



# **Mushroom Education Packet**

Produced by The American Mushroom Institute

Copyright 2003

For more information, contact:

The American Mushroom Institute  
One Massachusetts Avenue, N.W.  
Suite 800  
Washington, D.C. 20001

A decorative border of mushrooms surrounds the page. The mushrooms are arranged in a rectangular frame, with some mushrooms overlapping the corners and sides. The mushrooms are light brown with darker brown gills and stems.

## Overview

The information in this packet can be used in various ways and adapted to your particular needs. For instance, you can read the text to younger children or you can pass out the text to older students to enable them to read with or without you. Many vocabulary words appear in bold print throughout the text and also appear in the glossary. Vocabulary also appears throughout the material in activity forms, such as word searches and worksheets.

The text in this packet is divided into several major areas: *A History of Mushrooms, Mushroom Farming in the Kennett Square Area, How Mushrooms Grow, The Parts of the Mushroom, and Recycling in the Mushroom Farming Industry.*

The majority of the activities in this material have been correlated to the text. Some activities lend themselves to projects, most particularly the growth of corn in soil or spent compost and the cookbook activity.

Lesson plans for the text have been included as well as suggestions for the activity pages.



## Lesson Plan 1

## A History of Mushrooms

### Preview

*A History of Mushrooms* describes a brief history of the mushroom and the first mushroom farm in America.

### Performance Objectives

This lesson will enable each pupil to do the following:

- Recall and state specific information.
- Interpret the meanings of specific statements.
- Draw conclusions.
- Make inferences about growing conditions.

### Vocabulary

The words that follow can be found in the glossary. Before students read the lesson, introduce the words with which your pupils may be unfamiliar.

<b>Prehistoric</b>	<b>Pharaohs</b>	<b>Forbidden</b>
<b>Warriors</b>	<b>Poisonous</b>	<b>Florist</b>
<b>Damp</b>	<b>Survive</b>	<b>Decaying</b>
<b>Harvested</b>	<b>Edible</b>	<b>Fungi</b>

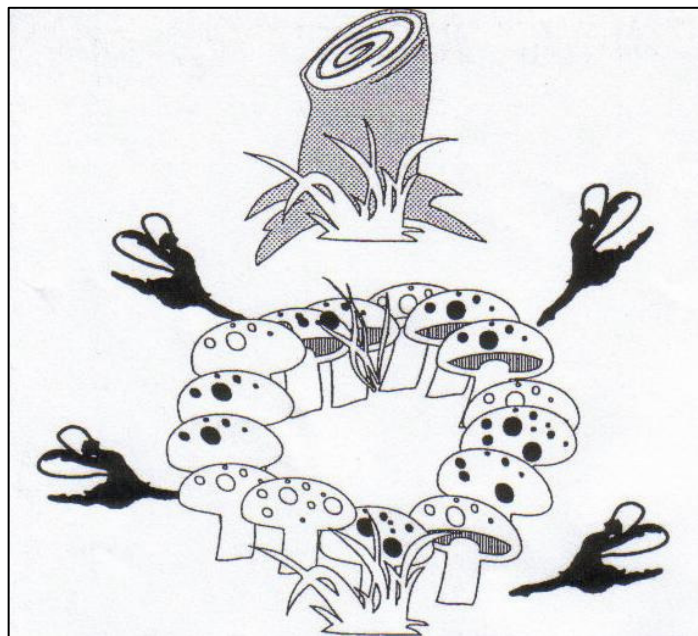
### Reading and Discussion

Ask your students why certain foods might be reserved for kings and warriors. Ask students how something that needs to be raised in the dark could possibly be raised in a place as light and sunny as a greenhouse.

## A History of Mushrooms

Mushrooms are part of a larger group of plants known as **fungi**. A fungus is different from an ordinary green plant because it can't make its own food. Fungi have been around since **prehistoric** days. Remains of fungi have been found in dinosaur pits! The Egyptian **pharaohs** (kings) reserved mushrooms for their own plates. It was **forbidden** for anyone else to eat them. They believed the mushrooms had magical powers. The ancient Romans fed mushrooms only to their **warriors** because they believed mushrooms gave them god-like strength.

Mushrooms can look strange. For instance, some mushrooms actually glow in the dark! No wonder people thought they were magical. Sometimes mushrooms grow in a circle or ring that appears around a circular path. In the olden days, many people believed these rings were made by fairies dancing through the night. Because of this, these rings are called "fairy rings" today. Fairy rings are really caused by the growth patterns of mushroom, not by dancing fairies!



A decorative border of small, light-colored mushrooms surrounds the text on the page.

## A History of Mushrooms (continued)

Mushrooms come in many colors, shapes, and sizes. As a matter of fact, there are 38,000 different varieties. Some mushrooms are poisonous. Never eat mushrooms that have been picked outside of a store. The most common mushroom that is raised for eating is the white button mushroom (*Agaricus*). Shitake, enoki, and oyster mushrooms are also raised for eating.

Mushroom farming first started in America in 1896 in Kennett Square, Pennsylvania. This city grows about 50 percent of the mushrooms raised in the United States. Kennett Square is called the “mushroom capital of the world!”

The first mushroom farm in the United States was started by two **florists** named Mr. Hicks and Mr. Swayne. Florists are people who raise flowers to sell. Mr. Hicks and Mr. Swayne wanted to make use of empty space under the shelves upon which they grew their flowers. Of course, flowers need sunlight to grow. It was very dark and **damp** under the shelves. They knew they couldn't grow flowers in the dark, but they could grow mushrooms! Mushrooms don't need sunlight to grow. They **survive** by eating **decaying** matter, so Mr. Hicks and Mr. Swayne started growing mushrooms under their flower shelves and that became the first mushroom farm in America.

In those days, mushrooms were planted in the fall and **harvested** in the spring. You couldn't get mushrooms to eat in the summer. Today, thanks to improvements in technology, such as air conditioning, you can buy **edible** (can be eaten) mushrooms all year round.

**Remember, pick your mushrooms in the store!**



## What Did I Learn?

1. The first mushroom farm was started by \_\_\_\_\_.  
\_\_\_\_\_ and \_\_\_\_\_. \_\_\_\_\_.
2. They were \_\_\_\_\_ who raised flowers to sell.
3. They wanted to make use of \_\_\_\_\_ they had  
under their shelves.
4. Mushrooms don't need \_\_\_\_\_ to grow.
5. Under the shelves, it was very \_\_\_\_\_ and  
\_\_\_\_\_.
6. Mushrooms survive by eating \_\_\_\_\_ matter.
7. In those days, mushrooms were planted in the  
\_\_\_\_\_.
8. They were harvested in the \_\_\_\_\_.
9. You couldn't get mushrooms in the \_\_\_\_\_.
10. Thanks to improvements in \_\_\_\_\_, such as  
air conditioning, you can buy mushrooms all year long.

### Word Bank

Sunlight  
Decaying  
Summer  
Damp

Technology  
Space  
Mr. Hicks  
Dark

Mr. Swayne  
Spring  
Florists  
Fall



## **ANSWER KEY: What Did I Learn?**

1. The first mushroom farm was started by **Mr. Hicks** and **Mr. Swayne**.
2. They were **florists** who raised flowers to sell.
3. They wanted to make use of **space** they had under their shelves.
4. Mushrooms don't need **sunlight** to grow.
5. Under the shelves, it was very **dark** and **damp**.
6. Mushrooms survive by eating **decaying** matter.
7. In those days, mushrooms were planted in the **fall**.
8. They were harvested in the **spring**.
9. You couldn't get mushrooms in the **summer**.
10. Thanks to improvements in **technology**, such as air conditioning, you can buy mushrooms all year long.

### **Word Bank**

**Sunlight**  
**Decaying**  
**Summer**  
**Damp**

**Technology**  
**Space**  
**Mr. Hicks**  
**Dark**

**Mr. Swayne**  
**Spring**  
**Florists**  
**Fall**



## Mushroom Word Search

U	P	U	I	C	Q	S	Q	G	F	W	U	C	C	H
M	S	C	I	G	H	M	Y	R	I	A	F	C	B	V
S	R	N	I	Q	N	M	U	A	E	N	N	C	L	K
P	B	U	A	R	F	U	C	S	S	T	M	K	G	Z
N	H	K	A	I	O	U	F	F	H	Q	G	L	V	F
C	I	A	A	S	T	T	N	T	J	R	O	J	U	O
E	Q	A	R	S	O	P	S	G	G	C	O	S	K	R
S	Y	T	T	O	J	N	Y	I	U	B	B	O	L	B
B	R	W	V	Q	A	S	I	G	H	S	G	O	M	I
M	U	O	P	S	B	H	N	D	E	E	G	T	C	D
Y	P	E	I	Y	L	H	S	A	R	A	R	Y	U	D
F	J	D	R	R	M	D	M	B	M	K	N	P	B	E
R	I	N	G	S	R	I	B	I	L	O	C	Y	G	N
F	L	E	Y	F	I	A	F	B	L	G	R	V	L	C
H	B	V	S	G	W	Q	W	W	D	M	D	S	X	M

