between certain sponges and photosynthetic organisms. Be sure to include information about how these photosynthetic organisms obtain light. (*Hint:* After you have written a draft of your paragraph, share your draft with a friend. Ask your friend to point out any statements that are unclear. Use this information to revise your paragraph.)

Performance-Based Assessment

Making Models Construct a two- or three-dimensional model of a sponge or cnidarian. Label the organism's important structures. Explain how the organism obtains food and responds to the environment.

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35. Students should define both mitosis and meiosis and then explain how each is involved in sponge reproduction. In most sponge species, a single sponge forms both eggs and sperm by meiosis, and then internal fertilization occurs. The zygote then undergoes many mitotic divisions to eventually produce an adult sponge.