Chapter 20 Study Guide

Study Tip

Divide the class into small groups, and have students quiz one another about the Vocabulary terms and the Key Concepts.

Thinking Visually

In their tables, students should include information about animallike protists, unicellular plantlike protists, multicellular plantlike protists, and funguslike protists. Students should indicate that animallike protists and funguslike protists are heterotrophic, while plantlike protists are autotrophic. Movement varies among protists. Three of the four groups of animallike protists are motile, as are most of the unicellular plantlike protists.

Chapter 20 Assessment

Reviewing Content

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

Understanding Concepts

11. Possible answer: Yes, the terms are useful because many protists have characteristics similar to those of plants, animals, or fungi.

12. In fresh water, the water may move into a protozoan by osmosis. The excess water is collected by contractile vacuoles.

13. Ciliates use short, hairlike projections called cilia to move. The cilia beat, propelling the ciliate through water. Sarcodines use pseudopods for movement. These pseudopods extend out of the central mass of the cell. Cytoplasm streams into the pseudopod, and the rest of the cell follows.

Chapter 20 Study Guide

20–1 The Kingdom Protista

Key Concept

- Protists are eukaryotes that are not members of the kingdoms Plantae, Animalia, or Fungi.

Vocabulary
protist, p. 497

20–2 Animallike Protists: Protozoans

Key Concepts

- Animallike protists that swim using flagella are classified in the phylum Zoomastigina and are often referred to as zooflagellates.
- Sarcodines are animallike protists that use pseudopods for feeding and movement.
- Members of the phylum Ciliophora, known as ciliates, use cilia for feeding and movement.
- Members of the phylum Sporozoa do not move on their own and are parasitic.
- Some animallike protists cause serious diseases, including malaria and African sleeping sickness.

Vocabulary
pseudopod, p. 500
amoeboid movement, p. 500
food vacuole, p. 500 • cilium, p. 501
trichocyst, p. 501 • macronucleus, p. 501
micronucleus, p. 501 • gullet, p. 502
anal pore, p. 502 • contractile vacuole, p. 502
conjugation, p. 502

20–3 Plantlike Protists: Unicellular Algae

Key Concepts

- Chlorophyll and accessory pigments allow algae to harvest and use the energy from sunlight.
- Euglenophytes are plantlike protists that have two flagella but no cell wall.
- Members of the phylum Chrysophyta are a diverse group of plantlike protists that have gold-colored chloroplasts.
- Diatoms produce thin, delicate cell walls rich in silicon (Si)—the main ingredient in glass.
- About half of dinoflagellates are photosynthetic; the other half live as heterotrophs.

Vocabulary
accessory pigment, p. 506 • eyespot, p. 507
pellicle, p. 507 • phytoplankton, p. 509

20–4 Plantlike Protists: Red, Brown, and Green Algae

Key Concepts

- Red algae are able to live at great depths due to their efficiency in harvesting light energy. Red algae contain chlorophyll *a* and reddish accessory pigments called phycobilins.
- Brown algae contain chlorophyll *a* and *c*, as well as a brown accessory pigment, fucoxanthin.
- Green algae share many characteristics with plants, including their photosynthetic pigments and cell wall composition.
- The life cycles of most algae include both a diploid and a haploid generation.

Vocabulary
phycobilin, p. 510
filament, p. 512
alternation of generations, p. 512
gametophyte, p. 514
spore, p. 514
sporophyte, p. 514

20–5 Funguslike Protists

Key Concepts

- Funguslike protists lack chlorophyll and absorb nutrients from dead or decaying organic matter. But unlike most true fungi, funguslike protists have centrioles. They also lack the chitin cell walls of true fungi.
- Slime molds are funguslike protists that play key roles in recycling organic material.
- Oomycetes thrive on dead or decaying organic matter in water and are plant parasites on land.

Vocabulary
cellular slime mold, p. 516
acellular slime mold, p. 516
fruiting body, p. 516
plasmodium, p. 518
hypha, p. 518
zoosporangium, p. 518
antheridium, p. 519
oogonium, p. 519

Thinking Visually

Make a table that compares the means of feeding and movement of the four main groups of protists.

CHAPTER RESOURCES

Print:

- ***Teaching Resources,*** Chapter Vocabulary Review, Graphic Organizer
- ***Chapter Tests: Levels A and B,*** Chapter 20 Test

Technology:

- ***Computer Test Bank,*** Chapter 20 Test
- ***iText,*** Chapter 20 Assessment

Chapter 20 Assessment

Interactive textbook with assessment at PHSchool.com

Reviewing Content

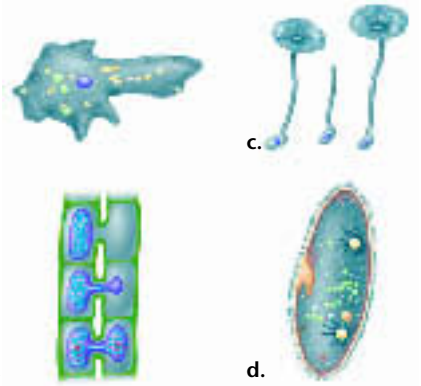
Choose the letter that best answers the question or completes the statement.