**DINOSAUR  
FORBIDDEN  
MUSHROOM  
ROMANS**

**EGYPTIANS  
FUNGI  
PHAROAHS  
WARRIORS**

**FAIRY  
FUNGUS  
RINGS  
PREHISTORIC**

**ANSWER KEY: Mushroom Word Search**

U	P	U	I	C	Q	S	Q	G	F	W	U	C	C	H
M	S	C	I	G	H	M	Y	R	I	A	F	C	B	V
S	R	N	I	Q	N	M	U	A	E	N	N	C	L	K
P	B	U	A	R	F	U	C	S	S	T	M	K	G	Z
N	H	K	A	I	O	U	F	F	H	Q	G	L	V	F
C	I	A	A	S	T	T	N	T	J	R	O	J	U	O
E	Q	A	R	S	O	P	S	G	G	C	O	S	K	R
S	Y	T	T	O	J	N	Y	I	U	B	B	O	L	B
B	R	W	V	Q	A	S	I	G	H	S	G	O	M	I
M	U	O	P	S	B	H	N	D	E	E	G	T	C	D
Y	P	E	I	Y	L	H	S	A	R	A	R	Y	U	D
F	J	D	R	R	M	D	M	B	M	K	N	P	B	E
R	I	N	G	S	R	I	B	I	L	O	C	Y	G	N
F	L	E	Y	F	I	A	F	B	L	G	R	V	L	C
H	B	V	S	G	W	Q	W	W	D	M	D	S	X	M

**DINOSAUR  
FORBIDDEN  
MUSHROOM  
ROMANS**

**EGYPTIANS  
FUNGI  
PHAROAHS  
WARRIORS**

**FAIRY  
FUNGUS  
RINGS  
PREHISTORIC**



## Lesson Plan 2

## How Mushrooms Grow

### Preview

*How Mushrooms Grow* describes the growth of the mushroom from the spore to the fruiting body and the conditions necessary for mushrooms to grow. This lesson also describes the different parts of the mushroom.

### Performance Objectives

This lesson will enable the students to do the following:

- Recall and state specific information.
- State the growth cycle of the mushroom.
- Identify the parts of the mushroom.

### Vocabulary

The words that follow are found in the glossary. Before the lesson is read, introduce the words with which your pupils may be unfamiliar.

<b>Mycelium</b>	<b>Fruiting body</b>	<b>Hyphae</b>	<b>Cap</b>
<b>Stalk</b>	<b>Veil</b>	<b>Annulus</b>	<b>Spores</b>

### Reading and discussion

Ask your students if they can name the parts of a flower or other plant. Direct them to read or listen for the parts of the mushroom that correspond to the parts of a flower.



## How Mushrooms Grow

Mushrooms like to live in dark, damp places. They feed off of the decaying matter around them using **mycelium**. As the mushroom grows, it develops **spores** in the **gills**. The gills are located on the underside of the **cap**. New mushrooms grow from these spores. The spores are so tiny that you can't see them without a microscope. Millions of spores together would look like fine powder.

When the spores are ripe, they shoot out of the mushroom. Then they drift away on the wind. They mix with the spores of other mushrooms. If they land in a dark, damp place with a food source, they will grow into new mushrooms. First, they develop a threadlike structure called a **hyphae**. Lots of hyphae grow together and form the **mycelium**. The hyphae and the mycelium grow under the surface where you can't see them. Because the mycelium of many kinds of mushrooms tends to grow in a circular pattern, the mushrooms often grow in a circle or ring. These rings are called "fairy rings" because people in the olden days thought they were made by fairies dancing through the night. Next, the **fruiting body** starts to grow. It grows above the surface. When it first appears, it looks like a little button. This button-like part of the fruiting body is called the **cap**. The cap is protected by a thin covering called a **veil**. As the mushroom grows bigger, the veil splits and falls down around the **stalk** (stem) of the mushroom and forms the **annulus**.



## What Did I Learn?

1. Mushrooms like to live in \_\_\_\_\_, \_\_\_\_\_ places.
2. They feed off of \_\_\_\_\_ matter around them.
3. New mushrooms grow from the \_\_\_\_\_.
4. The spores grow in the \_\_\_\_\_.
5. The gills are under the \_\_\_\_\_.
6. Spores shoot out of the gills and \_\_\_\_\_ with spores from other mushrooms.
7. The spores are spread by the \_\_\_\_\_.
8. When the spores begin to grow, they first develop \_\_\_\_\_.
9. The hyphae grow into a \_\_\_\_\_.
10. The mycelium produce a \_\_\_\_\_  
\_\_\_\_\_ that can be seen above the surface.

### Word Bank

Mix	Dark	Damp	Wind
Gills	Spores	Hyphae	Fruiting body
Decaying	Cap	Mycelium	



## **ANSWER KEY: What Did I Learn?**

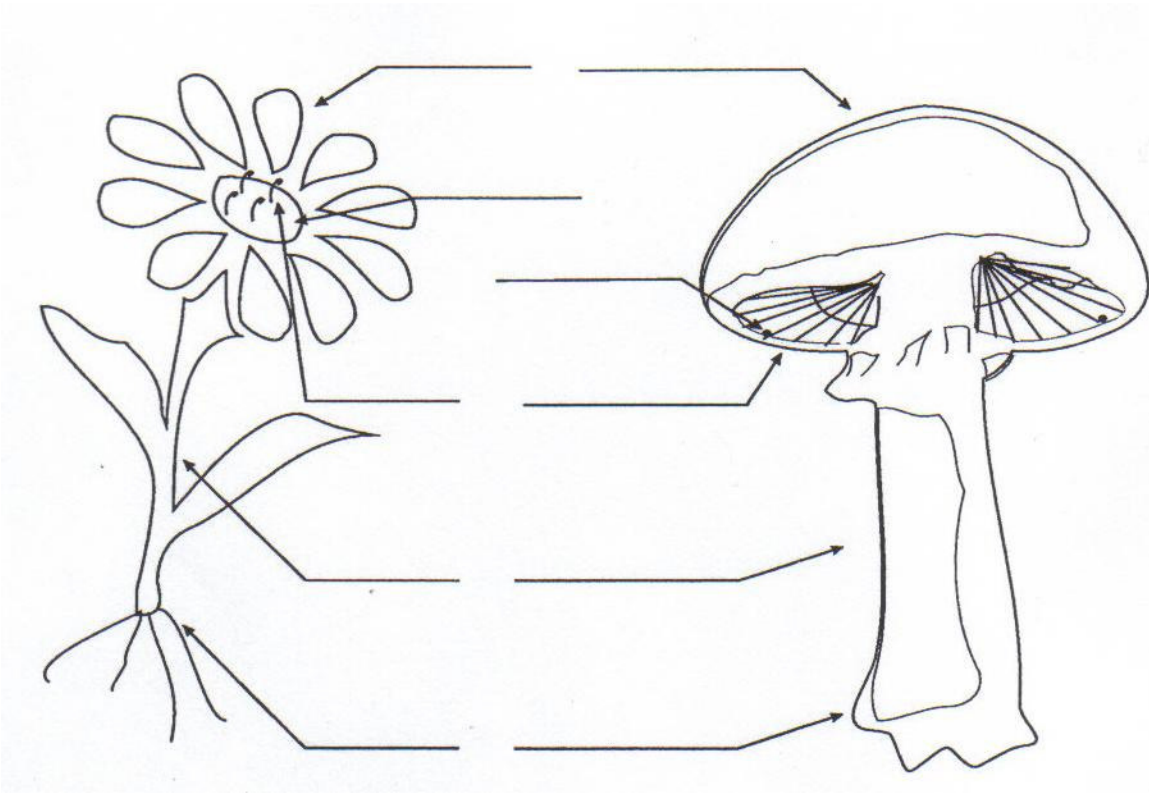
1. Mushrooms like to live in **dark, damp** places.
2. They feed off of **decaying** matter around them.
3. New mushrooms grow from the **spores**.
4. The spores grow in the **gills**.
5. The gills are under the **cap**.
6. Spores shoot out of the gills and **mix** with spores from other mushrooms.
7. The spores are spread by the **wind**.
8. When the spores begin to grow, they first develop **hyphae**.
9. The hyphae grow into a **mycelium**.
10. The mycelium produces a **fruiting body** that can be seen above the surface.

### **Word Bank**

<b>Mix</b>	<b>Dark</b>	<b>Damp</b>	<b>Wind</b>
<b>Gills</b>	<b>Spores</b>	<b>Hyphae</b>	<b>Fruiting body</b>
<b>Decaying</b>	<b>Cap</b>	<b>Mycelium</b>	

## Compare the Flower and the Mushroom

Some parts of a mushroom are very similar to the parts of a flower. Can you name the parts of each that correspond to the other?



