Study Guide

Interactive Textbook
- Complete student edition
- Section and chapter self-assessments
- Assessment reports for teachers

Help Students Read

Building Vocabulary

Word-Part Analysis Tell students that the suffix *-sis* means *process* or *action*, the prefix *sym* means *along with* or *together,* and *bio* refers to life and living organisms. Thus *symbiosis* describes the close relationship between two species that benefits at least one of the species. The suffix *-ism* also means *act* or *process*, and the word *mutual* means *directed by each toward the other* or *shared in common*. Thus *mutualism* is a type of symbiosis in which each of two species benefit.

Word Forms Ask students to write their own definitions of *bloom* and *vacuole*, using the dictionary for help. Have students explain how the definitions relate to the terms *algal bloom* and *contractile vacuole*.

Connecting Concepts

Concept Maps Help students develop one way to show how the information in this chapter is related. Protists are a diverse group of organisms that include traits shared with animals, plants, and fungi. Algae are protists that can bloom dramatically when nutrients in water increase. Fungi, heterotrophs that reproduce with spores, vary in their reproductive structures and in the roles they play in nature. Have students brainstorm to identify the key concepts, key terms, details, and examples from this chapter, then write each one on a sticky note and attach it at random on chart paper or on the board. Tell students that this concept map will be organized in hierarchical order and to begin at the top with the key concepts. Ask students these questions to guide them to categorize the information on the sticky notes: **What traits do protists share and how do they differ? How are fungi similar to protists? Why do algal blooms occur?**

Chapter Study Guide

1 Protists

Key Concepts

- Like animals, animal-like protists are heterotrophs, and most are able to move from place to place to obtain food.
- Like plants, algae are autotrophs.
- Like fungi, funguslike protists are heterotrophs, have cell walls, and use spores to reproduce.

Key Terms

protist
protozoan
pseudopod
contractile vacuole
cilia
symbiosis
mutualism
algae
pigment
spore

2 Algal Blooms

Key Concepts

- In general, algal blooms occur when nutrients increase in the water.
- Red tides are dangerous when the toxins that the algae produce become concentrated in the bodies of organisms that consume the algae.
- Eutrophication triggers a series of events with serious consequences.

Key Terms

algal bloom
red tide
eutrophication

3 Fungi

Key Concepts

- Fungi are eukaryotes that have cell walls, are heterotrophs that feed by absorbing their food, and use spores to reproduce.
- Fungi usually reproduce by making spores. The lightweight spores are surrounded by a protective covering and can be carried easily through air or water to new sites.
- Fungi play important roles as decomposers and recyclers on Earth. Many fungi provide foods for people. Some fungi cause disease while others fight disease. Still other fungi live in symbiosis with other organisms.

Key Terms

fungi
hyphae
fruiting body
budding
lichen

What are the traits and roles of fungi? Prompt students by using connecting words or phrases, such as "adapted to," "classified by," and "result in" to indicate the basis for the organization of the map. The phrases should form a sentence between or among a set of concepts.

Answer

Accept all logical presentations by students.

All in One Teaching Resources

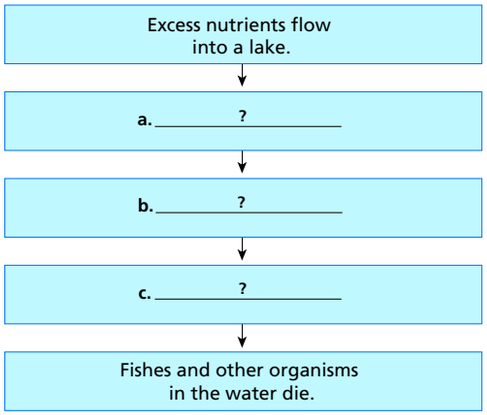
- Key Terms Review: *Protists and Fungi*
- Connecting Concepts: *Protists and Fungi*

Review and Assessment

Go Online PHSchool.com
For: Self-Assessment
Visit: PHSchool.com
Web Code: cea-1030

Organizing Information

Sequencing Copy the flowchart about changes in a lake onto a separate sheet of paper. Then complete it and add a title. (For more on Sequencing, see the Skills Handbook.)



Reviewing Key Terms

Choose the letter of the best answer.

1. Which of the following characteristics describes all protists?
   a. They are unicellular.
   b. They can be seen with the unaided eye.
   c. Their cells have nuclei.
   d. They are unable to move on their own.
2. A protist structure that collects water and expels it from the cell is called a
   a. pseudopod.
   b. contractile vacuole.
   c. cilia.
   d. spore.
3. The interaction between two species in which at least one of the species benefits is called
   a. eutrophication. **b.** hyphae.
   c. symbiosis. **d.** budding.
4. An overpopulation of saltwater algae is called a(n)
   a. pigment. **b.** lichen.
   c. red tide. **d.** eutrophication.
5. A lichen is a symbiotic association between
   a. fungi and plant roots.
   b. algae and fungi.
   c. algae and bacteria.
   d. protozoans and algae.

