

Bio-10-Q2W6-Qs. Bank-Fungi

Matching

Match each item with the correct statement below.

- | | |
|-----------------------|--------------------|
| a. basidiomycetes | e. pioneer species |
| b. mycorrhizae | f. deuteromycetes |
| c. alga | g. penicillin |
| d. <i>Penicillium</i> | h. plant |

- _____ 1. is an example of a deuteromycote.
- _____ 2. A mycorrhiza is a mutualistic relationship between a fungus and a(n) _____.
- _____ 3. is an antibiotic produced by a deuteromycote.
- _____ 4. Plants that have _____ associated with their roots grow larger.
- _____ 5. make up a division of fungi that have no known sexual stage.
- _____ 6. A lichen is a mutualistic relationship between a fungus and a(n) _____ or cyanobacterium.
- _____ 7. Lichens are _____ in all parts of the world.
- _____ 8. Scientists think that ascomycotes and _____ evolved from a common ancestor.

Match each item with the correct statement below.

- | | |
|----------------|---------------|
| a. lichen | f. stolons |
| b. chitin | g. sporangium |
| c. gametangium | h. zygospore |
| d. haustoria | i. ascospore |
| e. mycorrhiza | j. ascus |

- _____ 9. in zygomycotes, the haploid structure in which gametes are produced
- _____ 10. symbiotic association in which a fungus lives in close contact with the roots of a plant partner
- _____ 11. spore produced by sac fungi
- _____ 12. saclike structure in which sexual spores develop in some fungi
- _____ 13. symbiotic association between a fungus and a green alga or cyanobacterium
- _____ 14. complex carbohydrate in the cell walls of fungi
- _____ 15. hyphae that grow horizontally along the surface of a food source
- _____ 16. thick-walled spores adapted to withstand unfavorable conditions
- _____ 17. case in which asexual spores are produced
- _____ 18. in parasitic fungi, specialized hyphae that penetrate cells and absorb nutrients

Completion

Complete each statement.

- 19. Fungi reproduce _____ by fragmentation, budding, or producing spores.
- 20. In _____, pieces of hyphae grow into new mycelia.
- 21. The process of a parent cell undergoing mitosis and producing a new individual that pinches off, matures, and separates from the parent is called _____.
- 22. When environmental conditions are right, a _____ may germinate and produce a threadlike _____ that will grow into a mycelium.

23. Some hyphae grow away from the mycelium to produce a spore-containing structure called a _____.
24. In most fungi, the structures that support _____ are the only part of the fungus that can be seen.
25. Fungi may produce spores by _____ or _____.
26. Many adaptations of fungi for survival involve _____.
27. _____ protect spores and keep them from drying out until they are released.
28. A single puffball may produce a cloud containing as many as _____ spores.
29. Producing a large number of spores increases a species' chances of _____.
30. Fungal spores can be dispersed by _____, _____, and _____.

Essay

31. What are the threadlike filaments in a multicellular fungus called? What do they form?
32. Some hyphae are divided into individual cells by cross walls with pores in them. What are these cross walls called? What purpose do the pores serve?
33. What are basidia and where are they found?
34. What does a mycelium with two nuclei in its cells form?

Modified True/False

Indicate whether the statement is true or false. If false, change the identified word or phrase to make the statement true.

- _____ 35. A lichen is the result of a mutual relationship between a fungus and an algae or cyanobacteria.
- _____ 36. Mycorrhizae is a mutualistic relationship between fungi and algae.
- _____ 37. Basidiospores are produced by mushrooms.
- _____ 38. Zygospores are found in saclike structures produced by specialized hyphae.
- _____ 39. Specialized hyphae called haustoria penetrate the cells of a host tree and provide additional surface for absorption of water and minerals.
- _____ 40. A unique feature of fungal decomposition is that organic material is digested inside the fungal cells.
- _____ 41. No fungus contains chlorophyll in its hyphal cells.
- _____ 42. All fungi have cell walls made of cellulose.
- _____ 43. Bread mold is able to penetrate the bread by means of zygospores.
- _____ 44. The fungus that produces penicillin is an example of a basidiomycote.
- _____ 45. Mushrooms are examples of club fungi.
- _____ 46. The short-lived reproductive structure in mushrooms is the mycelium.