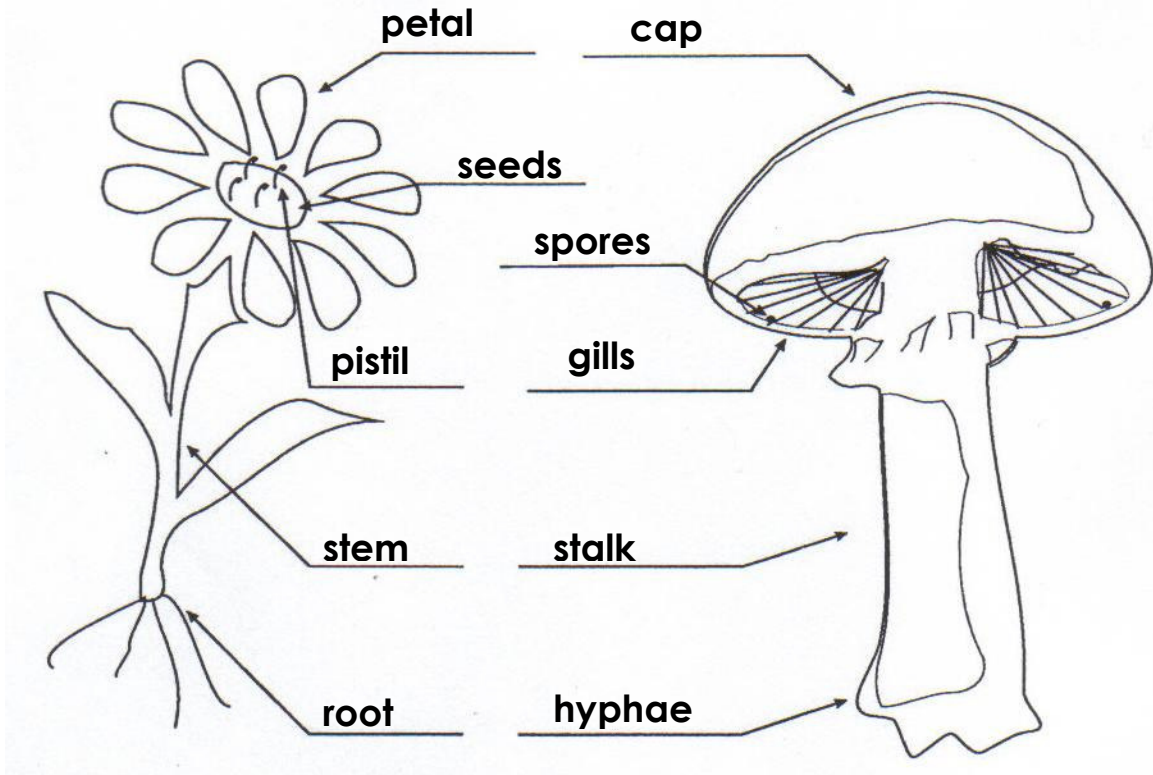
### Word Choices

Stem  
Seeds  
Roots  
Pistil  
Stalk

Petals  
Gills  
Cap  
Spore  
Hyphae

## **ANSWER KEY: Compare the Flower and the Mushroom**

Some parts of a mushroom are very similar to the parts of a flower. Can you name the parts of each that correspond to the other?



### **Word Choices**

**Stem**  
**Seeds**  
**Roots**  
**Pistil**  
**Stalk**

**Petals**  
**Gills**  
**Cap**  
**Spore**  
**Hyphae**



## Mushroom Fact or Fantasy?

Mark **T** before each statement that is correct.

Mark **O** before each statement that is wrong.

- \_\_\_\_\_ 1. Mushrooms need sunlight.
- \_\_\_\_\_ 2. The gills are part of the stalk.
- \_\_\_\_\_ 3. Spores create new mushrooms.
- \_\_\_\_\_ 4. Mushrooms grow in dark, damp places.
- \_\_\_\_\_ 5. Edible means it is safe to eat.
- \_\_\_\_\_ 6. Mushrooms make food from sunlight.
- \_\_\_\_\_ 7. Decaying matter helps mushrooms grow.
- \_\_\_\_\_ 8. Some mushrooms glow in the dark.
- \_\_\_\_\_ 9. Mushrooms are magical.
- \_\_\_\_\_ 10. Mushrooms are farmed in Kennett Square, PA.



**ANSWER KEY: Mushroom Fact or Fantasy?**

Mark **T** before each statement that is correct.

Mark **O** before each statement that is wrong.

- O 1. Mushrooms need sunlight.
- O 2. The gills are part of the stalk.
- I** 3. Spores create new mushrooms.
- I** 4. Mushrooms grow in dark, damp places.
- I** 5. Edible means it is safe to eat.
- O 6. Mushrooms make food from sunlight.
- I** 7. Decaying matter helps mushrooms grow.
- I** 8. Some mushrooms glow in the dark.
- O 9. Mushrooms are magical.
- I** 10. Mushrooms are farmed in Kennett Square, PA.



## Growth Experiment

### Materials needed

Regular soil

Spent compost

Corn seeds

Potting containers (paper cups or small margarine containers may be used)

Water

Sunlight

### Procedure

1. Give each student two pots, one with regular soil and one with compost.
2. Plant corn seed in each pot.
3. Place pots in sunny window or under "grow light."
4. Water plants regularly.
5. Keep a chart noting data, such as which plant appeared above the surface first and weekly measurements of the height of each plant.

# Growth Chart

Student Name \_\_\_\_\_

Date Started \_\_\_\_\_ Date Ended \_\_\_\_\_

Height/Inches

9						
8						
7						
6						
5						
4						
3						
2						
1						
0						
	Week One	Week Two	Week Three	Week Four	Week Five	Week Six

- Plot in blue the corn that was planted in compost.
- Plot in red the corn that was planted in soil.
- Compare each one—which worked better?



## Lesson Plan 3

## The Parts of the Mushroom

### Preview

*The Parts of the Mushroom* describes the structure of the mushroom and the function of each part.

### Performance Objectives

This lesson will enable the students to do the following:

- Recall and state specific information.
- Label the parts of the mushroom.
- Describe the functions of the different mushroom parts.

### Vocabulary

The words that follow can be found in the glossary. Before the lesson is read, introduce the words with which the students may be unfamiliar.

**Mycelium**  
**Annulus**

**Fruiting body**  
**Stalk**

**Gills**

### Reading and discussion

Begin by asking students how many parts of the mushroom they can name. Direct them to read or listen for as many different parts as they can. Ask them if they can draw what they heard or read about the parts of the mushroom.



## The Parts of the Mushroom

The top of the mushroom, the part that sticks up above the surface, is the most colorful part. It can be shaped like a cup, a shelf or an umbrella. It is actually only a small part of the mushroom. The rest of the plant, the part that takes in nourishment (food), grows below the surface. The hidden part is called the **mycelium**. The mycelium is made of a mass of threadlike structures called **hyphae**. This part of the mushroom acts like the stems, roots and leaves of green plants by taking in the food to make the mushroom grow.

After the mycelium has grown to a certain point, the part of the mushroom that you see above the surface develops. This part is called the **fruiting body**. The fruiting body contains the material that will create new mushrooms. When it first appears above the surface, it looks like a tiny button called a **cap**. On the underside of the cap are the **gills**. The cap starts out covered by a **veil**. The veil splits as the mushroom gets bigger and falls down around the **stalk** where it forms the **annulus**.



## What Did I Learn?

1. The most \_\_\_\_\_ part of the mushroom is the part that shows above the surface.
2. The part of the mushroom that you see above the surface can be shaped like a \_\_\_\_\_, \_\_\_\_\_ or an \_\_\_\_\_.
3. The hidden part of the mushroom that helps it grow is called the \_\_\_\_\_.
4. The mycelium is a mass of threadlike structures called the \_\_\_\_\_.
5. The mycelium acts like the \_\_\_\_\_ of other plants.
6. The \_\_\_\_\_ is the part of the mushroom that you see.
7. The \_\_\_\_\_ is the very top of the mushroom.
8. The cap is often covered by a \_\_\_\_\_.
9. The veil splits and forms the \_\_\_\_\_ on the stalk of the mushroom.
10. The stalk is like the \_\_\_\_\_ of other plants.

### Word Bank

Colorful  
Shelf  
Stem

Annulus  
Mycelium  
Veil

Hyphae  
Cup  
Umbrella

Roots  
Fruiting body  
Cap



## **ANSWER KEY: What Did I Learn?**

1. The most **colorful** part of the mushroom is the part that shows above the surface.
2. The part of the mushroom that you see above the surface can be shaped like a **shelf**, **cup** or an **umbrella**.
3. The hidden part of the mushroom that helps it grow is called the **mycelium**.
4. The mycelium is a mass of threadlike structures called the **hyphae**.
5. The mycelium acts like the **roots** of other plants.
6. The **fruiting body** is the part of the mushroom that you see.
7. The **cap** is the very top of the mushroom.
8. The cap is often covered by a **veil**.
9. The veil splits and forms the **annulus** on the stalk of the mushroom.
10. The stalk is like the **stem** of other plants.