If the statement is true, write *true*. If it is false, change the underlined word or words to make the statement true.

6. Ciliates use flagella to move.
7. Plantlike protists are called protozoans.
8. Eutrophication is the process by which nutrients in a lake build up over time.
9. Most fungi are made up of threadlike structures called spores.
10. Fungi produce spores in structures called fruiting bodies.

Writing in Science

Informational Pamphlet Create a pamphlet to teach young children about fungi. Explain where fungi live, how they feed, and the roles they play. Include illustrations as well.

Discovery Channel SCHOOL
Protists and Fungi
Video Preview
Video Field Trip
Video Assessment

Go Online PHSchool.com
For: Self-assessment
Visit: PHSchool.com
Web Code: cea-1030
Students can take a practice test online that is automatically scored.

All in One Teaching Resources
- Transparency A26
- Chapter Test
- Performance Assessment Teacher Notes
- Performance Assessment Student Worksheet
- Performance Assessment Scoring Rubric

ExamView® Computer Test Bank CD-ROM

Review and Assessment

Organizing Information

a. Algal growth increases.
b. Layer of algae prevents sunlight from reaching plants and other algae beneath. These plants and algae die.
c. Decomposers increase in number and use up oxygen in the water.

Reviewing Key Terms

1. c **2.** b **3.** c **4.** c **5.** b
6. false; cilia
7. false; algae
8. true
9. false; hyphae
10. true

Writing in Science

Writing Mode Description

Scoring Rubric

4 Includes detailed, accurate information for all criteria and illustrations; art is neat and supports text
3 Includes all criteria; art somewhat extraneous
2 Minimally meets all criteria
1 Includes inaccurate or incomplete information

Protists and Fungi

Show the Video Assessment to review chapter content and as a prompt for the writing assignment. Discussion questions: **Describe the relationship between fungi and algae in lichens.** *(In a lichen, the alga provides food for the fungus, while the fungus provides water and shelter for the alga; both organisms benefit.)* **What important role do fungi play in the ecosystem in which they live?** *(They act as decomposers and provide food.)*

Checking Concepts

11. An amoeba extends pseudopods around a food particle to engulf it.

12. Algae range from unicellular to huge multicellular individuals, as well as unicellular forms living in colonies.

13. Animal-like and funguslike protists are heterotrophs. Plantlike protists are autotrophs, but some can also be heterotrophs.

14. An algal bloom is a rapid increase in a population of algae. In the ocean, an algal bloom can cause a red tide to occur, which is dangerous because the toxins that the algae produce can become concentrated in the bodies of organisms that consume the algae. An algal bloom in a lake can increase the rate of eutrophication, blocking sunlight and depleting oxygen, thus killing organisms in the lake.

15. In sexual reproduction, two hyphae grow together, exchange genetic material, and produce a fruiting body.

16. The fungus benefits from food produced by the algae or bacteria, which obtain shelter, water, and minerals from the fungus.

Thinking Critically

17. Organism A is an amoeba, which engulfs its food with pseudopods. Organism B is a paramecium, which uses cilia to push food-containing water into its oral groove.

18. Most other life forms would probably disappear also. Algae provide food and oxygen for water animals and help maintain the oxygen in the atmosphere.

19. Fungi play many beneficial roles, especially that of decomposer. Killing fungi could allow the accumulation of dead plants and animals. Fungi also help many plants to survive.

20. There could be excess nutrients in the water, or it may be old and need to be changed. The scum could be from eutrophication, a natural process that occurs over time.

21. Keep it aired out, dry, and cool. Molds thrive in warm, moist environments.

Review and Assessment

Checking Concepts

11. Describe the process by which an amoeba obtains its food.

12. Describe the differences among algae in terms of their sizes.

13. Compare how animal-like, plantlike, and funguslike protists obtain food.

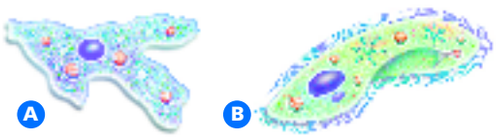
14. What are algal blooms? What problems can they cause in Earth's waters?

15. How does sexual reproduction occur in fungi?

16. Explain how the two organisms that make up a lichen both benefit from their symbiotic relationship.

Thinking Critically

17. **Comparing and Contrasting** Identify the organisms below. Describe the method by which each obtains food. What structures are involved?



18. **Predicting** If all algae suddenly disappeared from Earth's waters, what would happen to living things on Earth? Explain your answer.

19. **Making Judgments** You see an advertisement for a new, powerful fungicide guaranteed to kill most fungi on contact. What should people take into consideration before choosing to buy this fungicide?

20. **Relating Cause and Effect** You see some green scumlike material growing on the walls of your freshwater aquarium at home. List some possible reasons why this growth has occurred.

