



Kingdom Fungi Coloring Worksheet

The basic structural features of fungi are not cells but hyphae. Hyphae are microscopic branching filaments filled with cytoplasm and nuclei. Each thread consists of a tube formed from a wall enclosing cytoplasm and a vacuole. The hyphal walls are not made of cellulose but of a substance called chitin, also found in the exoskeletons of arthropods, an organic nitrogenous compound. The hyphae contain many nuclei distributed throughout the cytoplasm. Sometimes the hyphae are divided into compartments by cross walls called septa. Fungi with cross walls are called septate fungi, while fungi without cross walls are called coenocytic fungi.

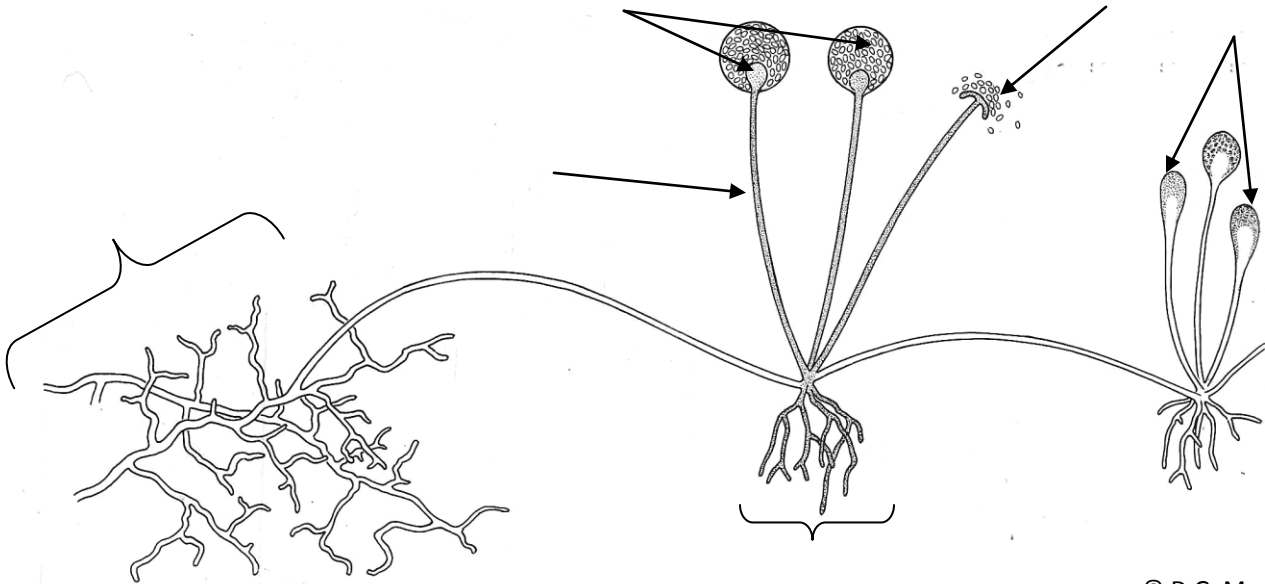
1. What are hyphae?
2. Describe the inside of hyphae.
3. What surrounds the hyphae and what compound is it made of?
4. What are hyphal cross walls called? Are they always present?

The fungi do not have chlorophyll so they cannot make their food in the way that plants do. Fungi, like animals are heterotrophs. However, fungi are absorptive, not ingestive heterotrophs (digest food after they eat it) like animals. They feed on dead or decaying organic matter and are classified as saprophytes. Their hyphae penetrate the dead material and form a branching network called a mycelium. The tips of the growing hyphae produce enzymes which digest the organic material. The soluble products are absorbed into the hyphae. Because fungi digest food first and then absorb it, they are absorptive heterotrophs.

ZYGOMYCOTA (bread Mold)

When bread mold fungi, such as *Rhizopus stolonifer*, grow on stale bread or rotting fruit, the mycelium can be seen as gray colored "fuzz". *Rhizopus* reproduces asexually by sending up vertical hyphae called sporangiophores. Horizontal hyphae called rhizoids connect sporangiophores to each other. Each of these hyphae swells at the tip to produce a sporangium. A sporangium is a type of spore case. The cytoplasm in the sporangium divides repeatedly to produce a mass of spores, each with a nucleus. When the sporangium breaks open, the spores are dispersed in the air, and each can grow to form a new mycelium if it lands on suitable material. This is an asexual type of reproduction, but the mold can also reproduce sexually.

