

# A BEGINNER'S GUIDE TO MYCOLOGY



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Salt Lake Youth Mycology

## ABOUT US



Mason, Colton, Kaitlyn

SLYM seeks to show the world that fungi are essential and mushrooms are awesome.

### About the 2022 Founding Members

COLTON EVERILL is a senior at Mountain Ridge High School whose curiosity for mushrooms was sparked by his cousin Mason. After being invited to SLYM, Colton fell in love with mycology.

KAITLYN SKARDA, a freshman at Lincoln Academy and Pleasant Grove HS, became intrigued by mushrooms in 7th grade, and has been learning about them ever since. She talks about mushrooms to anyone who will listen and is known for giving out mushroom stickers.

MASON CUTCHEN is a senior at Hunter High School. Mason has been interested in mycology for as long as he can remember. He loves to study mushrooms and plants.



# So what?

Mushrooms are really cool, but what are they good for?

Today we use mushrooms in a wide variety of ways. From food, to building materials, even for their medicinal properties to stop cancer.



We can also use mushrooms as a cruelty free alternative to animal products. We can make both leather and meat look a-likes (and taste a-likes) that function almost identically to their animal counterparts.

It goes beyond imitating other living things though. We can also make biodegradable plastics and other forms of packaging, keeping more out of our landfills.



Another amazing way we can use mushrooms is to capture carbon in the atmosphere, which can be a powerful tool for fighting climate change.

Mushrooms also happen to make great bricks, that when maintained well can be used for upwards of 20 years; Providing cheap temporary housing options for third world countries.

This is just the beginning of how amazing mushrooms are and every year that goes by we discover more and more amazing facts about them!