- ___ 47. Mycorrhizae increase the reproductive surface of plant roots. _____
- ___ 48. During asexual reproduction, ascomycotes produce ascospores. _____

Multiple Choice

Identify the choice that best completes the statement or answers the question.

- ___ 49. Fossils of fungi are rare due to _____.
 a. their late appearance on the Geologic Time Scale
 b. their lack of species diversity
 c. their composition of soft materials
 d. their ability to form protective zygosporoes
- ___ 50. The bread mold, Rhizopus, produces sexual zygosporoes when _____.
 a. environmental conditions are unfavorable
 b. environmental conditions are favorable
 c. there is moist food
 d. rhizoids are present
- ___ 51. In hyphae divided by septa, cytoplasm flows from one cell to the next through _____.
 a. haustoria
 b. chitin
 c. spores
 d. pores
- ___ 52. Fungi that transform complex organic substances into raw materials that other organisms can use are _____.
 a. parasites
 b. mutualists
 c. decomposers
 d. autotrophs
- ___ 53. One criterion for classifying fungi is by how they _____.
 a. form symbiotic relationships
 b. reproduce
 c. obtain their food
 d. recycle nutrients

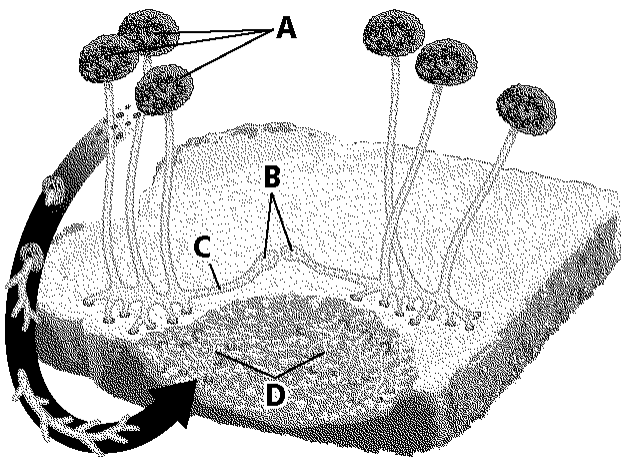


Figure 20-2

- ___ 54. In Figure 20-2, where are spores formed?
 a. A
 b. B
 c. C
 d. D
- ___ 55. In Figure 20-2, which structures gather nutrients?
 a. A
 c. C

- b. B
d. D
56. In Figure 20-2, where will sexual reproduction happen?
a. A c. C
b. B d. D
57. In Figure 20-2, which structure acts as an anchor?
a. A c. C
b. B d. D
58. In Figure 20-2, what would cause a zygospore to form at B?
a. moisture c. an overabundance of food
b. unfavorable environmental conditions d. heat

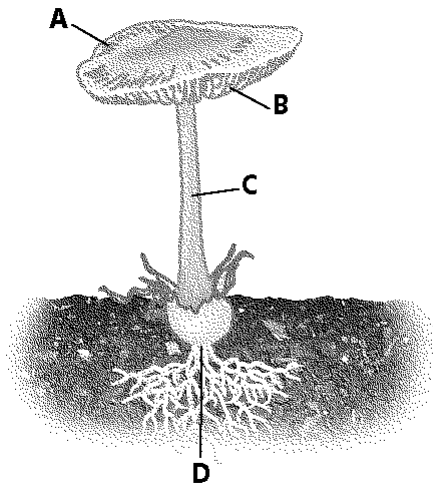


Figure 20-3

59. Where are spores released in the organism shown in Figure 20-3?
a. A c. C
b. B d. D
60. Where does meiosis in the organism shown in Figure 20-3?
a. A c. C
b. B d. D

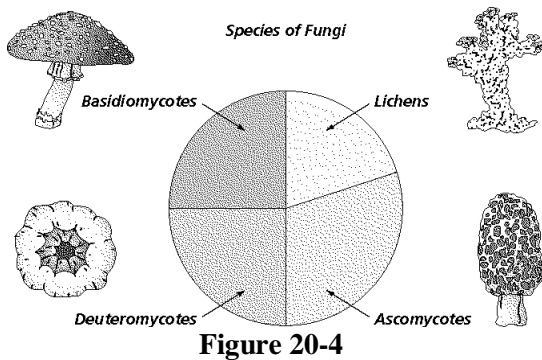


Figure 20-4

61. According to Figure 20-4, which type of fungi has the most species?
a. deuteromycotes c. lichens

- _____ 62. Mushrooms, which are basidiomycetes, make up what percentage of the fungi species, according to Figure 20-4?
- | | |
|-------------------|----------------|
| b. basidiomycetes | d. ascomycetes |
| a. 4% | c. 25% |
| b. 20% | d. 50% |

