

Fungus Lab

Pre-Lab Discussion

Fungi are heterotrophic eukaryotes with cell walls that contain chitin. Most people think only of mushrooms as fungi, but in fact mushrooms are just the fruiting body, reproductive structures, of a much larger organism. Most of the fungal organism is found underground in a mass of branching hyphae called mycelium below the soil.

Mushrooms are not the only type of fungi. More than 100,000 species of fungi are known and the organisms are separated from one another in how they reproduce. All fungi can reproduce asexually by cell division of the mycelium, but fungi sexually reproduce differently in each phylum.

In this lab investigation, you will observe fungus specimens from different phyla. You will be able to compare the similarities and differences between the fungi and their reproductive structures, and be able to describe their role in the environment.

Problem

What are the differences in reproduction and form between the fungus phyla?

Materials (per pair)

Microscope

Prepared slides of:

- *Rhizopus sp.*
- *Rhizopus sp. conjugation*
- *Peziza sp.*
- Yeast
- *Penicillium sp.*
- *Aspergillus sp.*
- Lichen

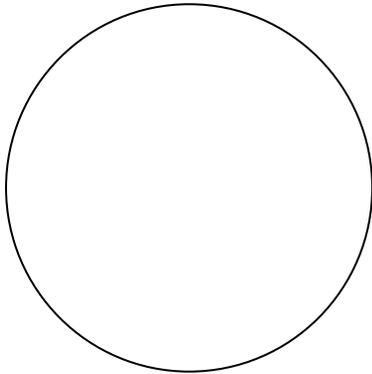
Safety

Always handle the microscope with extreme care. You are responsible for its proper care and use. Always use caution when handling glass slides as they can break easily and cut you. Always use special caution when working with laboratory organisms. Be cautious of the mushrooms, yeast and blue cheese if you may be allergic.

Procedure

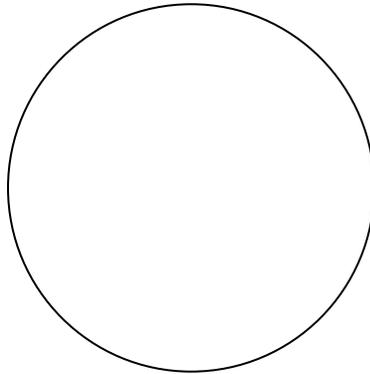
Part I: Zygomycota

- A. Obtain a common bread mold slide. In the first circle, draw *Rhizopus*. Obtain a slide of *Rhizopus* conjugation. In the second circle, draw a **gametangia**. In the third circle, draw a **zygospore**. Label the diagrams as indicated



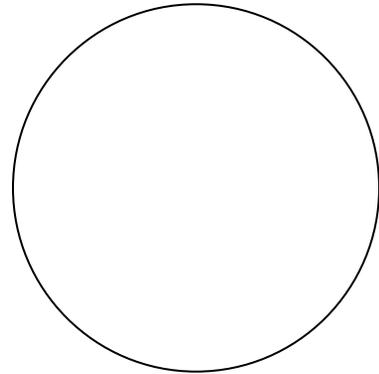
Rhizopus

Label: Sporangiphore
Rhizoids
Sporangium
Spores



Gametangia

Label: + Stolon
- Stolon
Gametangia



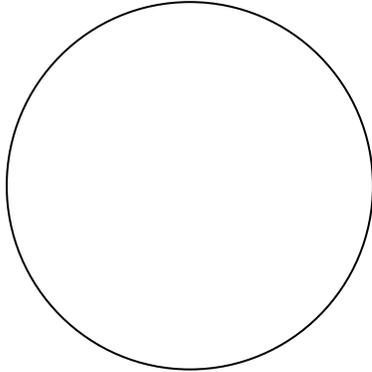
Zygospore

Label: + Stolon
- Stolon
Zygospore

1. What type of reproduction includes a sporangium?
2. What type of reproduction includes gametangia and zygospores?
3. If you collected a large mass of *Rhizopus* and transferred it to an orange and then collected a large mass of *Aspergillus* from an orange and transferred it to a slice of bread, both of the fungi would die. Explain why this happens.