# Different Parts of mushrooms

Cap:  
The cap is helps protect the spores

Spores:  
reproductive spores

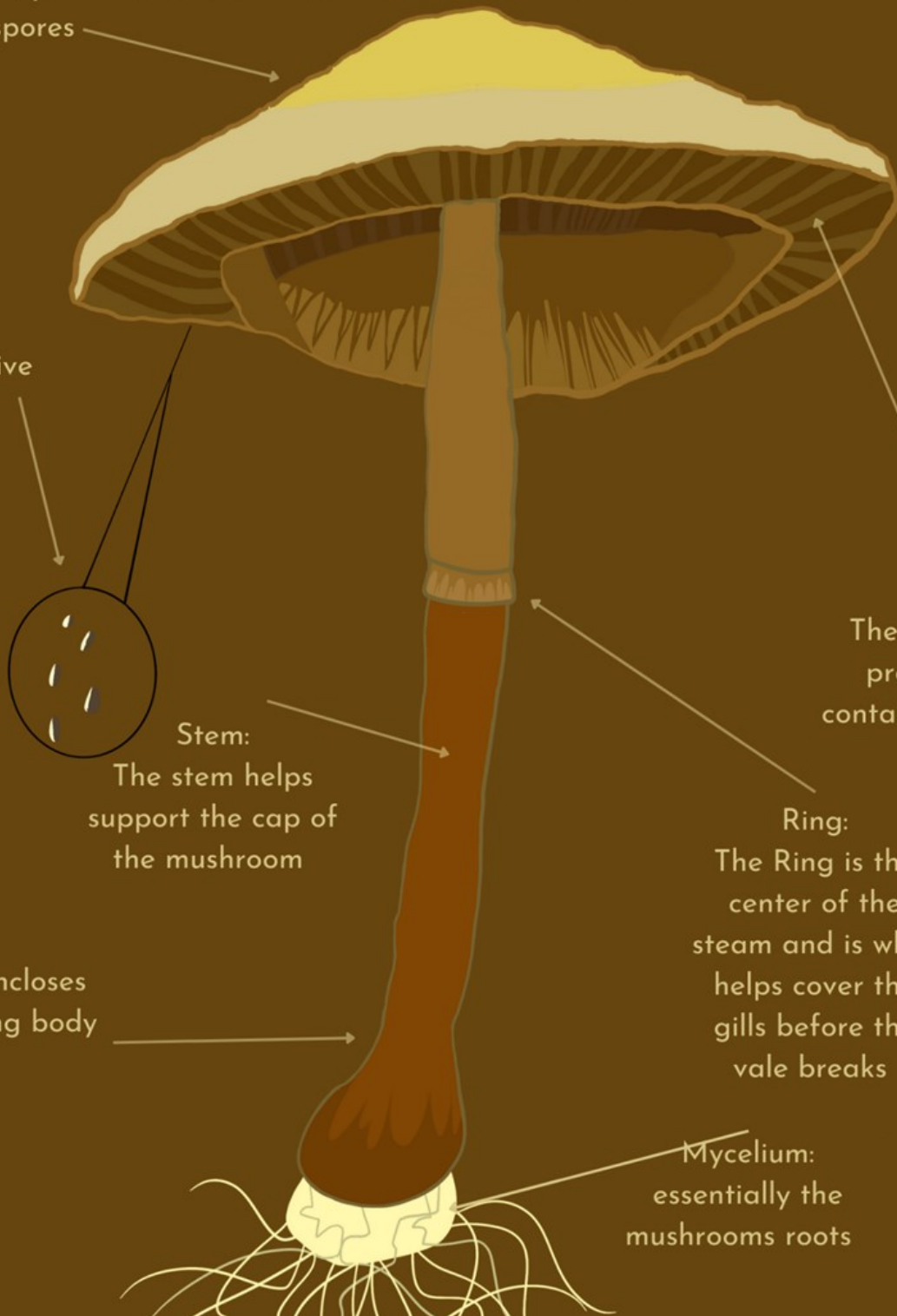
Volva: Encloses the fruiting body

Stem:  
The stem helps support the cap of the mushroom

Mycelium:  
essentially the mushrooms roots

Gills:  
The gills helps protect and contain the spores

Ring:  
The Ring is the center of the stem and is what helps cover the gills before the vale breaks



Earth Star



- There is a mushroom which only grows in areas that are undisturbed
- Earthstar mushrooms grow in sandy soils and sometimes in sand dunes
- Cup fungi often grow in healthy gardens
- Puffball mushrooms are shaped like golfballs and you can see it when their spores disperse (poke them with a stick and see what happens)

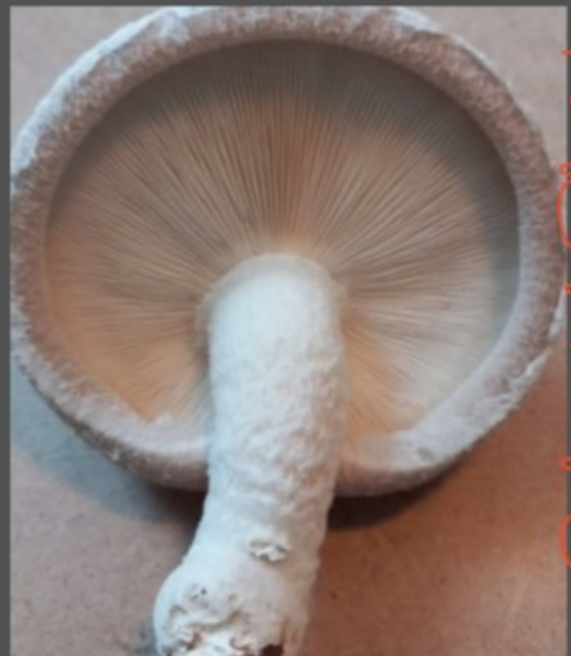
## CRAZY MUSHROOM FACTS



Fruil Body

- Fungi are genetically closer to humans than plants
- One of the largest life forms on earth is a fungus
- Mushrooms are the fruiting bodies of some fungi and only represent about 5% of the organism
- Some fungi can break down plastic

