

### MATERIALS

- Hot pot for boiling water
- 1 full toilet paper rolls
- Bag of oyster mushroom grain spawn, filter bag, rubber band
- 3-4 mushrooms, stalks cut off
- 3-4 sheets of white paper
- “How mushrooms grow” poster
- Bowl, strainer

### PREPARATION

- Identify a location for the teepee mushroom growing experiment. The area should dark and 65-75°F
- Thoroughly clean work surface where you will be preparing mushroom-growing toilet paper rolls
- Locate a refrigerator to stimulate fruiting of mushroom rolls after 4-6 weeks of inoculation
- Find a location in the classroom to set all spore prints where they will not be moved

## PROCEDURE

### Part 1: The kingdom of fungi, the anatomy of a mushroom, and decomposition

- Talk to students about the characteristics of the kingdom of fungi, the life cycle of the mushroom (spores – hyphae – mycelium – mushroom). Describe how the mushrooms are composters – their life process decomposes organic matter. Explain how this is good for the garden!

### Part 2: Grow a Decomposer (starting a 4-6 week process in class)

- Tell students “We are going to grow our own decomposers! We are going to watch oyster mushroom spores decompose this roll of toilet paper in our classroom, using it for the nutrition they need to grow.”
- Fill a large pan with water and bring to a boil. Remove from heat and dunk toilet paper roll into the water until they are fully saturated. Remove from water with tongs and let drain and cool. When steam no longer rises from roll and inside of cardboard tube is comfortable to touch, put roll into filter bag.
- Shake bag of grain spawn until grains have separated from each other, then cut the corner off the bag and fill cardboard tube with spawn, then close bag above filter patch with a rubber band.
- Place bagged roll in a dark area (a cupboard) that is 65-75° F. This environment mimics conditions underneath the bark of trees, which is the oyster mushroom’s natural environment.
- Within three weeks, the roll should be covered with white, fluffy mycelium, possibly a small patch of green. Let the fungus grow for another 1-3 weeks – the longer allowed to grow, the faster the roll will complete its fruiting process.
- Place the bagged roll into the refrigerator for 48 hours (at minimum) to stimulate fruiting. When ready to fruit, remove the bag and place in a well lit room at room temperature, remove rubber band and fluff open the bag to increase air flow. Fruiting is triggered by the decrease in CO<sub>2</sub> which has built up in the bag from spawn growth. In 7-14 days you should be harvesting mushrooms.
- To harvest, grab stem and twist, or cut at the base. Best to harvest when caps are 2 inches across. Spray lightly with water if caps start to shrivel or get leathery.
- Following harvest, you can place the closed bag back in a darkened place and repeat the following steps until the toilet paper roll is exhausted. Then, throw spent roll into compost.

### Part 3: Spore prints

- “Now we are going to be setting up another experiment that will let us see the spores inside of different mushrooms.” Reference “How mushrooms grow” poster and talk about the function of spores!
- Have student place mushrooms, stems removed on sheets of white paper labeled in an undisturbed part of the classroom; place a drop of water on top of the cap to help release spores. Leave between 24 hours and a few days, then carefully remove mushroom to see a beautiful spore pattern.

# Growing Mushrooms

## Soil & Ecology

### ENGAGE

Ask students to “Imagine all of the leaves that fall off of trees in the fall. Where do they go? Why are our forests and yards not constantly covered with leaves?” Reference what you have learned so far this year about composting. “What did we do with our plants when we pulled them out of the ground in the late fall?” “What were we making in our compost pile?” Now, ask students to imagine what the world would look like without decomposers? “What are these decomposers?”

### OBJECTIVES

- Students will understand the term “fungus” and the basic anatomy and life cycle of mushrooms.
- Students will understand the role of mushrooms as decomposers, and will be able to draw connections between mushrooms and the process by which we compost in the school garden.

### EXPLAIN

#### The fungus among us

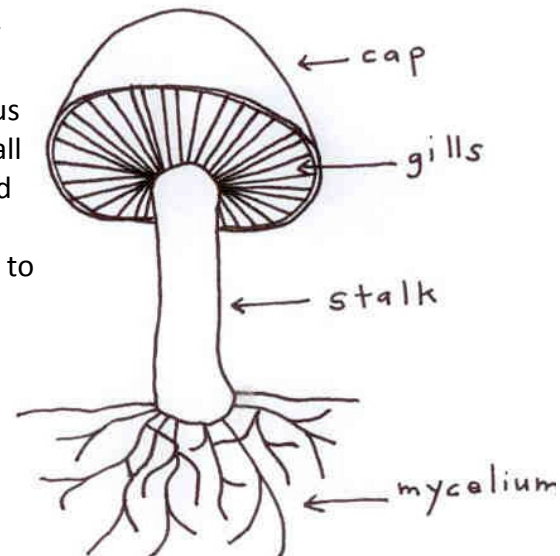
Fungi are living organisms that are neither plant nor animal. Unlike plants, fungi don’t use chlorophyll to produce energy/food from light. Instead they feed off of hosts, which can range from living to dead matter – from symbiotic partnerships within the roots of trees, where both tree and fungus benefit, to parasitic destructions of the host (Athlete’s Foot). Mushrooms fall into a third category of fungus, they are **saprophytic**, meaning they get food from dead or decaying matter (such as wood, soil, grass, or dung). In doing so, mushrooms break down this matter, or **decompose** it. Mushrooms help to recycle the nutrients in the matter they are decomposing, returning those nutrients to the soil. In this way, mushrooms are natural **composters!**

#### Life of a mushroom

Mushrooms begin with spores that travel from their parent mushroom. If spores happen to land on suitable host site, maybe a fallen log or a damp corner of your yard, they begin to grow into a network of **mycelium**, which are made up of long threadlike parts (similar to roots) called **hyphae** that absorb nutrients from their environment (such as a rotting log or a pile of leaves). When the mycelia have food, water, and a happy temperature and location, they produce **mushrooms**, their fruiting body.

#### Fungi culture

People use fungus for food (there are many edible mushrooms: shiitake, portabella, cremini) and for medicine (penicillin is made from fungi). Also, yeast is a fungus used to make bread.



### ADDITIONAL CONTENT INTEGRATION (see previous page)

Compare the life cycle of plants to the life cycle of fungi. Have students illustrate them side by side. What are the similarities? Differences? What do fungi need to survive that is different than the needs of plants?

How about humans? What do plants, fungi, and humans all have in common that they need to survive?

### ADDITIONAL MATERIALS

- Chart paper
- Marker

### EVALUATE

**Journal prompt:** How do mushrooms help in our school garden? Diagram this process.