Reproduction In Fungi

All fungi reproduce asexually by forming microscopic, one-celled structures called spores. These cells, once released from the parent, will form a new organism if supplied with moisture and food. Fungi form many more spores than will ever mature into new organisms. Chances are a few spores will find suitable growth conditions and will form new organisms.

In this investigation you will:

(a) examine spores from three different fungi.
(b) compare the shape and numbers of spores formed by these three fungi.
(c) estimate the number of spores formed by one mushroom by using a sampling technique.

Materials

microscope	dropper
glass slide	bread mold
coverslip	tweezers
water	*Peziza* (preserved)
pencil with eraser	mushroom
scissors	hand lens or dissecting microscope

Procedure

Part A. Reproductive Structures of Bread Mold

• Use a hand lens or dissecting microscope to observe the mold growing in a dish. This mold is common bread mold.

1. Describe the appearance of bread mold. _____

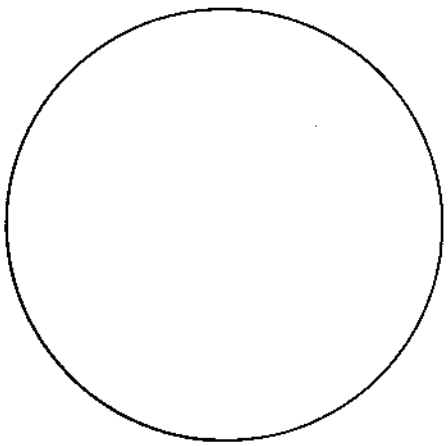
_____

2. What color is the bread mold? _____

• Use tweezers to remove a small piece of the mold from the dish and prepare a wet mount.

• Observe the mold under low and high powers.

A number of structures resembling "lollipops" can be seen. Each stalk has a ball-like structure called a sporangium sitting on top of it. The sporangia are covered with many tiny black dotlike structures called spores. Some spores may have broken loose and can be seen free of the sporangia. Spores are the reproductive parts of fungi. Spores are one cell in size and can form a new fungus if they are provided with ideal growing conditions.



bread mold spores

3. Describe the shape of bread mold spores.

_____

4. Are there few or many spores formed by one fungus? _____

• Diagram what you see in the space provided. Label the spores.

Part B. Reproductive Structures of Cup Fungus

• Observe the mold called *Peziza* or cup fungus. What you are looking at is the reproductive structure of this fungus.

5. Describe the appearance of *Peziza*. _____

_____

6. What color is *Peziza*? _____

• Prepare a wet mount of *Peziza* by following these steps:

• *Step 1:* Use scissors to cut off a very small piece of *Peziza*. **CAUTION:** *Always be careful with scissors.*

• *Step 2:* Place the fungus on a clean glass slide.

• *Step 3:* Add 2 to 3 drops of water.

• *Step 4:* Place a coverslip over the water and fungus.

• *Step 5:* Using the eraser end of a pencil, gently press down on the top of the coverslip to spread out the fungus.

• *Step 6:* Observe the fungus under low and high powers.

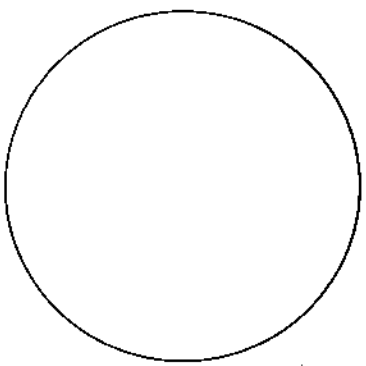
• Look for areas on the slide where one or two fingerlike tubes, asci, can be clearly seen. (The entire fungus is made up of asci.) Each ascus contains spores.

7. Describe the shape of cup fungus spores. _____

_____

8. How many spores are present within each ascus? _____

• Diagram what you see in the space provided. Label the spores.



Peziza spores

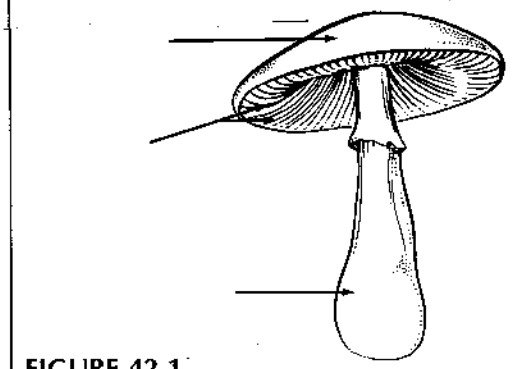


FIGURE 42-1

Part C. Reproductive Structures of a Mushroom

• Identify the three main parts of a mushroom. They are (a) stipe—stalklike part of mushroom, (b) pileus—cap on top of mushroom, and (c) gills—thin, dark brown strips on underside of pileus.