- Mushrooms have their own language and can speak up to 50 words.
- Mushrooms were first cultivated in China and Japan as early as 600 CE
- King Stropharia is considered the fastest growing mushroom



Cultivated Shiitake



- There are fungi that can trap and kill insects like carnivorous plants. They use the insects for nutrients.
- There are mushrooms that can grow in sub-zero temperatures.
- The highest temperature a mushroom has been known to grow at is 140°F.
- Some types of fungi grow with plant roots in a mutually beneficial symbiosis.
- Some mushrooms have nutritional and health benefits.

## MORE MUSHROOM FACTS



Oysters

- There are mushrooms that grow underwater and can grow floating on water.
- There are mushrooms that grow in deep, dark caves.
- There are mushrooms that can grow on ice and under ice.
- Different species of oyster mushrooms grow at different temperatures.

- Mushrooms can grow in any direction depending on their environment.
- Fungi are important for fighting climate change because they interact with greenhouse gases.
- Boletus edulis, the porcini, is the state mushroom of Utah.
- Boletus edulis has been recorded growing at 7,874.016 feet elevation



Boletus edulis

# HOW TO BUILD A STILL AIR BOX- AND WHAT IT'S FOR

Still air boxes (SAB) provide a sterile work environment on a budget. They can be used for various things, including:

- Culturing endophytes from plant tissue
- Cloning wild mushrooms onto a petri dish
- Testing a fungus's ability to eat a contaminant
- Anything else that requires a sterile workspace

## Materials

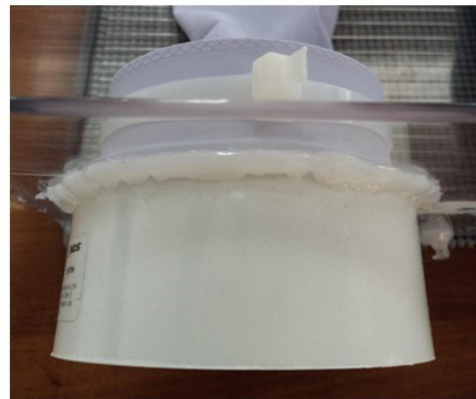
- Clear plastic bin
- Dish washing gloves
- Non-slip rubber mat
- Hot glue
- (2) 3in to 4in plumbing adapters
- 4 inch hole saw
- 2 large zip ties

**Step One.** Place a board or stiff object up against the side of the plastic that you will be putting the holes in. Hold pressure against the board/plastic to prevent it from flexing and cracking while you cut it. Use the 4 inch hole saw to cut two holes next to each other in the plastic. They should be about 2.5 inches apart, depending on the size of the box you are using.

## Step Two.

Place the 3in end of the adapter through the hole and use hot glue to secure the 4 in end to the outside of the box.

Use the zip ties to secure the gloves to the inside part of the adapter so that they are easy to replace if they rip or wear out.



## Step Three.

Glue the non-slip mat to the bottom of the box.

Depending on the design of your box, you may need a way to secure the lid so that it doesn't allow airflow in while you are working inside the box.