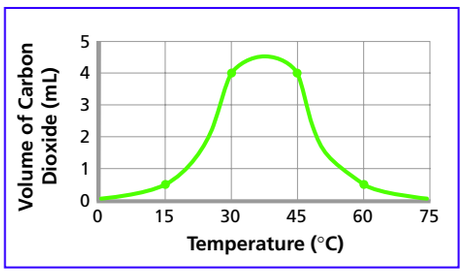
21. **Problem Solving** What are some actions that homeowners can take to discourage the growth of mold in their basements? Explain why these actions might help solve the problem.

Applying Skills

Use the graph to answer Questions 22–25.

When yeast is added to bread dough, the yeast cells produce carbon dioxide, which causes the dough to rise. The graph below shows how temperature affects the amount of carbon dioxide that is produced.

Temperature and Carbon Dioxide Production



22. **Interpreting Data** Based on the graph, at what temperature does yeast produce the most carbon dioxide?

23. **Inferring** Use the graph to explain why yeast is dissolved in warm water, rather than in cold water, when it is used to make bread.

24. **Predicting** Based on the graph, would you expect bread dough to rise if it were placed in a refrigerator (which is kept at about 2° to 5°C)? Explain.

25. **Drawing Conclusions** Explain how temperature affects the amount of carbon dioxide that the yeast cells produce.

Lab zone Chapter Project

Performance Assessment Create a poster that summarizes your experiment for the class. In your poster, include your hypothesis and describe the conditions that produced the best mushroom growth. Use diagrams and graphs to display your results. Did the project raise any new questions about mushrooms for you? If so, how could you answer those questions?

Lab zone Chapter Project

L3

Project Wrap-Up Provide students with materials for making the posters. Set aside time for them to work on posters during class, and allow them to look at each other's posters for ideas. Students should organize information on their posters in a clear manner.

Reflect and Record Some students may have found it difficult to organize their results because they changed the variables too often or were not confident of their results. Students may propose another experiment or talking to an expert as a way of answering their questions.

Standardized Test Prep

Test-Taking Tip

Reading All the Answer Choices

Always read *every* answer choice in a multiple-choice question before selecting the answer you think is correct. If you stop reading as soon as you find an answer that seems correct, you may not notice another choice that is more complete or accurate. Or you may not see that "all of the above" is given as one of the answer choices.

Sample Question

Which of the following is true of a lichen that is composed of fungus and an alga?

A The alga provides food for the fungus.
B The fungus provides the alga with shelter, water, and minerals.
C The fungus is a heterotroph and cannot photosynthesize.
D all of the above

Answer

Choice **D** is the correct answer because all choices are correct. The fungus and alga that make up a lichen depend on one another. The fungus depends on the alga for food. In turn, the fungus provides the alga with water, minerals, and a place to live.

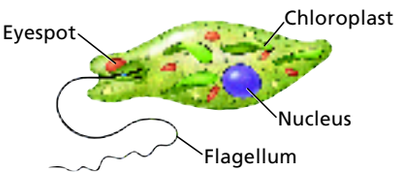
Choose the letter of the best answer.

1. Roberto fills a petri dish with pond water containing a mixture of protozoans and algae. He covers half the dish with aluminum foil and places it on a sunny windowsill. Predict what Roberto might observe after several days.
A The protozoans and algae would be evenly distributed throughout the dish.
B The protozoans and algae would be found only in the covered half of the petri dish.
C More algae would be found in the uncovered half of the dish.
D The protozoans can now make their own food.

2. Which of the following statements about fungus reproduction is true?
F Fungi reproduce sexually by budding.
G Fungi reproduce by making spores.
H Fungi reproduce asexually when two hyphae join together and exchange genetic material.
J Fungi do not reproduce sexually.

3. Which of the following statements about a paramecium is correct?
A It has two contractile vacuoles that remove excess water from the cytoplasm.
B It uses cilia to move.
C It has two nuclei.
D all of the above

4. Which structure tells you that the euglena shown below is an autotroph?



F eyespot
G flagellum
H nucleus
J chloroplast

5. Which of the following is true of algal blooms?
A They occur only in fresh water.
B They occur only in salt water
C They occur when nutrients in the water increase.
D They are caused by animal-like protists.

Constructed Response

6. During a hike in a state park, you notice some mushrooms growing on a log. Describe how the mushrooms use the log as a food source. Include information on what mushroom structures play a role in the process and the sequence of events that occur.

Applying Skills

22. At about 38°C

23. Yeast must be active and produce carbon dioxide so the dough will rise, and it is more active in warm water.

24. No. For the most part the dough would not continue to rise because yeast are usually inactive at that temperature.

25. The optimal temperature range for yeast activity is between 30°C and 45°C. Above or below this range, the amount of carbon dioxide produced decreases sharply.

Standardized Test Prep

1. C **2.** G **3.** D **4.** J **5.** C

6. The hyphae of the mushrooms grow into the log, which is a food source. Digestive chemicals from the hyphae ooze into the log and break it down into small substances that the hyphae can absorb.