### **Word Bank**

**Colorful**  
**Shelf**  
**Stem**

**Annulus**  
**Mycelium**  
**Veil**

**Hyphae**  
**Cup**  
**Umbrella**

**Roots**  
**Fruiting body**  
**Cap**



## Mushroom Word Search

S	E	K	L	A	T	S	Y	Q	H
F	U	M	S	X	W	U	N	V	P
R	R	L	O	L	Z	G	S	A	P
M	K	Q	U	O	L	E	C	X	M
K	R	A	D	N	R	I	N	G	A
U	X	A	F	O	N	H	G	K	D
P	W	J	P	U	B	A	S	U	D
J	Y	S	X	N	N	Y	F	U	I
R	M	T	I	G	H	G	W	R	M
M	F	A	I	R	Y	B	I	L	L

**ANNULUS**  
**DARK**  
**GILLS**  
**SPORES**

**CAP**  
**FAIRY**  
**STALK**  
**MUSHROOM**

**DAMP**  
**FUNGI**  
**RING**

## ANSWER KEY: Mushroom Word Search

S	E	<b>K</b>	L	A	T	<b>S</b>	Y	Q	H
F	<b>U</b>	<b>M</b>	<b>S</b>	X	W	U	N	V	<b>P</b>
R	R	L	<b>O</b>	L	Z	G	<b>S</b>	A	<b>P</b>
M	K	Q	U	<b>O</b>	L	<b>E</b>	<b>C</b>	X	<b>M</b>
<b>K</b>	<b>R</b>	<b>A</b>	<b>D</b>	<b>N</b>	<b>R</b>	<b>I</b>	<b>N</b>	<b>G</b>	<b>A</b>
U	X	A	<b>F</b>	<b>O</b>	<b>N</b>	<b>H</b>	<b>G</b>	K	<b>D</b>
P	W	J	<b>P</b>	<b>U</b>	B	<b>A</b>	<b>S</b>	U	D
J	Y	<b>S</b>	X	N	<b>N</b>	Y	F	<b>U</b>	I
R	M	T	I	G	H	<b>G</b>	W	R	<b>M</b>
M	<b>F</b>	<b>A</b>	<b>I</b>	<b>R</b>	<b>Y</b>	B	I	L	L

**ANNULUS**  
**DARK**  
**GILLS**  
**SPORES**

**CAP**  
**FAIRY**  
**STALK**  
**MUSHROOM**

**DAMP**  
**FUNGI**  
**RING**

A decorative border of small, light-colored mushrooms surrounds the text on the page.

## Out of Place

Underline the words that do **NOT** belong.

1. Mushrooms have—eggs, seeds, spores.
2. Mushrooms have—stems, stalks, hats.
3. Mushrooms need—sunlight, food, leaves.
4. Mushrooms grow in—dark, light, damp—places.
5. Some parts of the mushroom are—roots, hyphae, stem, stalk.
6. The—cap, veil, sac—is used for protection.
7. The spores develop in the—stalk, roots, gills.
8. The annulus forms on the—cap, mycelium, stalk.
9. Mushrooms come in many—colors, shapes, sizes, rooms.



## **ANSWER KEY: Out of Place**

Underline the words that do **NOT** belong.

1. Mushrooms have—eggs, seeds, spores.
2. Mushrooms have—stems, stalks, hats.
3. Mushrooms need—sunlight, food, leaves.
4. Mushrooms grow in—dark, light, damp—places.
5. Some parts of the mushroom are—roots, hyphae, stem, stalk.
6. The—cap, veil, sac—is used for protection.
7. The spores develop in the—stalk, roots, gills.
8. The annulus forms on the—cap, mycelium, stalk.
9. Mushrooms come in many—colors, shapes, sizes, rooms.



## What Did I Learn?

1. Mushrooms are part of a larger group of plants known as \_\_\_\_\_.
2. Fungus doesn't make its own \_\_\_\_\_.
3. Fungi have been around since \_\_\_\_\_ days.
4. Mushrooms were believed to have \_\_\_\_\_ powers.
5. People were \_\_\_\_\_ to eat them unless they were warriors or kings.
6. When mushrooms grow in a circle they are called \_\_\_\_\_.
7. Mushrooms come in many \_\_\_\_\_, \_\_\_\_\_ and \_\_\_\_\_.
8. Mushrooms that shouldn't be eaten are called \_\_\_\_\_.
9. \_\_\_\_\_ is called the mushroom capital of the world.
10. Kennett Square grows about \_\_\_\_\_ of the mushrooms in the United States.

### Word Bank

Poisonous  
Fairy rings  
Shapes

Fungi  
Sizes  
Food

Magical  
50%  
Forbidden

Colors  
Prehistoric  
Kennett Square



## **ANSWER KEY: What Did I Learn?**

1. Mushrooms are part of a larger group of plants known as **fungi**.
2. Fungus doesn't make its own **food**.
3. Fungi have been around since **prehistoric** days.
4. Mushrooms were believed to have **magical** powers.
5. People were **forbidden** to eat them unless they were warriors or kings.
6. When mushrooms grow in a circle they are called **fairy rings**.
7. Mushrooms come in many **colors**, **shapes** and **sizes**.
8. Mushrooms that shouldn't be eaten are called **poisonous**.
9. **Kennett Square** is called the mushroom capital of the world.
10. Kennett Square grows **50%** of the mushrooms in the United States.

### **Word Bank**

**Poisonous**  
**Fairy rings**  
**Shapes**

**Fungi**  
**Sizes**  
**Food**

**Magical**  
**50%**  
**Forbidden**

**Colors**  
**Prehistoric**  
**Kennett Square**

A decorative border of mushrooms surrounds the text. The border consists of several rows of mushrooms, with the top and bottom rows being the most prominent. The mushrooms are light-colored with dark gills and stems.

## Farming Mushrooms

Mushrooms are the major cash food crop of Pennsylvania. Over 461 million pounds of mushrooms were harvested in 2003, with much of the harvest from the Kennett Square area. This is about half of all of the mushrooms harvested in the whole United States!

Growing a mushroom from spore to harvest takes lots of work and at least 10 weeks of time. The mushroom starts in a laboratory where the spores are **germinated** and form the thread-like fibers called mycelium. Tiny pieces of these fibers are placed on **millet seeds** and then **incubated**. Next, the mushroom mycelium is delivered to a mushroom farm. Here, it is cast by hand into an eight-inch deep bed of **pasteurized** compost. The heat and the **humidity** in the mushroom house, called a **double**, are carefully controlled. Computers are often used to help monitor and regulate the growing conditions in the doubles.

After about two or three weeks, the compost is covered by the mushroom mycelium. At this time, peat moss is layered over the mycelium. Suddenly, the room temperature is dropped to 60 degrees and the humidity is raised to 95 percent. The mushroom mycelium then all pull together and start to grow up! In another two to three weeks, the mushrooms are fully-grown above the peat moss and ready to be picked.



## What Did I Learn?

Mushrooms are a healthy food that should only be eaten if they have been bought from a store.

1. Where are mushrooms grown?  
A. Sunny fields                      B. Dark, damp places
2. Mushrooms are farmed in  
A. Kennett Square                  B. Gobi Desert
3. The "stem" of the mushroom is called the  
A. Cap                                  B. Stalk
4. Mushrooms get their food from  
A. Sunlight                              B. Decaying matter
5. The \_\_\_\_\_ makes the food  
A. Veil                                  B. Mycelium
6. The \_\_\_\_\_ protects the mushroom  
A. Veil                                  B. Cap
7. \_\_\_\_\_ is the "mushroom capital" of the world  
A. Pennsylvania                      B. Kennett Square
8. Ancient people thought that mushrooms were  
A. Caterpillar cottages      B. Magical
9. Ancient people fed mushrooms to  
A. Kings and mushrooms      B. Everyone
10. New mushrooms are made from  
A. Spores                                B. Eggs



## Answer Key: What Did I Learn?

Mushrooms are a healthy food that should only be eaten if they have been bought from a store.

1. Where are mushrooms grown?  
A. Sunny fields                      **B. Dark, damp places**
2. Mushrooms are farmed in  
**A. Kennett Square**                      B. Gobi Desert
3. The “stem” of the mushroom is called the  
A. Cap                                      **B. Stalk**
4. Mushrooms get their food from  
A. Sunlight                                **B. Decaying matter**
5. The \_\_\_\_\_ makes the food  
A. Veil                                      **B. Mycelium**
6. The \_\_\_\_\_ protects the mushroom  
**A. Veil**                                      B. Cap
7. \_\_\_\_\_ is the “mushroom capital” of the world  
A. Pennsylvania                        **B. Kennett Square**
8. Ancient people thought that mushrooms were  
A. Caterpillar cottages                **B. Magical**
9. Ancient people fed mushrooms to  
**A. Kings and mushrooms**            B. Everyone
10. New mushrooms are made from  
**A. Spores**                                      B. Eggs

## Recycling

Farming mushrooms involves a lot of **recycling**. Hay, straw, chicken manure and cottonseed hulls are some of the basic ingredients used to make the **compost** (soil) that mushrooms need to grow. The compost is **pasteurized** so that any germs or bacteria that might harm the mushrooms are destroyed. This **sterile** compost is then put into the mushroom houses where the mushrooms are planted. After the mushrooms are harvested, the soil is still valuable. This spent mushroom compost is removed from the mushroom house and recycled in peoples' gardens, spread in farm fields to provide a growing base for other crops, and used in **reclaiming** of strip mines and other environments.