# Tools to bring with you while foraging



Kitchen scissors

1-2 trays to put  
different mushrooms in



Assorted Baskets

Pocket Shovel



Gloves

Small ruler



Sharp Compact Knife

Hori-Hori, or Weeding  
Knife, or Japanese  
Garden Knife



Flashlight

Hand Lens or Loupe



# MUSHROOM COOKING TIPS

1. IF WASHING MUSHROOMS BEFORE YOU COOK THEM, ONLY EXPOSE THEM TO WATER BEFORE THEY ARE CUT. IF THEY ARE WASHED AFTER THEY ARE CUT, THEY CAN ABSORB THE WATER QUICKLY AND BECOME SOGGY. SO, BE SURE TO ONLY QUICKLY WASH WHOLE MUSHROOMS, AND DON'T LEAVE THEM EXPOSED TO WATER FOR LONGER THEN MAYBE 10 SECONDS; DRY THEM QUICKLY.
2. COOK OUT THE MOISTURE. EVERYONE HAS THEIR OWN PREFERENCES ON HOW THEY LIKE THE TEXTURE OF THEIR MUSHROOMS, AND IN MY OPINION MUSHROOMS ARE BEST WHEN CRISP, AND SOMEWHAT CARMALIZED. ONE OF THE BEST WAYS TO ACHIEVE THIS IS BY THOROUGHLY COOKING THE MUSHROOMS, UNTIL THEY ARE NO LONGER GIVING OFF LIQUID. IT'S IMPORTANT TO NOT OVER-COOK THEM, SO THEY AREN'T RUBBERY, BUT COOK OUT ALL OF THE LIQUID SO THEY AREN'T SLIMY, EITHER.
3. COOK WITH LOTS OF OIL. TO REPLACE THE MOISTURE LEAVING THE MUSHROOMS AS YOU COOK THEM, PUT OIL IN THE PAN JUST BEFORE YOU PUT IN THE MUSHROOMS. YOU WANT THE MUSHROOMS TO ABSORB THE OIL AND REPLACE IT WITH THE LIQUID THEY ALREADY HAD. THIS HELPS BRING OUT THE FLAVOR IN THE MUSHROOMS, AND IT ALSO HELPS GET THAT CAMELIZED TEXTURE. I LIKE TO ADD SOME BUTTER AS WELL JUST A MINUTE OR SO BEFORE I TURN OFF THE HEAT.
4. ONLY ADD SEASONINGS, SUCH AS SALT, ONCE THE MUSHROOMS ARE MOSTLY COOKED. THIS IS THE BEST WAY FOR THE SEASONINGS TO BE NOTICEABLE AND NOT AFFECT THE TEXTURE OF THE MUSHROOMS.





# HOW TO SAUTÉ MUSHROOMS

FIRST, CLEAN OFF DIRT FROM THE MUSHROOMS WITH A DAMP PAPER TOWEL OR BY BRIEFLY CLEANING WITH WATER AND DRYING. CUT THE MUSHROOMS INTO QUARTER-INCH SECTIONS, CUTTING AWAY HARD STEMS OR OTHER UNWANTED PARTS OF THE MUSHROOM.

USE ABOUT A TABLESPOON OF EXTRA-VIRGIN OLIVE OIL FOR EVERY EIGHT OUNCES OF MUSHROOMS. HEAT THIS OIL IN A SKILLET OVER MEDIUM HEAT. THEN, DISPERSE MUSHROOMS ACROSS PAN AND ALLOW TO COOK UNTIL THEY BEGIN TO BROWN. CONTINUE STIRRING AND LEAVING TO COOK UNTIL ALL SIDES ARE GOLDEN BROWN, AND NO MORE MOISTURE IS BUBBLING OUT OF THE MUSHROOMS. APPROXIMATELY ONE MINUTE BEFORE REMOVING FROM HEAT, SEASON WITH PREFERRED SEASONINGS. SOME RECOMMENDED SEASONINGS ARE SALT, PEPPER, BUTTER, AND GARLIC. LEMON JUICE CAN BE ADDED ONCE REMOVED FROM HEAT.



# CRISPY FRIED CHICKEN & MUSHROOM GRAVY

**CHICKEN INGREDIENTS:** 1/3 CUP ALL PURPOSE FLOUR, 1/2 TSP GARLIC POWDER, 1 TBS SALT, 1 TSP PAPRIKA, 1/2 TSP PEPPER (DIVIDED), 1/2 TSP POULTRY SEASONING, 2/4 CUP WATER, 1 EGG, PINCH OF SALT, 2 LBS CUT UP CHICKEN, OIL FOR DEEP FRYING

**GRAVY INGREDIENTS:** 2 TBSP BUTTER, 2 OZ OYSTER MUSHROOMS, 1 CLOVE GARLIC MINCED, 2 TBSP ALL PURPOSE FLOUR, 2 CUPS MILK.