Label and color the parts of *Rhizopus stolonifer* --- mycelium (dark brown), hyphae (light brown), mature sporangium (orange), sporangium releasing spores (yellow), sporangiophores (purple), rhizoid (blue), and an immature sporangium (red).



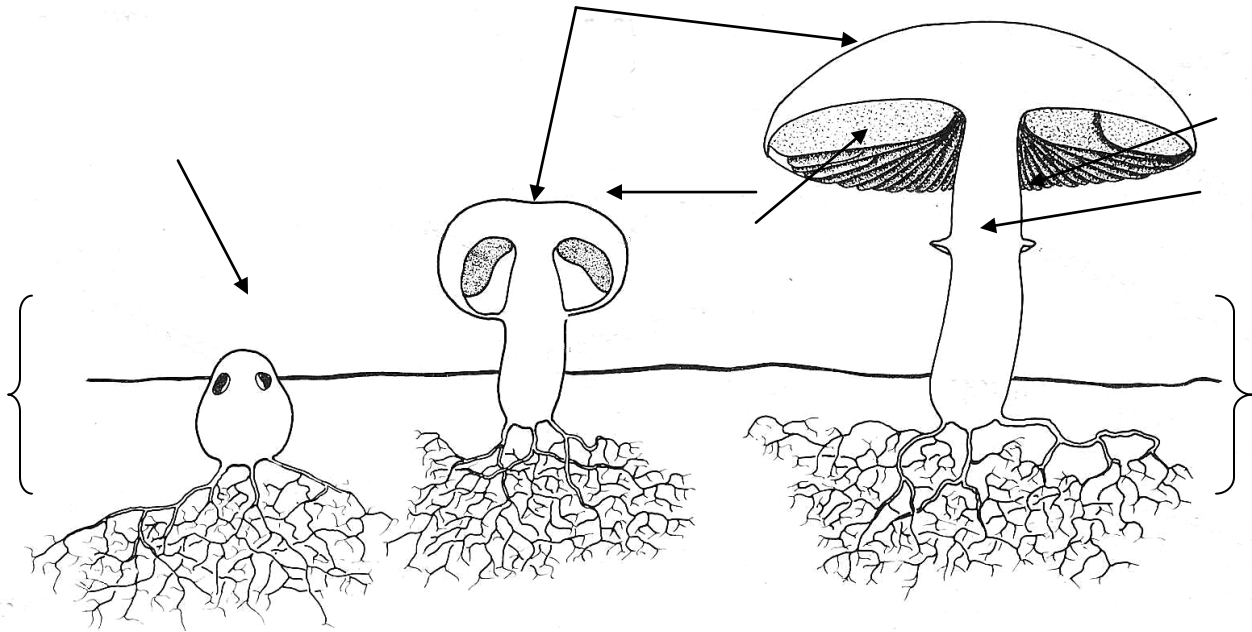
5. Fungi aren't classified with plants. Explain why?
6. Why are fungi classified as heterotrophs like animals?
7. Why are fungi considered as saprobes?
8. Explain how an absorptive heterotroph feeds?
9. What is the scientific name for a common mold that grows on bread?
10. A mass of hyphae that grows into bread to digest it is called what?
11. Vertical hyphae produce what structures?
12. What is the function of these structures?
13. When spores spread and land in a suitable place, what forms?
14. Is this a sexual or asexual method of reproduction?

BASIDIOMYCOTA (Mushrooms and Toadstools)

Mushrooms and toadstools form a large group of fungi which live in the soil or in rotting wood. Their mycelia (plural of mycelium) spread through the soil or the dead wood, dissolving and absorbing the organic substances. The fruiting bodies (part of the organism seen above ground) of *Psalliota campestris* (field mushroom) and *Psalliota arvensis* (horse mushroom) are edible. The fruiting bodies of toadstools are mostly inedible or even poisonous.

Under favorable conditions some of the hyphae just below the soil, mass together into mycelia and form a spherical body that grows rapidly and pushes above the surface. This is what is called the fruiting body. As this body grows, it develops three distinct regions: a stalk called the stipe, a cap or pileus, and gills under the cap. Spores develop on these gills on structures called basidia under the cap. At first, the cap is joined all round its edge to the stalk but later, as a result of the rapid growth of stalk and cap, the cap breaks free leaving a ring of tissue, the annulus or ring, round the stalk. Some fungi also have a sack like structure at their base called the volva.

