

# Mushrooms

Information compiled by the Mushroom Council

**How Produced** – The life of a mushroom begins in a laboratory as a tiny grain, but it will eventually grow into flavorful mushroom in just five steps.

**Step 1 – Composting:** At the farm, the grower prepares a growing medium called compost. The compost is often made from wetted straw, horse manure, hay, and/or crushed corncobs. The grower mixes the ingredients and waits for them to decompose. Once the material is broken down, they bring the compost inside to pasteurize it. Pasteurizing kills any insects or pests and removes ammonia, which formed during decomposition. This step is important because the compost provides nutrients for the mushrooms to grow.

**Step 2 – Spawning:** The mushroom compost must be inoculated with mushroom spawn for mushrooms to grow. Growers start the process by sterilizing a mixture often composed of rye grain, water, and chalk. The grower spreads this mixture across the compost and the spawn will begin to appear as a white to blue-white mass throughout the compost. The compost will fully grow with spawn in about 14 days.

**Step 3 – Casing:** The pasteurized compost is placed in stacked, wooden trays. A top-dressing, called casing, is layered onto the compost. This is where the mushrooms will eventually form.

**Step 4 – Pinning:** This is the growth stage where the shape of the mushroom forms, appearing like pins. From this point, it takes about three months to produce the first mushrooms for harvest.

**Step 5 – Cropping:** Mushrooms develop at varying rates, so harvest can take six to 10 weeks. Once all of the mushrooms are picked, the trays are emptied, and the growing area is pasteurized with steam before a new crop is started. Mushroom farms today are highly technical operations with computerized systems to monitor each point in production.

**History** – The first record for the cultivation of mushrooms in Western cultures was around 1650 in Paris, France. Over time, different cultures cultivated a variety of mushroom species. The United States began mushroom cultivation in 1865, and Americans have been able to cook mushrooms in their kitchens since then. Before this time, mushrooms were mainly reserved for condiments.

**Varieties** – The most popular mushroom is the white button, representing approximately 90% of mushrooms consumed in the United States. Crimini mushrooms, also known as baby bellas or browns, are similar in appearance to the white button, but have a light-tan to rich-brown cap and a firmer texture. Portabella mushrooms are another popular variety. Known as the “vegetarian meat,” they have a meat-like texture and flavor. Specialty mushroom varieties include shiitake, maitake, oyster, beech, and royal trumpet.



**Commodity Value** – Today, mushrooms are commercially produced in almost every state. As the top mushroom producing state, Pennsylvania accounts for approximately 65% of the total U.S. production. California is the second largest mushroom producing state, accounting for 20% of total U.S. mushroom production.

**Top Producing Counties** – In California, mushrooms are primarily grown on the coastal strip between San Mateo and San Diego. The leading mushroom growing counties include Monterey, Santa Clara, Ventura, San Diego, and San Mateo. As the top producing county, Monterey County alone accounts for nearly 50% of California’s total production.

**Nutritional Value** – Mushrooms are a produce powerhouse of nutrients. Few foods naturally contain vitamin D, but mushrooms are unique for being the only source in the produce aisle and one of the few non-fortified food sources that do. Mushrooms are low in calories, fat-free, cholesterol-free, and low in sodium. Mushrooms provide selenium, potassium, B vitamins, and ergothioneine, a naturally occurring antioxidant that helps protect the body’s cells.

**For additional information:**

Mushroom Council

(816) 251-4512

Website: [www.mushroomcouncil.com](http://www.mushroomcouncil.com)

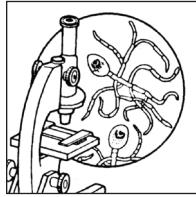


# Mushroom Activity Sheet

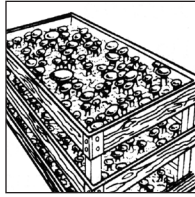
## Mushrooms to Market



1. Compost production



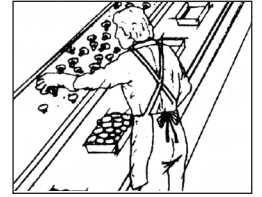
2. Spawn production



3. Mushroom growing



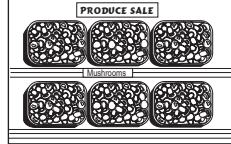
4. Mushroom harvesting



5. Mushroom packaging



6. Mushroom transporting



7. Mushroom sales



8. Mushroom cooking



9. Enjoyment

### Lesson Ideas

- Persuade the class that your chosen mushroom variety is the best. Create a convincing, fact-based advertisement and develop a supporting sales presentation.
- Determine the current market price (per pound) for different mushroom varieties. Weigh the mushrooms, convert data from dollars per pound to dollars per gram and compare the price.
- Egyptians believed mushrooms were the plant of immortality. Research specific mushroom rituals for ancient civilizations.
- Compare the energy flow of autotrophic plants and heterotrophic fungi. Create a Venn diagram showing the similarities and differences.
- Identify nutrients found in mushrooms and their effects on human health. Develop a tri-fold brochure to illustrate the health benefits.
- Research each mushroom variety. Create a fictional, multi-paragraph story that features one of the mushroom varieties as the main character. Follow the mushroom's experience from spawn to supper.

### Fantastic Facts

1. Monterey County produces the most mushrooms in California.
2. The white button variety is the most popular variety of mushroom.
3. The portabella mushroom variety is known as the "Vegetarian Meat."
4. Potassium, copper, vitamin D, phosphorus, and ergothioneine are all nutrients found in mushrooms.
5. A typical mushroom harvest lasts six to 10 weeks.
6. Light is not required for mushroom growth.
7. Up to one million pounds of mushrooms can be produced annually from one acre of land.
8. Pasteurization is a process that kills insects and pests while removing ammonia from the compost.
9. It is not safe to eat mushrooms found outdoors. Only eat mushrooms bought at a market.

## Lesson Plan: Mushroom Dissection

**Introduction:** Mushrooms are natural wonders. Very different from plants, these fungi have cell walls made of chitin and do not go through the process of photosynthesis.

**Objective:** Students will identify and dissect several different varieties of mushrooms.

**California Standards:** CC ELA: W.3-12.7; NGSS: 4-LS-1, MS-LS-1

**Materials:** Scalpels, tweezers, microscopes, microscope slides and cover slips, magnifying glasses, paper, tape.

#### Procedure:

1. Review mushroom anatomy with the class. Discuss varieties of mushrooms and make observations about visual differences and structural similarities. Discuss the important role mushrooms and all fungi serve in the ecosystem.
2. Distribute three different varieties of store-bought mushrooms to the class. Each student/group should have one mushroom.

3. Instruct students to identify and record their given mushroom variety. Have students carefully bisect the mushroom to reveal the internal components. Students may either draw their mushroom specimen or tape their specimen to a piece of paper. Guide students in labeling the following parts: hyphae, fruiting body, mycelium, cap, gills, stipe (stalk), ring, pores, and scales.
4. Demonstrate use of the scalpel to take a small sample of mushroom tissue for microscopic observation. Students place their mushroom sample on a slide, view, and record observations. Challenge students to also draw their magnified tissue sample and label cell wall, cross wall, nuclei, and cytoplasm.
5. Students compare findings and submit completed lab reports.
6. Conclude the experiment by reviewing the unique qualities of mushrooms and their exceptional nutritional value.