DIRECTIONS: 1. MIX 1/2 TSP GARLIC POWDER AND 1TBS SALT TOGETHER, 2. IN A LARGE SHALLOW DISH MIX FLOUR, PAPRIKA, TBS SALT, PEPPER AND POULTRY SEASONING, 3. IN ANOTHER SHALLOW DISH, BEAT EGG AND WATER, ADD A PINCH OF SALT AND COMBINE 2/3 CUP FLOUR 4.COAT CHICKEN IN EGG MIXTURE 5. FRY CHICKEN UNTIL GOLDEN BROWN AND CHICKEN REACHES INTERNAL TEMPERATURE OF 165

FOR THE GRAVY: MELT THE BUTTER IN A SKILLET OVER MEDIUM HEAT. ADD THE CHOPPED OYSTER MUSHROOMS AND MINCED GARLIC TO THE SKILLET AND SAUTÉ UNTIL THE MUSHROOMS ARE TENDER, ABOUT 5 MINUTES.

SPRINKLE THE FLOUR OVER THE MUSHROOMS AND STIR UNTIL THE FLOUR IS WELL INCORPORATED.

SLOWLY POUR IN THE MILK, WHISKING CONSTANTLY TO PREVENT LUMPS FROM FORMING.

CONTINUE TO COOK THE GRAVY, STIRRING FREQUENTLY, UNTIL IT THICKENS AND COMES TO A SIMMER. THIS SHOULD TAKE ABOUT 5-10 MINUTES.

SEASON THE GRAVY WITH SALT AND PEPPER TO TASTE.

REMOVE THE GRAVY FROM HEAT AND SERVE IT OVER FRIED CHICKEN, BISCUITS, MASHED POTATOES, OR ANY OTHER DISH THAT COULD USE A DELICIOUS GRAVY.



# MUSHROOM PASTA

**INGREDIENTS:** SALT, 1 LB OYSTER MUSHROOMS, ¼ CUP OLIVE OIL, PEPPER, 1 SMALL ONION CHOPPED, ⅓ CUP MILK, 4 TABLESPOONS UNSALTED BUTTER, 1 POUND FARFALLE OR OTHER PASTA, ¼ CUP GRATED PARMESAN, ¼ CUP CHOPPED PARSLEY, MINT, OR BASIL

1. BRING A LARGE POT OF WATER TO A BOIL AND SALT IT. CHOP THE MUSHROOMS.
2. IN MEDIUM SKILLET, HEAT UP OIL AND ADD CHOPPED MUSHROOMS, COOK UNTIL MUSHROOMS BECOME MORE FIRM, ABOUT 5 TO 10 MINUTES. LOWER THE HEAT AND ADD THE CHOPPED ONION. LOWER THE HEAT AND STIR ABOUT 5 TO 10 MINUTES AS THE MIXTURE BEGINS TO BROWN. ADD THE MILK AND BUTTER, STIR, THEN TURN OFF HEAT.
3. ADD PASTA TO BOILING WATER AND COOK FOR DIRECTED AMOUNT OF TIME. DRAIN THE PASTA, ADD TO THE SKILLET WITH THE MUSHROOM SAUCE, AND STIR. STIR IN THE CHEESE, TASTE, AND ADD SALT AND PEPPER TO TASTE. GARNISH WITH PREFERRED HERBS AND PARMESAN AND SERVE.





# HOW TO GROW OYSTER MUSHROOMS PG 1

## Materials

- Substrate- shredded straw, coffee chaff, shredded paper, shredded cardboard, some combination of these things
- Grain Spawn or starter kit
- Bucket with 1inch holes
- Rubbing alcohol



**Step One.** Acquire grain spawn or a starter grow kit from a reputable mushroom company. Oyster mushrooms have preferred temperature fruiting ranges, so be sure to research which species you are growing and match it to the weather as best you can.