Label and color BOTH drawings as follows --- forming fruiting body (light brown), mycelia (dark brown), cap (orange), gills (yellow), annulus (violet), and stipe gray.



gills underneath cap

(some fungi have pores or downward-projecting, spine-like teeth beneath the cap)

cap (or pileus)

basidia

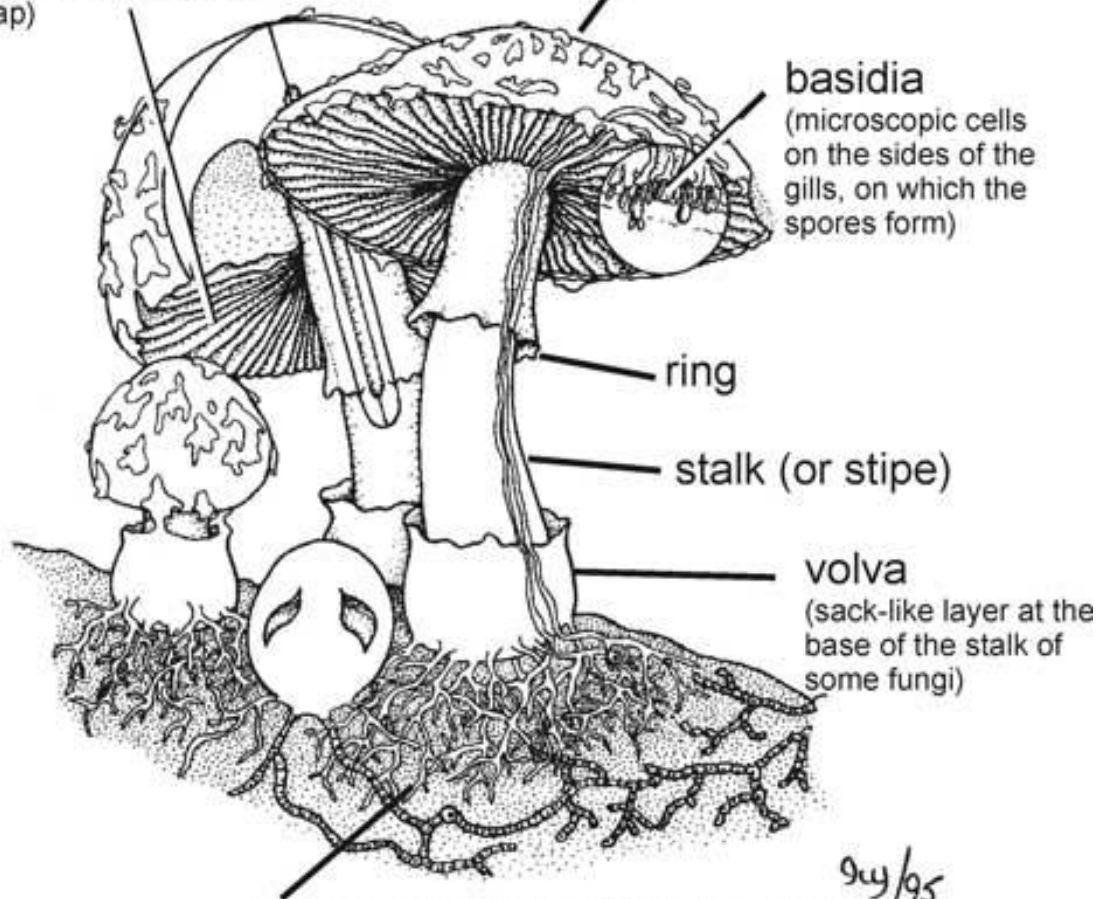
(microscopic cells on the sides of the gills, on which the spores form)

ring

stalk (or stipe)

volva

(sack-like layer at the base of the stalk of some fungi)



Livingstone ©BIODIDAC

microscopic mycelium within the substrate on which the fungus is growing

15. What does the fruiting body form from underground?
16. What is another name for the stalk?
17. What is another name for the cap?
18. What is the ring around the stalk called and what causes it to form?
19. Where do spores form & what are the spore-forming structures called?