Short Answer

63. Compare and contrast *basidium* and *basidiospore*.
64. Compare and contrast *hypha* and *mycelium*.
65. Why is it important to make sure enough dirt is kept around the roots when transplanting a plant?
66. Describe what you think Earth would be like if there were no fungi to decompose dead materials.
67. Imagine that you discover an organism growing near the base of a tree in your yard. How could you determine whether the organism is a fungus?
68. Why are mycorrhiza economically important?
69. How is a zygospore formed?
70. How is reproduction in the deuteromycetes different from that in the other fungi?
71. How does the symbiotic relationship in a lichen benefit both organisms?
72. What are three different feeding relationships in which fungi are engaged?
73. How do fungi obtain nutrients? What is this process called?
74. A biologist proposes classifying fungi along with the protists, rather than as a separate kingdom. Why might this suggestion be accepted? Why might the suggestion be rejected?
75. Fossil plants often had mycorrhizal roots. How might the mycorrhizal association have played a role in the invasion of plants on land?
76. Hypothesize about how mycorrhizal associations may have evolved.
77. Wheat rust is a fungus that causes enormous damage to wheat crops. The life cycle of wheat rust alternates between two different hosts: wheat plants and barberry bushes. The rust needs both hosts to complete its sexual cycle. What could farmers do to eradicate the disease?
78. A soil fungus is one of the sources of cyclosporine. This drug is given to patients about to receive an organ transplant. Cyclosporine suppresses the body's natural response, which is to reject the organ transplant as a foreign substance. Hypothesize about how cyclosporine may be useful to the fungus that produces it.

To study the effect of mycorrhizal associations, one investigator grew six seedlings in nutrient solution. The seedlings illustrated in the drawing in Figure 20-1 were then placed in soil that contained no mycorrhizal fungi. The seedlings illustrated on the right were grown first in forest soil rich in mycorrhizal fungi and were then transferred to the soil without mycorrhizal fungi. All the plants grew for the same amount of time.

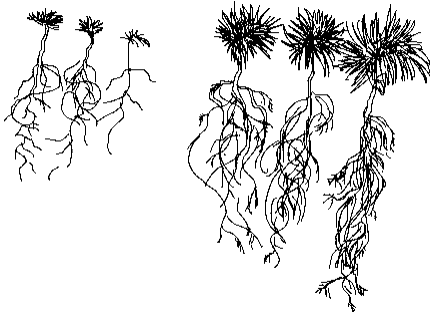


Figure 20-1

79. Plan an experiment to prove your hypothesis. Refer to Figure 20-1.
80. You have been given six healthy plants that were grown in soil with mycorrhizal fungi. Hypothesize what might happen to the mycorrhizae if you transplant the plants to soil that is phosphate rich. For your answer, refer to Figure 20-1.
81. Referring to Figure 20-1, what was the control in the investigation?
82. What was the variable in this investigation? See Figure 20-1.

At first, it may seem that the fungus receives the greatest benefit from a mycorrhizal association. After all, a plant can produce organic compounds that the fungus can use. However, the fungus is also useful to the plant. For one thing, the fungal hyphae increase the absorptive surface of the plant roots. Table 20-2 records the inflow of phosphate in two kinds of onion plants—mycorrhizal and non-mycorrhizal plants.

Inflow of Phosphate in Onion Plants			
Trials	Interval Duration (days)	Inflow (pmol/cm/s)	
		Mycorrhizal	Non-mycorrhizal
1	14	0.17	0.050
2	7	0.22	0.016
3	10	0.13	0.042
Averages:		0.17	0.036

Table 20-2

83. Why do mycorrhizal plants take in more phosphate than non-mycorrhizal plants? Refer to Table 20-2.
84. In each of the trials recorded in Table 20-2, contrast the amount of phosphate that moved into an onion plant that is mycorrhizal with the phosphate in an onion plant that is non-mycorrhizal. What conclusion do you reach?