1. Which of the following descriptions applies to most protists?
   a. unicellular prokaryotes
   b. multicellular prokaryotes
   c. unicellular eukaryotes
   d. multicellular eukaryotes

2. Which of the following is NOT true of amoebas?
   a. They reproduce by binary fission.
   b. They move by pseudopodia.
   c. They have a definite shape.
   d. They form temporary food vacuoles.

3. For defense, a paramecium uses small, bottle-shaped structures known as
   a. cilia.
   b. pseudopodia.
   c. trichocysts.
   d. micronuclei.

4. Which of the diagrams below shows the process of conjugation?



5. The wide range of colors in algae depends upon the presence of
   a. chlorophyll *a* and *b*.
   b. chlorophyll *a* and *c*.
   c. chlorophyll *a* and *d*.
   d. accessory pigments.

6. The population of small, photosynthetic organisms found near the surface of the ocean is called
   a. euglenophytes.
   b. chrysophytes.
   c. phytoplankton.
   d. dinoflagellates.

7. What characteristics do green algae share with plants?
   a. photosynthetic pigments and cell wall composition
   b. photosynthetic and accessory pigment composition
   c. accessory pigments and cell wall composition
   d. accessory pigments and cell membrane composition

8. Alternation of generations is defined as the switching back and forth between the production of
   a. cells by mitosis and meiosis.
   b. asexual and sexual reproductive cells.
   c. gametophytes and sporophytes.
   d. diploid and haploid cells.

9. Slime molds are found primarily in
   a. oceans.
   b. rotting wood or compost piles.
   c. fast-moving streams.
   d. deserts.

10. The thin filaments produced by water molds are known as
    a. oogonia.
    b. antheridia.
    c. zoosporangia.
    d. hyphae.

Understanding Concepts

11. Are the categories animallike, plantlike, or fungus-like useful in classifying protists? Explain your answer.

12. All freshwater protozoans have contractile vacuoles to get rid of excess water. Describe the process responsible for this excess water.

13. Compare the structures used for movement in the ciliates and sarcodines.

14. Describe the process of conjugation. Is conjugation a form of reproduction? Explain your answer.

15. What characteristics distinguish algae from other protists?

16. Describe the two methods euglenophytes can use to obtain energy.

17. Explain why plantlike protists are so important to aquatic food chains.

18. List the three phyla of multicellular plantlike protists. Give an example of an organism in each phylum.

19. Describe the process of alternation of generations. Explain its significance.

HOMEWORK GUIDE

Section:	Questions:
Section 20–1	1, 11, 26
Section 20–2	2–4, 12–14, 20, 22, 28
Section 20–3	5, 6, 15–17, 21, 27, 29
Section 20–4	7, 8, 18, 19
Section 20–5	9, 10, 23–25

Students can use the iText to access an interactive version of the Student Edition and a self-test.

(Continued from page 522)

14. Conjugation allows ciliates to exchange genetic material. Two paramecia join together. After meiosis of their diploid micronuclei, each organism is left with four haploid micronuclei. Three of the nuclei disintegrate, leaving one nucleus in each organism to divide by mitosis, forming a pair of identical nuclei. The two paramecia then exchange one nucleus from their pairs. Conjugation is not a form of reproduction, because no new offspring are formed. The two paramecia are genetically changed from their former state, but they are identical to each other.

15. Algae contain the green pigment chlorophyll and carry out photosynthesis, unlike other protists.

16. Euglenophytes obtain energy by phytosynthesis. If sunlight is not available, euglenophytes can obtain energy by absorbing nutrients available in decayed organic material.

17. Their position at the bottom of the food chain allows much of the diversity of aquatic life. Phytoplankton provide a source of energy for organisms as diverse as shrimp and whales.

18. Phlya of plantlike protists are: (1) Rhodophyta or red algae; example: *Chondros crispus;* (2) Phaeophyta or brown algae; example: *Sargassum*; and (3) Chlorophyta or green algae; example: *Volvox*.

19. Many algae switch back and forth between haploid and diploid stages during their life cycles, enabling them to survive unfavorable conditions. Under adverse conditions, a single-celled organism will produce haploid gametes by mitosis. These gametes, which are of two opposing mating types, bind to each other, shed their cell walls, and fuse to from a diploid zygote. The zygote can form a protective wall, enabling it to survive freezing or drying conditions. When conditions are favorable, the zygote begins to grow.

Critical Thinking

20. The antibiotic kills wood-digesting symbiotic bacteria that live inside the cytoplasm of the protists. Because the termites can no longer digest wood, they will die of starvation.