## Farm Facts and Guesstimates

Did you know that about...

- 2500 tons of hay
- 4400 tons of straw and horse manure
- 1265 tons of chicken manure
- 1265 tons of cottonseed hulls

...are used every week in the Kennett Square area?

### Go Figure!

Note: There are 52 weeks in a year.

In the Kennett Square area...

How much hay is used in 1 year?

---

How many tons of straw and horse manure are used in 1 year?

---

How many tons of chicken manure are used in 1 year?

---

How many tons of cottonseed hulls are used in 1 year?

---



## **ANSWER KEY: Farm Facts and Guesstimates**

Did you know that about...

- 2500 tons of hay
- 4400 tons of straw and horse manure
- 1265 tons of chicken manure
- 1265 tons of cottonseed hulls

...are used every week in the Kennett Square area?

### **Go Figure!**

Note: There are 52 weeks in a year.

In the Kennett Square area...

How much hay is used in 1 year?

**130,000 tons**

How many tons of straw and horse manure are used in 1 year?

**228,800 tons**

How many tons of chicken manure are used in 1 year?

**65,780 tons**

How many tons of cottonseed hulls are used in 1 year?

**65,780 tons**



## Fun With Mushroom Math

Farmer Joe raises and sells mushrooms to Distributor Mike for 19 cents per pound. Distributor Mike delivers and sells them to Grocer Sam for 24 cents per pound. Grocer Sam sells them to Mr. Jones for 30 cents per pound.

What is the difference in price between Farmer Joe and Distributor Mike?

\_\_\_\_\_

What is the difference in price between Distributor Mike and Grocer Sam?

\_\_\_\_\_

What is the difference in price between Farmer Joe and Grocer Sam?

\_\_\_\_\_

Why do you think Farmer Joe has to charge the price he does?

\_\_\_\_\_  
\_\_\_\_\_

Why do you think Distributor Mike charges the price he does?

\_\_\_\_\_  
\_\_\_\_\_

Why do you think Grocer Sam must charge the price he does?

\_\_\_\_\_  
\_\_\_\_\_



## **ANSWER KEY: Fun With Mushroom Math**

Farmer Joe raises and sells mushrooms to Distributor Mike for 19 cents per pound. Distributor Mike delivers and sells them to Grocer Sam for 24 cents per pound. Grocer Sam sells them to Mr. Jones for 30 cents per pound.

What is the difference in price between Farmer Joe and Distributor Mike?

**5 cents**

What is the difference in price between Distributor Mike and Grocer Sam?

**6 cents**

What is the difference in price between Farmer Joe and Grocer Sam?

**11 cents**

Why do you think Farmer Joe has to charge the price he does?

**Possible Answers:** money for spawn, farming tools, electric bills, to pay hired help, money to pay Mike because he doesn't have the trucks or drivers to deliver.

Why do you think Distributor Mike charges the price he does?

**Possible Answers:** money for gas for the trucks, to pay his drivers, truck repairs

Why do you think Grocer Sam must charge the price he does?

**Possible Answers:** to pay his employees, electric bill for the store, money for store supplies, such as bags and price tags



## Create a Cookbook

Each student should contribute a recipe that uses mushrooms. They may bring in a family recipe or visit the library and choose a recipe. The child's name should appear in the book along with the recipe of his/her choice. You may also want the students to make illustrations to accompany their recipes.

The students may design their own covers or cut out and color the mushrooms on the border of the workbook. The pictures in the packet may also be used as bulletin board decorations.

Several recipes are also included in this packet and may be used in the class cookbook.

### Mushroom Recipes

#### Yorkshire Pudding with Mushrooms

1 cup flour  
1 cup milk  
 $\frac{1}{4}$  teaspoon salt  
2 eggs  
 $\frac{1}{4}$  cup drippings from roast (preferably beef)  
 $\frac{1}{2}$  cup chopped mushrooms

Preheat oven to 425°. Mix flour and salt. Add  $\frac{3}{4}$  cup milk and beat until smooth. Add eggs and remaining milk and beat until smooth and creamy. Pour mixture with the drippings into a pan in which the mushrooms have been previously sautéed. Mix in the mushrooms gently. Bake 30 minutes. Serve while hot.



## More Mushroom Recipes

### **Mushroomers' Delight**

1 cup parboiled mushrooms, chopped  
2 cups boneless chicken  
2 cups cream of chicken soup or chicken gravy  
1 cup pineapple chunks, drained  
½ cup slivered almonds  
salt to taste

Mix all ingredients, reserving some of the slivered almonds for garnish. Place in a well-greased casserole dish and bake for 30 minutes in a 350° oven. Serve with rice or chow mien noodles.

### **Mushroom Gravy**

Cook any edible mushroom in butter. Reserve liquid. Add to chicken broth or the drippings of any meat. Thicken as you would any gravy and season to taste.

### **Mushroom and Sour Cream Casserole**

4 cups chopped mushrooms  
2 cups breadcrumbs  
2/3 cup butter  
1 cup chopped parsley  
1 cup sour cream  
Salt and pepper to taste  
1 tablespoon minced onion (optional)

In a well-buttered casserole, sprinkle breadcrumbs and parsley. Add a layer of mushrooms and dot with butter. Bake for 30 minutes in a 350° oven, adding sour cream after 20 minutes of cooking.



## Glossary

- Annulus:** Forms on the stalk when the veil splits and falls off the cap.
- Cap:** The “button-like” part of the mushroom that first appears above the earth.
- Compost:** A mixture of decaying organic matter, such as manure and straw, used as the growing medium for mushrooms.
- Damp:** Wet.
- Decaying:** Rotting, decomposing.
- Double:** A building in which mushrooms are grown.
- Edible:** Fit to eat.
- Florist:** A person whose business is the raising or selling of flowers.
- Forbidden:** Not permitted, not allowed, prohibited.
- Fruiting body:** The part of the mushroom that appears above the surface of the earth.
- Fungi:** Sub-kingdom or division of plants that include yeasts, mold, and mushrooms.
- Germinated:** Caused to sprout.
- Gills:** Underneath part of the cap that forms the spores.
- Harvested:** Gathered, picked.
- Hyphae:** Threadlike structure that develops when the spore lands in the proper growing conditions.
- Humidity:** Dampness, especially of the air.
- Incubated:** To maintain at optimum environmental conditions to promote growth.
- Millet seeds:** Seeds from a grass-like plant, such as hay.
- Mycelium:** Develops from many hyphae underground and collects the nourishment for the mushroom.



**Pasteurized:**

Destruction of disease-producing microorganisms.

**Pharaoh:**

A king of ancient Egypt.

**Poisonous:**

Toxic, inedible

**Prehistoric**

Period of history before written records.

**Reclaiming:**

To rescue from an undesirable state or to make available for human use by changing natural conditions.

**Recycling:**

The recovery and reuse of materials from spent products. The reclaiming of materials from a product that has been worn out or used.

**Spores:**

Tiny, tiny part of the mushroom that produces new mushrooms.

**Stalk:**

The stem-like part of the mushroom.

**Sterile:**

Free from bacteria or other microorganisms.

**Survive:**

To live, exist.

**Veil:**

Thin covering that protects the cap.