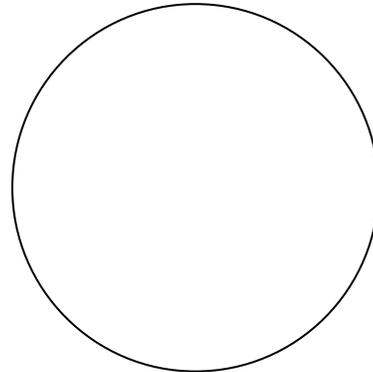
Part II: Ascomycota

A. Draw **Yeast** and ***Peziza sp.*** from a slide. Label as indicated.



Yeast

Label: Cell wall
Cytoplasm
Bud



Peziza sp.

Label: Cell wall
Cytoplasm
Ascospore
Ascus

4. What type of reproduction did you observe in the yeast?

5. What type of reproduction did you observe in the *Peziza sp.*?

6. Yeast cells are very versatile – they are facultative anaerobes. Humans have been using yeast cells for centuries. List 2 different uses for yeast.
 - a.

 - b.

Part III: Basidiomycota

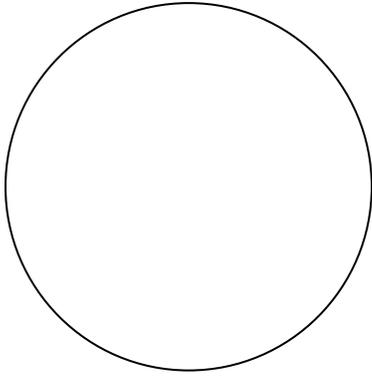
- A. Use the live specimen and the diagram in the book to draw a **Mushroom**. Label as indicated.

Label: Cap
Gills
Stipe (stalk)
Rhizoids

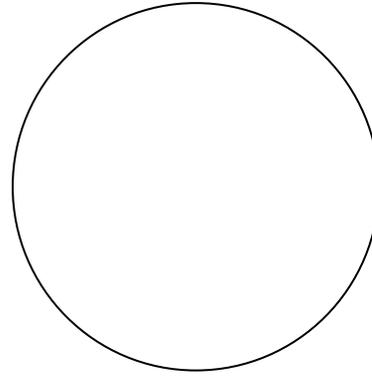
7. Where are basidiospores produced on the mushroom?
8. What is the reproductive structure of a basidiomycota that grows from the mycelium?
9. Assume that it is mid-summer and you just mowed the lawn. That night a heavy rain falls and the next morning you notice mushrooms all over the yard! Cell divisions can take place rapidly in fungi, but not that fast! Explain this explosion of fungi in your yard. HINT: Read in your book about fungi in section 21.4.

Part IV: Deuteromycota

A. Draw *Penicillium sp.* and *Aspergillus sp.* from the slides. Label as indicated.



Penicillium sp.



Aspergillus sp.

Label: Conidia
Conidiophore
Rhizoids

Label: Conidia
Conidiophore
Rhizoids

10. In 1928, Alexander Fleming discovered something special. He notices one of his petri dishes of *Staphylococcus* (a bacteria) was contaminated with fungal growth. At first he thought that his experiment was ruined, but then realized that in the area near the fungi, all the bacteria were dead! HINT: Use the index of your textbook for help!

- a. What was Fleming's conclusion from this last observation?

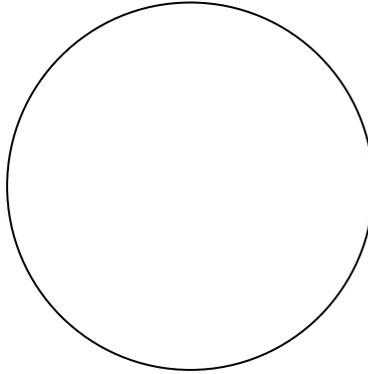
- b. Name the fungus Fleming found in his petri dish.

- c. What does this fungus produce that affected bacteria.

Part V: Lichens

A. Draw a cross section (c.s.) of a **Lichen** from a slide. Label as indicated.

Label: Algal cells
Dense fungal hyphae
Loose fungal hyphae



11. Many organisms form symbiotic relationships. There are several types of symbiotic relations. Sometimes one organism is harmed and the second organism benefits. With lichens, both organisms benefit. What is the name of a symbiotic relationship where both organisms benefit?

12. What is the function of the *fungus* in this mutualistic relationship of the lichen?

13. What is the function of the *algae* in this mutualistic relationship of the lichen?