21. Water pollution involving an excess of nutrients might cause a bloom of dinoflagellates which results in a red tide.

22. Sexual reproduction allows for an exchange of genes. New combinations of genes can enable species to adapt to changes in the environment.

23. Answers will vary, depending on the group of protists selected. A typical response might describe the effect that an oomycete had on Ireland and the ethnic and social character of many American cities.

24. Protist A belongs to the phylum Sarcodina; protist B belongs to the phylum Euglenophyta; protist C belongs to the phylum Myxomycota.

25. Slime molds produce sporangia when subjected to environmental stress for two reasons: greater mobility and increased genetic diversity. Greater spore mobility increases the organism's chances of finding another source of food. Greater diversity helps the slime mold adapt to changes in environmental conditions.

26. Protists that belong to the phylum Euglenophyta have characteristics of animallike protists in the ways they move and ingest food. However, they also have characteristics of plantlike protists in that they contain chloroplasts and they produce starch. These organisms cannot be classified as either animals or plants.

27. If the radiation slows the growth of phytoplankton or kills it, the amount of oxygen in the air might decrease and the amount of carbon dioxide might increase. If the radiation speeds up the growth of phytoplankton, the amount of oxygen in the air might increase and the amount of carbon dioxide decrease.

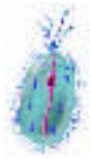
28. If red blood cells are infected with *Plasmodium* cells and are present in blood, they could be passed along by a transfusion. Once inside the recipient, the infected red blood cells could burst, releasing *Plasmodium* cells, which would then infect other red blood cells.

Chapter 20 Assessment

Critical Thinking

20. Formulating Hypotheses A scientist observes that termites that are fed a certain antibiotic die of starvation after a few days. The scientist also notices that the antibiotic affects certain protists that live inside the termite's gut in a peculiar way. Although the protists continue to thrive, they lose a certain kind of structure in their cytoplasm. Develop a hypothesis to explain these observations.

Protist before exposure to antibiotic



Protist after exposure to antibiotic

21. Applying Concepts How might water pollution result in a red tide?

22. Inferring During its lifetime, a paramecium can reproduce asexually about 700 times. However, it can reproduce many more times if it conjugates as well. How could the capability for sexual reproduction affect the evolution of paramecia?

23. Making Judgments Summarize the role of a selected group of protists in disrupting the equilibrium in an ecosystem and in a human population. Explain how the role of these organisms could contradict the statement that "small organisms are not important in life and in history." Provide specific examples in your answer.

24. Classifying Your teacher asks you to observe and classify into the correct phylum the following protists:

Protist A: Organism has no cell wall, lacks chlorophyll, and moves using pseudopodia.
Protist B: Organism has no cell wall, contains chlorophyll, and has two flagella.
Protist C: Cells appear amoeba-like and appear to fuse to produce structures with many nuclei, lack chlorophyll, and have sporangia that produce spores that germinate into flagellated cells.

25. Inferring Slime molds produce sporangia and spores only when food is scarce. Why do you think this is so? What advantages do slime molds gain from this?

26. Applying Concepts At one time, living things were classified as animals if they moved or ingested food, and as plants if they did not move or ingest food. What difficulties would arise in trying to classify the protists according to these criteria?

27. Predicting Growing "holes" in Earth's ozone layer may increase the amount of radiation that reaches the surface of the ocean. If this radiation were to affect the growth of phytoplankton, what long-term consequences might this have on Earth's atmosphere?

28. Inferring Examine the life cycle of *Plasmodium* illustrated in **Figure 20–7.** Based on the illustration, do you think malaria could be transmitted by a blood transfusion?

29. Connecting Concepts What are the reactants and products of photosynthesis? Where might algae get the raw materials they need to carry out photosynthesis? You may wish to refer back to Chapter 8 for help answering this question.

Writing in Science

Write one or two paragraphs about the four groups of protists described in this chapter. In your description, list the distinguishing characteristics of the organisms in each of the groups and identify at least one organism from each group. (*Hint:* Use a concept map to organize your ideas.)

Performance-Based Assessment

Making Models Select a representative protist from each of the four animallike protist groups. Make a model of each organism. Describe the characteristics that place it in that group.

Go Online
PHSchool.com
For: An interactive self-test
Visit: PHSchool.com
Web Code: cba-6200

29. The reactants of photosynthesis are carbon dioxide and water. The products are sugars and oxygen. Algae would get water from the water they live in and carbon dioxide from the water it is dissolved in.

Writing in Science

Students' paragraphs may vary, though all responses should differentiate among animallike protists, unicellular plantlike protists, multicellular plantlike protists, and funguslike protists. In their descriptions, students should include the distinguishing features of the major phyla of each of the four groups of protists. Examples of organisms from each group may be any of the organisms described in the chapter.