Problem

85. Complete Table 20-1.

Division of Fungi	Reproduce Sexually	Example of Fungi
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		<i>Rhizopus</i>
		Mushrooms
		Yeast
		<i>Penicillium</i>

Table 20-1

Bio-10-Q2W6-Qs. Bank-Fungi
Answer Section

MATCHING

- | | | | |
|-------------------|--------|--------|-----------|
| 1. ANS: D | PTS: 1 | | |
| 2. ANS: H | PTS: 1 | | |
| 3. ANS: G | PTS: 1 | | |
| 4. ANS: B | PTS: 1 | | |
| 5. ANS: F | PTS: 1 | | |
| 6. ANS: C | PTS: 1 | | |
| 7. ANS: E | PTS: 1 | | |
| 8. ANS: A | PTS: 1 | | |
| | | | |
| 9. ANS: C | PTS: 1 | DIF: B | OBJ: 20-4 |
| NAT: C4 C5 C6 | | | |
| 10. ANS: E | PTS: 1 | DIF: B | OBJ: 20-5 |
| NAT: F1 F4 F5 | | | |
| 11. ANS: I | PTS: 1 | DIF: B | OBJ: 20-4 |
| NAT: C4 C5 C6 | | | |
| 12. ANS: J | PTS: 1 | DIF: B | OBJ: 20-4 |
| NAT: C4 C5 C6 | | | |
| 13. ANS: A | PTS: 1 | DIF: B | OBJ: 20-5 |
| NAT: F1 F4 F5 | | | |
| 14. ANS: B | PTS: 1 | DIF: B | OBJ: 20-1 |
| NAT: C4 C6 F5 | | | |
| 15. ANS: F | PTS: 1 | DIF: B | OBJ: 20-1 |
| NAT: C4 C6 F5 | | | |
| 16. ANS: H | PTS: 1 | DIF: B | OBJ: 20-4 |
| NAT: C4 C5 C6 | | | |
| 17. ANS: G | PTS: 1 | DIF: B | OBJ: 20-4 |
| NAT: C4 C5 C6 | | | |
| 18. ANS: D | PTS: 1 | DIF: B | OBJ: 20-2 |
| NAT: C4 C6 F5 | | | |

COMPLETION

19. ANS: asexually
- PTS: 1
20. ANS: fragmentation
- PTS: 1
21. ANS: budding

- PTS: 1
22. ANS: spore, hypha
- PTS: 1
23. ANS: sporangium
- PTS: 1
24. ANS: sporangia
- PTS: 1
25. ANS: mitosis, meiosis
- PTS: 1
26. ANS: spores
- PTS: 1
27. ANS: Sporangia
- PTS: 1
28. ANS: 1 trillion
- PTS: 1
29. ANS: survival
- PTS: 1
30. ANS: water, wind, animals
- PTS: 1

ESSAY

31. ANS:
The threadlike filaments are called hyphae, which branch out to form a mycelium.
- PTS: 1
32. ANS:
The cross walls are called septa. Cytoplasm and organelles flow through the pores. The free-flowing cytoplasm quickly moves nutrients to different parts of the fungus.
- PTS: 1
33. ANS:
Basidia are spore-producing club-shaped hyphae found on gills, the thin tissues under the mushroom cap.
- PTS: 1
34. ANS:
It forms a button, which develops into a mushroom.
- PTS: 1

MODIFIED TRUE/FALSE

35. ANS: T PTS: 1 DIF: B
OBJ: 20-5 NAT: F1 | F4 | F5
36. ANS: F, the roots of a plant
PTS: 1 DIF: B OBJ: 20-5 NAT: F1 | F4 | F5
37. ANS: T PTS: 1 DIF: B
OBJ: 20-4 NAT: C4 | C5 | C6
38. ANS: F, Ascospores
PTS: 1 DIF: B OBJ: 20-4 NAT: C4 | C5 | C6
39. ANS: F, absorb nutrients from the living cells of their hosts
PTS: 1 DIF: B OBJ: 20-1 NAT: C4 | C6 | F5
40. ANS: F, outside
PTS: 1 DIF: B OBJ: 20-2 NAT: C4 | C6 | F5
41. ANS: T PTS: 1 DIF: B
OBJ: 20-1 NAT: C4 | C6 | F5
42. ANS: F, chitin
PTS: 1 DIF: B OBJ: 20-1 NAT: C4 | C6 | F5
43. ANS: F, rhizoids
PTS: 1 DIF: B OBJ: 20-1 NAT: C4 | C6 | F5
44. ANS: F, deuteromycote
PTS: 1 DIF: B OBJ: 20-3 NAT: C4 | C5 | C6
45. ANS: T PTS: 1 DIF: B
OBJ: 20-3 NAT: C4 | C5 | C6
46. ANS: F, cap and stalk
PTS: 1 DIF: B OBJ: 20-3 NAT: C4 | C5 | C6
47. ANS: F, absorptive
PTS: 1 DIF: B OBJ: 20-5 NAT: F1 | F4 | F5
48. ANS: F, conidiospores
PTS: 1 DIF: B OBJ: 20-3 NAT: C4 | C5 | C6