**Step Two.** Assemble your substrate materials. You can use straw shredded to approximately one inch pieces (you can sometimes buy animal bedding that is roughly this size). Mix roughly 50% straw with coffee chaff, shredded paper, and/or shredded cardboard. Do not use sawdust or wood shavings for this process. Put the substrate mix in a cloth bag and submerge it in water for 6-8 hours (overnight). After this cold soak, heat the water up to 150-160F and hold it in that temperature range for 1 hour. Remove from water and allow to cool for an hour or two. This process is called pasteurizing, and it will kill competitor mold spores that may be in the substrate.



# HOW TO GROW OYSTER MUSHROOMS PG 2

## Step Three

While your substrate is pasteurizing, use a paddle bit and a drill to make one inch holes in the sides of the bucket, roughly half way up the side. For a 2-3 gallon bucket, make 4 holes. For a 5 gallon bucket, make 6 holes.

Use a smaller bit, roughly the size of a pencil eraser, to drill 3-5 drainage holes in the bottom of the bucket.



## Step Four

When your substrate is cool enough to handle, put about one inch in the bottom of the bucket. Layer it in intervals with your grain spawn (or starter mushroom kit). One jar of grain spawn usually makes two 2.5 gallon grow kits; one starter grow kit can make 4-6 2.5 gallon grow kits. Evenly distribute your inoculant throughout the bucket. Then, put the lid on the bucket. Allow it to sit for a few days before watering.



## Step Five

A few days after inoculation, begin watering inside the bucket every other day or so. Water more frequently in summer. Replace the lid after watering. You should see white mycelium spread across the top. Periodically unclog the drainage holes using a paperclip. Mist the one inch holes on the sides of the bucket. This is where the mushrooms will fruit from.





# HOW TO GROW OYSTER MUSHROOMS PG 3

## Step Six

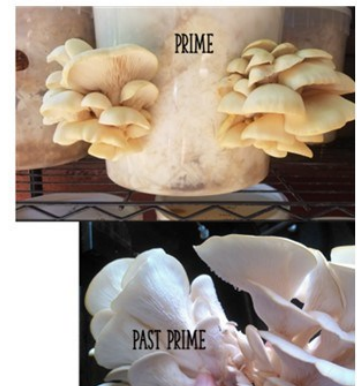
Watch for pins! These are baby mushrooms that will show up in the side holes. They can be really small and easy to miss. They typically show up about two weeks after inoculation.

Mist the pins multiple times per day, or loosely drape a wet towel over the bucket. They don't recover if they dry out at this stage. If they do dry out, scrape them off and let them start again.



## Step Seven

Most species of oyster mushroom are ready to harvest about 4 days after pinning. Keep them moist, in the shade, and in a spot with good airflow. Use the caps as an indicator for when to harvest; they should be turned under toward the gills. Harvest by using a knife to cut them off the side of the bucket.



## Step Eight

After harvest, use a knife to scrape away to a new layer of straw at the fruiting holes. Continue to water the inside of the bucket and mist the holes. Most holes will fruit 2-3 times.





# How animals interact with mushrooms around them.

Botanophila flies have been shown to help spread mushrooms by landing on the mushrooms and getting spores on them and then moving the spores around the environment until they reach another spore at which point the mushroom will germinate.

Leaf cutter ants utilize mushrooms to make their own fungus garden in which they will farm mushrooms for food and 2 species of snakes have been shown to use those fungus gardens to incubate their eggs.

Many different animals and reptiles eat mushrooms which provide a source of nutrition for them.

Animals in their natural habitat can tell which mushrooms are poisonous and box turtles are almost completely immune to mushroom toxin.



**SALT LAKE YOUTH MYCOLOGY** is a community project of Fungal Focus, LLC and was generously supported by Dry Creek Charity.



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