**Warriors:**

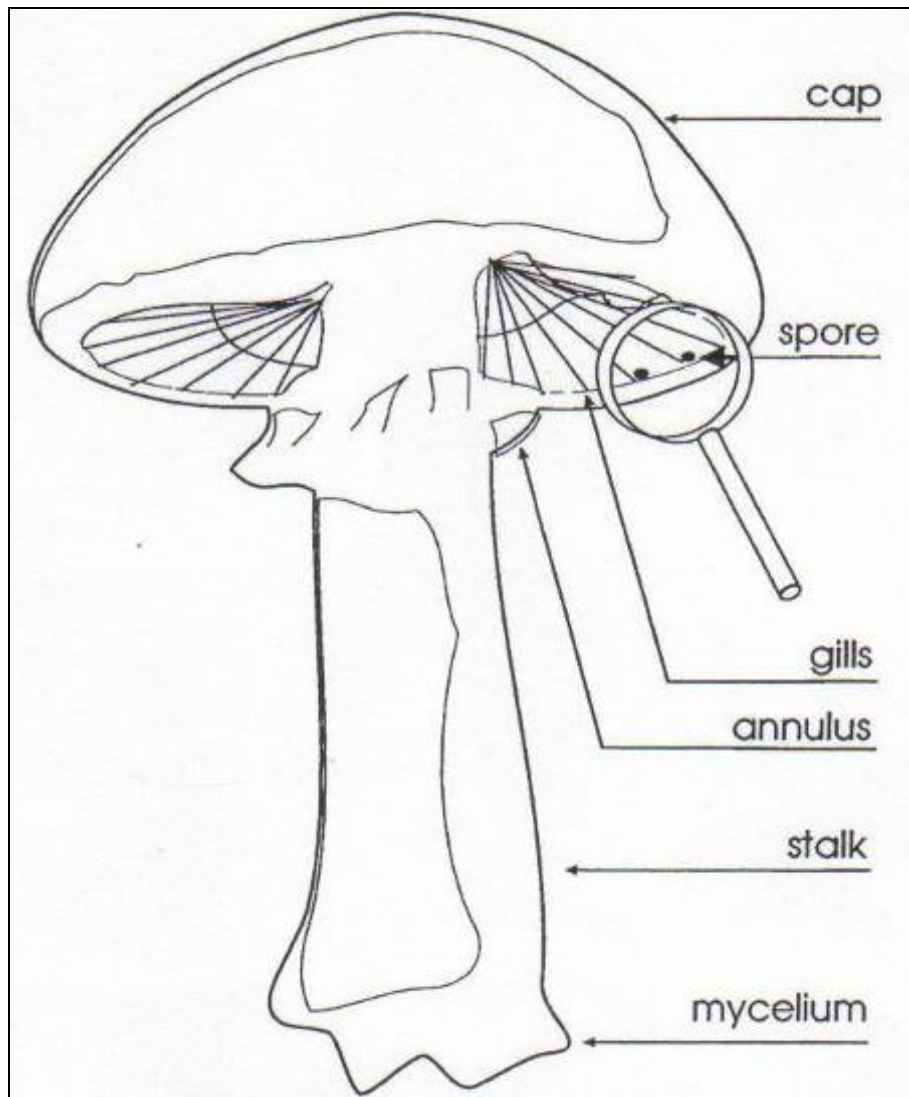
People engaged or experienced in battle.

## Bulletin Board Idea

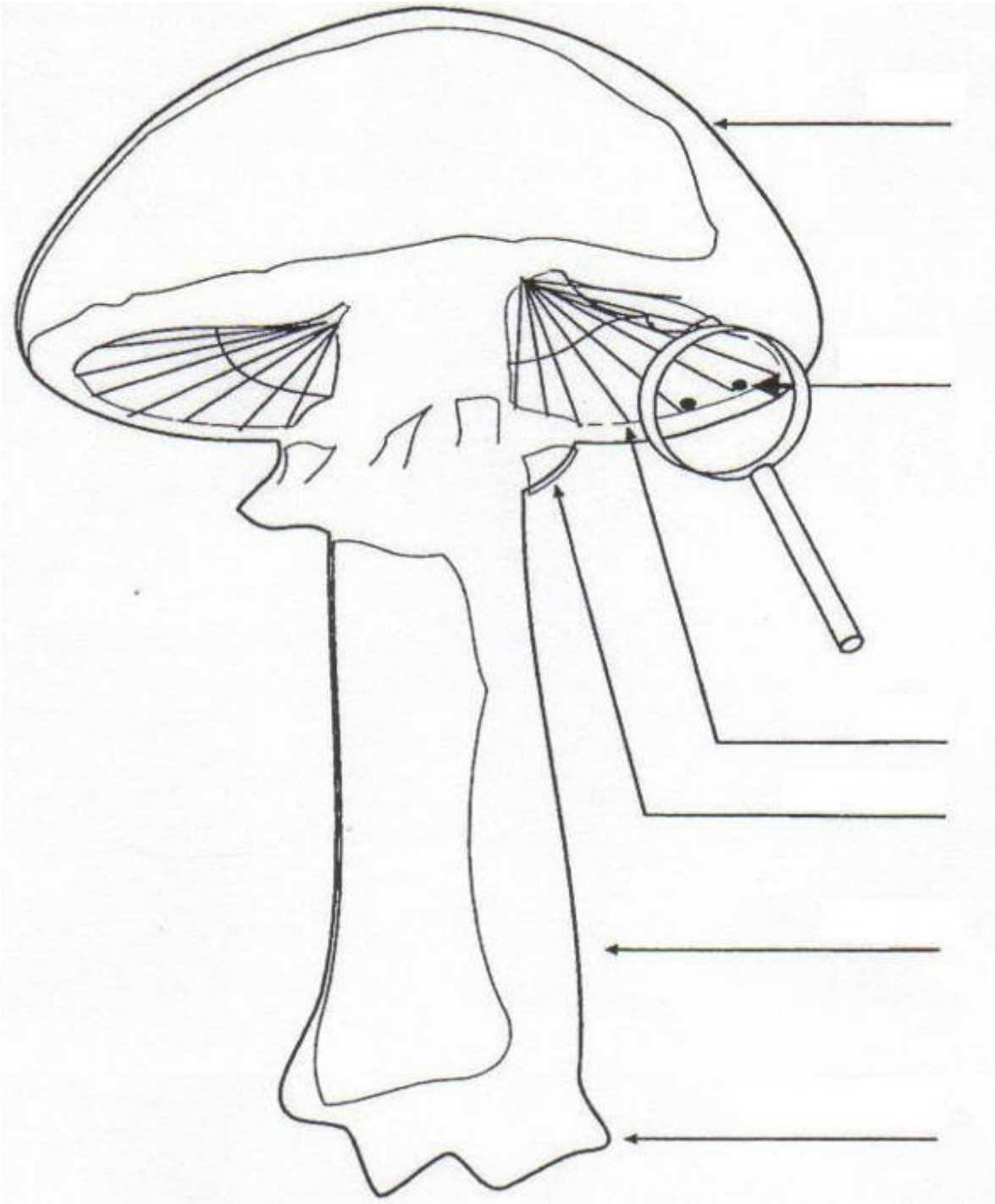
### Parts of a Mushroom

Make a large cutout (three-and-a-half to four feet tall). Post on a bulletin board or wall.

Students participate by painting or coloring the mushroom, drawing in the parts, and adding labels to the display.

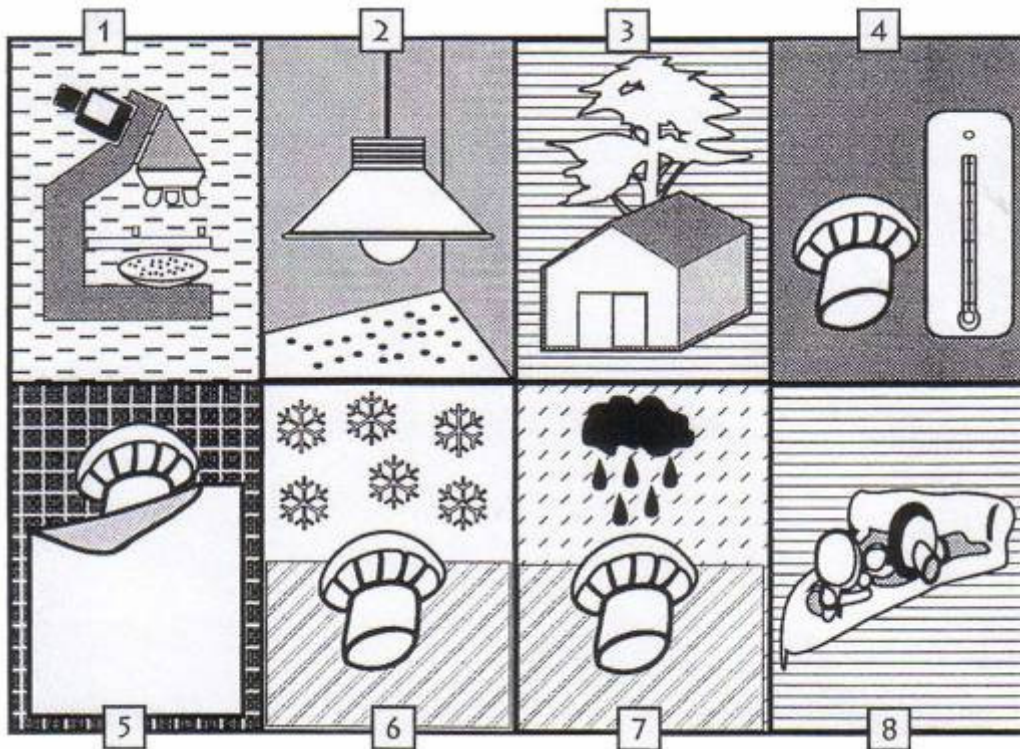


## Bulletin Board Idea



## Care of Mushrooms

1. Spores are germinated in a laboratory and develop into mycelium (root system).
2. They are incubated on millet seeds.
3. They are planted in compost at the mushroom farm.
4. The temperature and humidity are carefully controlled.
5. The mycelium is covered with peat moss.
6. The temperature is dropped to 60 degrees.
7. The humidity is raised to 95%.
8. The mature mushrooms are harvested 2-3 weeks later.