MULTIPLE CHOICE

49. ANS: C PTS: 1 DIF: B OBJ: 20-1
NAT: C4 | C6 | F5
50. ANS: A PTS: 1 DIF: B OBJ: 20-4
NAT: C4 | C5 | C6

51.	ANS: D NAT: C4 C6 F5	PTS: 1	DIF: B	OBJ: 20-1
52.	ANS: C NAT: C4 C6 F5	PTS: 1	DIF: B	OBJ: 20-2
53.	ANS: B NAT: C4 C5 C6	PTS: 1	DIF: B	OBJ: 20-3
54.	ANS: A NAT: C4 C5 C6	PTS: 1	DIF: A	OBJ: 20-4
55.	ANS: D NAT: C4 C5 C6	PTS: 1	DIF: A	OBJ: 20-4
56.	ANS: B NAT: C4 C5 C6	PTS: 1	DIF: A	OBJ: 20-4
57.	ANS: D NAT: C4 C5 C6	PTS: 1	DIF: A	OBJ: 20-4
58.	ANS: B NAT: C4 C5 C6	PTS: 1	DIF: A	OBJ: 20-4
59.	ANS: B NAT: C4 C5 C6	PTS: 1	DIF: A	OBJ: 20-4
60.	ANS: B NAT: C4 C5 C6	PTS: 1	DIF: A	OBJ: 20-4
61.	ANS: D NAT: F1 F4 F5	PTS: 1	DIF: A	OBJ: 20-5
62.	ANS: C NAT: F1 F4 F5	PTS: 1	DIF: A	OBJ: 20-5

SHORT ANSWER

63. ANS:
A basidium is a club-shaped hypha that produces spores. A spore produced on a basidium is called a basidiospore.
- PTS: 1 DIF: A OBJ: 20-4 NAT: C4 | C5 | C6
64. ANS:
In a multicellular fungus, a hypha is a basic structural unit in the form of threadlike filaments. A network of these fungal filaments forms a mycelium.
- PTS: 1 DIF: A OBJ: 20-1 NAT: C4 | C6 | F5
65. ANS:
If the roots are bare, the mycorrhizae associated with them will be stripped away. Without the mycorrhizae, most plants will not grow well.
- PTS: 1 DIF: A OBJ: 20-5 NAT: F1 | F4 | F5
66. ANS:
Without fungi to decompose dead materials, organic wastes would build up. Decomposition of organic wastes would still be carried out by some bacteria, but the speed of decomposition would slow dramatically.
- PTS: 1 DIF: A OBJ: 20-2 NAT: C4 | C6 | F5
67. ANS:

If the organism is eukaryotic and has chitin cell walls, it is a fungus. Fungi lack chloroplasts and have no cellulose in their cell walls.

PTS: 1 DIF: A OBJ: 20-1 NAT: C4 | C6 | F5

68. ANS:

This relationship between plant roots and fungi helps plants to grow larger and be more productive.

PTS: 1 DIF: A OBJ: 20-5 NAT: F1 | F4 | F5

69. ANS:

The tips of two different mycelia, each with a haploid nucleus, come together and fuse, forming two gametangia. When the contents of the two gametangia fuse, a diploid zygote forms and develops into a thick-walled zygosporangium.

PTS: 1 DIF: A OBJ: 20-4 NAT: C4 | C5 | C6

70. ANS:

The deuteromycetes have no known sexual phase, whereas the other fungi all have both an asexual and a sexual phase.

PTS: 1 DIF: A OBJ: 20-3 NAT: C4 | C5 | C6

71. ANS:

The alga or cyanobacterium provides food for itself and the fungus. The fungus helps retain moisture, provides the alga with water and minerals, and protects the alga from intense sunlight.