• Label these three parts on Figure 42-1. These three parts of the fungus are its reproductive structures.

9. What color is a mushroom? _____

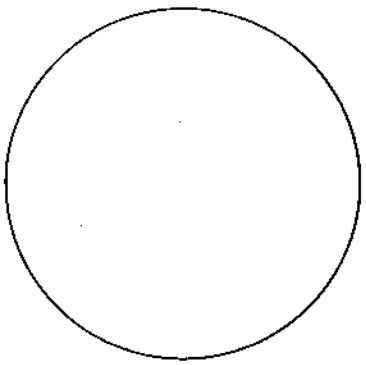
• To observe the reproductive structures of a mushroom, follow the six steps listed in Part B for making a wet mount. This time, however, remove a gill from the mushroom and place it on a glass slide. The tiny dark brown dotlike structures seen through the microscope are spores.

10. Describe the shape of mushroom spores.

_____

11. Are there few or many spores found on one gill? _____

• Diagram what you see in the space provided. Label the spores. Save your wet mount for Part D.



mushroom spores

Part D. Calculating the Number of Spores Formed by One Mushroom

How many spores are produced by one mushroom? It would be a difficult and unpleasant task to count each spore. There is a way, however, of determining the approximate number of spores formed. A sampling technique and some simple mathematics may be used to help determine the approximate number of spores.

- Using the gill wet mount from Part C, count the number of spores that can be observed on one gill under high power. The area you are looking at is called a high power field of view or high power field. Use the row marked Trial 1 in Table 42-1 to record your result.

- Move your slide so that you are looking at a new high power field of the same gill. Count and record spore numbers again using the row in Table 42-1 marked Trial 2.

- Average the number of spores counted in Trials 1 and 2 and record this number in Table 42-1.

TABLE 42-1. SPORES COUNTED UNDER HIGH POWER

TRIAL	NUMBER OF SPORES
1	
2	
Total	
Average	

TABLE 42-2. CALCULATING THE NUMBER OF SPORES ON ONE MUSHROOM

		SAMPLE DATA AND CALCULATIONS		YOUR DATA AND CALCULATIONS
Average number of spores counted under high power	(A)	10	(A′)	(From Table 42-1)
Area of one high power field (Assume ALL scopes are the same)	(B)	.08 mm^2	(B′)	.08 mm^2
Area of one gill measuring 10 × 2 mm (Assume all gills are the same size)	(C)	20.0 mm^2	(C′)	20.0 mm^2
Number of high power fields on each gill	(D)	$\frac{C}{B}$ or $\frac{20.0\ mm^2}{.08\ mm^2} = 250$	(D′)	$\frac{C'}{B'}$ or $\frac{20.0\ mm^2}{.08\ mm^2} = 250$
Number of spores on one side of gill	(E)	A × D or 10 × 250 = 2500	(E′)	A′ × D′ or _____ × 250 = _____
Number of spores on both sides of gill	(F)	E × 2 or 2500 × 2 = 5000	(F′)	E′ × 2 or _____ × 2 = _____
Average number of gills on one mushroom	(G)	160	(G′)	160
Number of spores on one mushroom	(H)	F′ × G′ or 5000 × 160 = 800,000	(H′)	F′ × G′ or _____ × 160 = _____

• Compute the total number of spores in one mushroom, following the steps shown in Table 42-2. The first column is done for you as an example. You complete the second column. (Note: Assumptions have been made with certain values or numbers to help simplify the calculations.)

Analysis

1. (a) What colors were the fungi used in this investigation? _____

   (b) Do fungi have chlorophyll? _____

   (c) What do your answers to (a) and (b) tell you about how fungi obtain food? _____

2. Write a general description of the spores seen in this investigation. Include shape, number of cells, and size. _____

3. Use a word or phrase that best describes the number of spores formed by

   (a) bread mold _____

   (b) *Peziza* _____

   (c) mushroom _____

4. Fungi cannot always be seen growing in nature. Yet, the potential for producing new fungi is tremendous.
   (a) What evidence do you have from Part D of this investigation that one fungus has a high reproductive capability? _____

   (b) Why are there so few fungi if their reproductive capability is so high? _____

5. There are two places in Part D where assumptions were made.

   (a) How could the assumption that all gills measure 10 mm × 2 mm be corrected? _____

   (b) How could the assumption that all mushrooms have 160 gills be corrected? _____