## Terminology

1. The \_\_\_\_\_ forms on the stalk when the veil splits and falls off the cap.
2. \_\_\_\_\_ means fit to eat.
3. \_\_\_\_\_ means unfit to eat or toxic.
4. Another word for gathered is \_\_\_\_\_.
5. The \_\_\_\_\_ are the root-like parts of mushrooms.
6. The parts of the mushroom that reproduces new mushrooms are the \_\_\_\_\_.
7. The stem-like part of the mushroom is called the \_\_\_\_\_.
8. The button-like top of the mushroom is called the \_\_\_\_\_.
9. The \_\_\_\_\_ protects the cap.
10. The spores are formed in the \_\_\_\_\_.

### Word Bank

Gills

Cap

Veil

Hyphae

Stalk

Edible

Harvested

Pharaohs

Annulus

Poisonous

Spores

Warriors



## **ANSWER KEY: Terminology**

1. The **annulus** forms on the stalk when the veil splits and falls off the cap.
2. **Edible** means fit to eat.
3. **Poisonous** means unfit to eat or toxic.
4. Another word for gathered is **harvested**.
5. The **hyphae** are the root-like parts of mushrooms.
6. The parts of the mushroom that reproduces new mushrooms are the **spores**.
7. The stem-like part of the mushroom is called the **stalk**.
8. The button-like top of the mushroom is called the **cap**.
9. The **veil** protects the cap.
10. The spores are formed in the **gills**.

### **Word Bank**

**Gills**

**Cap**

**Veil**

**Hyphae**

**Stalk**

**Edible**

**Harvested**

**Pharaohs**

**Annulus**

**Poisonous**

**Spores**

**Warriors**

## Fun Facts About Mushrooms

$$\begin{array}{r} 1 \\ +2 \\ \hline \end{array} =T \quad \begin{array}{r} 4 \\ +3 \\ \hline \end{array} =S \quad \begin{array}{r} 3 \\ +2 \\ \hline \end{array} =M \quad \begin{array}{r} 5 \\ +1 \\ \hline \end{array} =C \quad \begin{array}{r} 1 \\ +1 \\ \hline \end{array} =G \quad \begin{array}{r} 6 \\ +5 \\ \hline \end{array} =P$$

$$\begin{array}{r} 2 \\ +2 \\ \hline \end{array} =A \quad \begin{array}{r} 3 \\ +5 \\ \hline \end{array} =I \quad \begin{array}{r} 4 \\ +5 \\ \hline \end{array} =U \quad \begin{array}{r} 5 \\ +5 \\ \hline \end{array} =F \quad \begin{array}{r} 1 \\ +0 \\ \hline \end{array} =N \quad \begin{array}{r} 6 \\ +6 \\ \hline \end{array} =O$$

1. The top of the mushroom is called the  $\frac{6}{6} \frac{4}{4} \frac{11}{11}$ .

2. Mushrooms have plenty of \_\_\_\_\_ to make you healthy.

3. Mushrooms are part of a family of plants called

$$\frac{11}{10} \frac{12}{9} \frac{3}{1} \frac{4}{2} \frac{7}{8} \frac{7}{8} \frac{8}{9} \frac{9}{5}$$

$$\begin{array}{r} 2 \\ -1 \\ \hline \end{array} =K \quad \begin{array}{r} 6 \\ -3 \\ \hline \end{array} =U \quad \begin{array}{r} 7 \\ -2 \\ \hline \end{array} =L \quad \begin{array}{r} 8 \\ -6 \\ \hline \end{array} =G \quad \begin{array}{r} 9 \\ -5 \\ \hline \end{array} =A$$

$$\begin{array}{r} 10 \\ -2 \\ \hline \end{array} =P \quad \begin{array}{r} 7 \\ -1 \\ \hline \end{array} =R \quad \begin{array}{r} 8 \\ -1 \\ \hline \end{array} =I \quad \begin{array}{r} 11 \\ -2 \\ \hline \end{array} =S \quad \begin{array}{r} 13 \\ -3 \\ \hline \end{array} =O \quad \begin{array}{r} 17 \\ -6 \\ \hline \end{array} =D$$

1. Mushrooms make a delicious \_\_\_\_\_ that many people love.

$$9 \ 10 \ 3 \ 8$$

2. Mushrooms grow in  $\frac{11}{11} \frac{4}{4} \frac{6}{6} \frac{1}{1}$ , damp places.

3. The mushroom spores grow in the  $\frac{2}{2} \frac{7}{7} \frac{5}{5} \frac{5}{5} \frac{9}{9}$ .

## ANSWER KEY: Fun Facts About Mushrooms

$$\begin{array}{r} 1 \\ +2 \\ \hline 3 \end{array} =T \quad \begin{array}{r} 4 \\ +3 \\ \hline 7 \end{array} =S \quad \begin{array}{r} 3 \\ +2 \\ \hline 5 \end{array} =M \quad \begin{array}{r} 5 \\ +1 \\ \hline 6 \end{array} =C \quad \begin{array}{r} 1 \\ +1 \\ \hline 2 \end{array} =G \quad \begin{array}{r} 6 \\ +5 \\ \hline 11 \end{array} =P$$

$$\begin{array}{r} 2 \\ +2 \\ \hline 4 \end{array} =A \quad \begin{array}{r} 3 \\ +5 \\ \hline 8 \end{array} =I \quad \begin{array}{r} 4 \\ +5 \\ \hline 9 \end{array} =U \quad \begin{array}{r} 5 \\ +5 \\ \hline 10 \end{array} =F \quad \begin{array}{r} 1 \\ +0 \\ \hline 1 \end{array} =N \quad \begin{array}{r} 6 \\ +6 \\ \hline 12 \end{array} =O$$

1. The top of the mushroom is called the C A P.  
6 4 11

2. Mushrooms have plenty of P O T A S S I U M to make you healthy.

3. Mushrooms are part of a family of plants called  
F U N G I  
10 9 1 2 8

$$\begin{array}{r} 2 \\ -1 \\ \hline 1 \end{array} =K \quad \begin{array}{r} 6 \\ -3 \\ \hline 3 \end{array} =U \quad \begin{array}{r} 7 \\ -2 \\ \hline 5 \end{array} =L \quad \begin{array}{r} 8 \\ -6 \\ \hline 2 \end{array} =G \quad \begin{array}{r} 9 \\ -5 \\ \hline 4 \end{array} =A$$

$$\begin{array}{r} 10 \\ -2 \\ \hline 8 \end{array} =P \quad \begin{array}{r} 7 \\ -1 \\ \hline 6 \end{array} =R \quad \begin{array}{r} 8 \\ -1 \\ \hline 7 \end{array} =I \quad \begin{array}{r} 11 \\ -2 \\ \hline 9 \end{array} =S \quad \begin{array}{r} 13 \\ -3 \\ \hline 10 \end{array} =O \quad \begin{array}{r} 17 \\ -6 \\ \hline 11 \end{array} =D$$

1. Mushrooms make a delicious S O U P that many people love.

9 10 3 8

2. Mushrooms grow in D A R K, damp places.

11 4 6 1

3. The mushroom spores grow in the G I L L S.

2 7 5 5 9

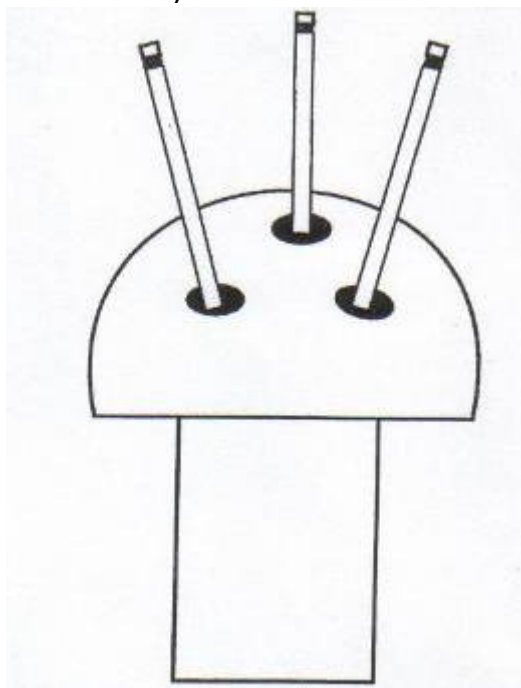
## Paper Mache Pencil Holder

### Materials

Large juice concentrate can  
Small plastic bowl (cream cheese container, etc.)  
Wheat paste  
Newspaper  
Masking tape

### Procedure

1. Fill about 1/3 of the can with sand or kitty litter. This will provide stability. Tape over the top so the ballast does not fall out.
2. Tear newspaper into narrow strips. Dip strips into paper mache mixture and wrap a few layers around the can.
3. Attach the bowl to the top of the can. Continue wrapping a few more layers around the can and bowl.
4. Using a pencil, poke holes through the top of the "cap."
5. Allow the pencil holder to dry overnight.
6. Paint or decorate it as you wish.





## Spore Prints

You should use only edible mushrooms for this activity.

Some mushroom spores are white: others are yellow, pink, purple, black or brown. If you want to see this for yourself, make "spore prints" of as many different kinds of mushrooms that you can find.