PTS: 1 DIF: A OBJ: 20-5 NAT: F1 | F4 | F5

72. ANS:

A fungus may be a decomposer, a parasite, or a mutualist that lives symbiotically with another organism.

PTS: 1 DIF: A OBJ: 20-2 NAT: C4 | C6 | F5

73. ANS:

Hyphae grow over and into cells and release powerful digestive enzymes, which break large organic molecules into small molecules that then diffuse into the fungus. Because food is digested outside the cells of the fungus, the process is called extracellular digestion.

PTS: 1 DIF: A OBJ: 20-2 NAT: C4 | C6 | F5

74. ANS:

Answers may vary. Fungi, like protists, are eukaryotic and show both plant and animal characteristics. However, most fungi are multicellular and have more complex life cycles than do protists.

PTS: 1 DIF: A OBJ: 20-3 NAT: C4 | C5 | C6

75. ANS:

Answers may vary but may include that the soil in which early plants began to grow lacked sufficient inorganic nutrients for growth. If it hadn't been for mycorrhizal roots, the early plants would have had difficulty in obtaining the minerals they needed. Also, the fungus helped maintain water around the plant, which is an advantage in dry soils.

PTS: 1 DIF: A OBJ: 20-5 NAT: F1 | F4 | F5

76. ANS:

Answers will vary. Some plants living in unfavorable conditions may have become infected with a fungus. If the hyphae of the fungus grew out to where minerals were more plentiful, the beginning of a beneficial relationship would have begun. The fungus would provide the plant with minerals and water, which would make the plant grow larger and healthier than it would without the fungus. In turn, the plant provides sugars and amino acids for the fungus.

PTS: 1 DIF: A OBJ: 20-5 NAT: F1 | F4 | F5

77. ANS:

They could eliminate any barberry bushes in the vicinity of their wheat fields.

PTS: 1 DIF: A OBJ: 20-2 NAT: C4 | C6 | F5

78. ANS:

The substance suppresses a reaction against the fungus by the cells on which the fungus depends for nutrients.

PTS: 1 DIF: A OBJ: 20-1 NAT: C4 | C6 | F5

79. ANS:

Answers will vary, but approaches should be based on using the six plants with mycorrhizae. Transplant three to phosphate-rich soil; after a period of time, compare the mass of these plants and their fungal mass with plant and fungal mass of the three control plants.

PTS: 1 DIF: A OBJ: 20-5 NAT: F1 | F4 | F5

80. ANS:

Answers will vary but may include that the mycorrhizae may proliferate, producing much larger plants and larger fungal mass.

PTS: 1 DIF: A OBJ: 20-5 NAT: F1 | F4 | F5

81. ANS:

The control was the group of plants grown only in the soil without mycorrhizal fungi.

PTS: 1 DIF: A OBJ: 20-5 NAT: F1 | F4 | F5

82. ANS:

The variable was the kind of soil in which the plants were first grown.

PTS: 1 DIF: A OBJ: 20-5 NAT: F1 | F4 | F5

83. ANS:

Answers will vary but may include that the mycorrhizal mycelium greatly increases the absorptive surface of the plant roots. Also, because the mycelium grows farther out into the soil, it obtains phosphates that are otherwise inaccessible to the plant.

PTS: 1 DIF: A OBJ: 20-5 NAT: F1 | F4 | F5

84. ANS:

In the first trial, the mycorrhizal onion plants took in more than three times as much phosphate as the non-mycorrhizal plants. In the second trial, the mycorrhizal plant absorbed more than 13 times as much phosphate. In the third trial, the mycorrhizal plant took in more than three times as much phosphate as the non-mycorrhizal plant. The conclusion would be that the mycorrhizal relationship greatly increases phosphate inflow.

PTS: 1 DIF: A OBJ: 20-5 NAT: F1 | F4 | F5

PROBLEM

85. ANS:

Division of Fungi	Reproduce Sexually	Example of Fungi
Zygomycota	both sexually and asexually	<i>Rhizopus</i>
Basidiomycota	yes	Mushrooms
Ascomycota	yes	Yeast
Deuteromycota	both sexually and asexually	<i>Penicillium</i>

Table 20-1

PTS: 1

DIF: A

OBJ: 20-3

NAT: C4 | C5 | C6