1. Take each mushroom and pull off the stem.
2. Put the cap on a piece of paper, half white and half black, with the gills resting on the paper.

(Black paper is needed in case the spores are white, and white is needed in case the spores are dark-colored.)

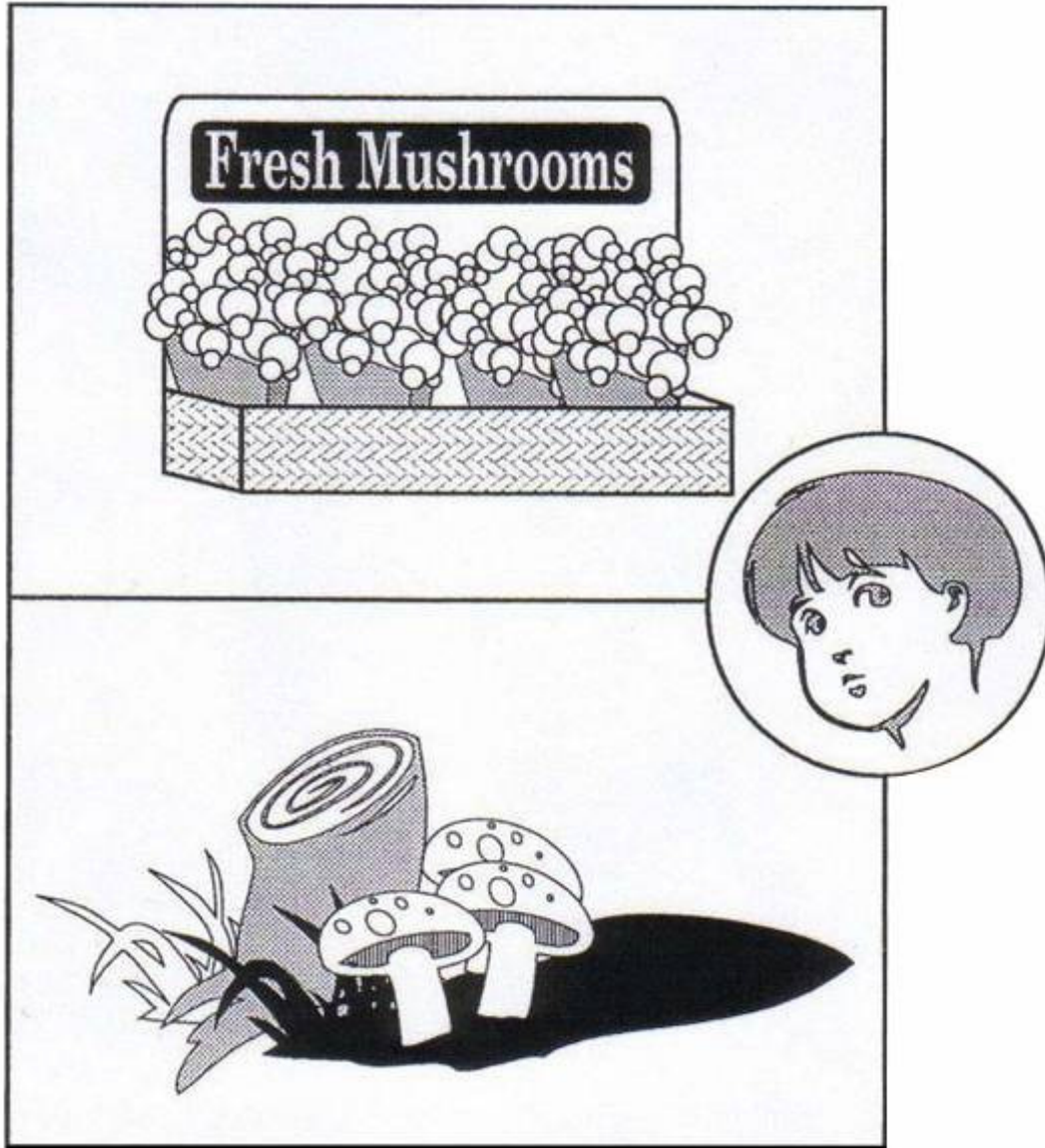
3. Cover the mushroom with a glass containing a tiny piece of wet cotton.
4. In an hour or two, lift up the glass and mushroom cap. Enough spores will have fallen on the paper to make a print.
5. If you spray the print with lacquer, you can keep it as a record.

Just as no two people have identical fingerprints, no two species of mushrooms have the same spore print.

**Remember: Never eat a wild mushroom that you find on your own.**

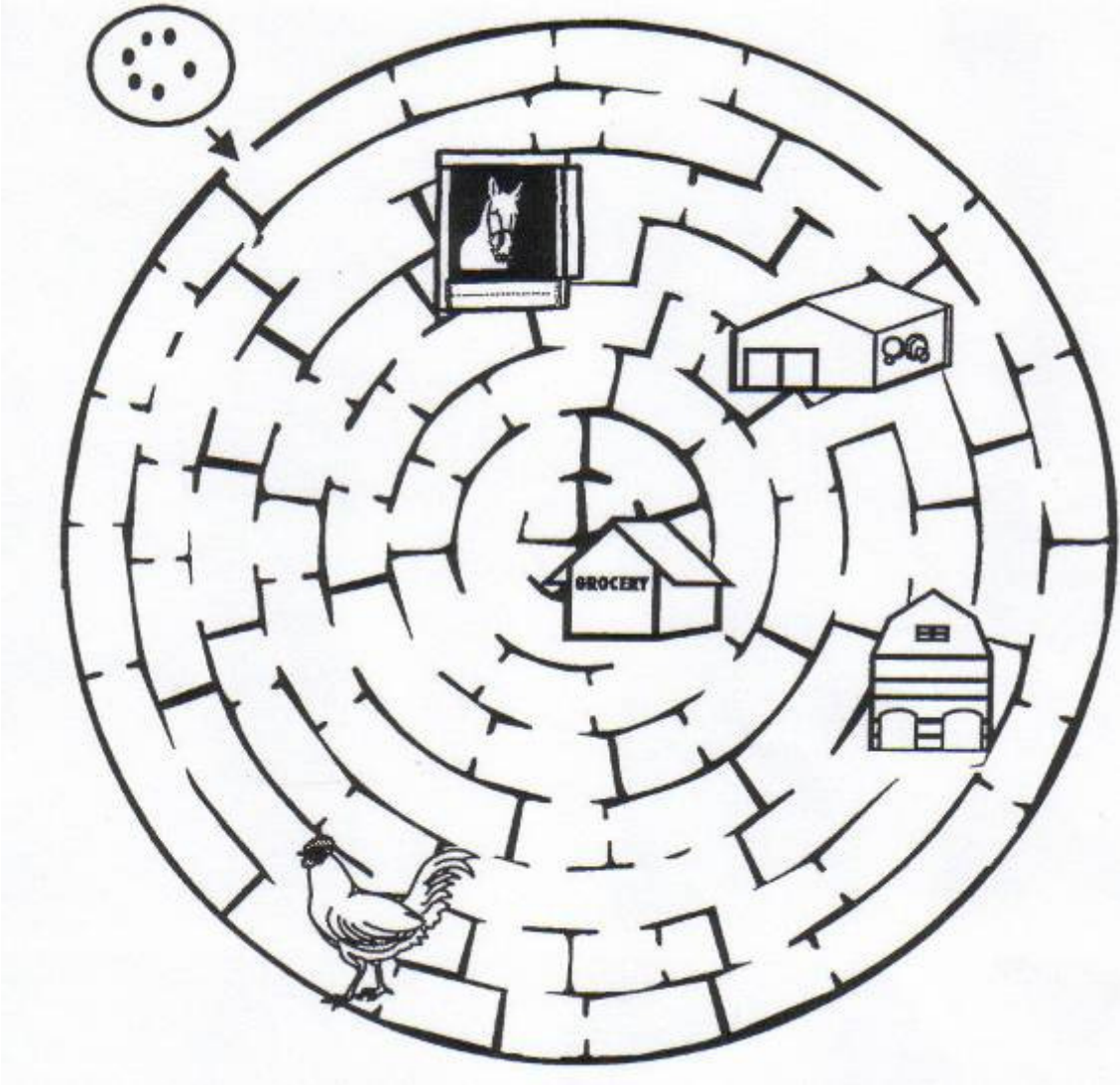
## Which Mushrooms Should You Pick?

Help this child pick the right mushrooms by drawing a circle around the correct choice.



## Road Map

Starting with the spawn, can you trace the life a mushroom to the grocery store? You must make the following stops on the way: horse farm, chicken coop, corncrib, and mushroom house.



## Book Mark



### **FUN-G-FACTS**

Mushrooms are the  
#1 cash food crop in  
Pennsylvania.



Mushrooms have  
been around since  
prehistoric times.



Some mushrooms  
actually glow in the  
dark.



In ancient egypt,  
mushrooms were  
forbidden to anyone  
but the pharoahs,  
who believed they  
possessed magical  
powers.