Transcript: How to Build a Monotub | Step-by-Step DIY Guide for Indoor Mushroom Growing | Monotub Tek | (Part 1)

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**[00:00:00]** Monotubs are simple, highly effective,   
discreet, require minimal infrastructure

**[00:00:05]** and minimal cost. In part one of this video, I'm   
going to show you how to build a DIY monotub,

**[00:00:11]** create your own master grain spawn,   
and grow your first flush of mushrooms.

**[00:00:16]** Although the monotub tech is   
most often associated with the

**[00:00:19]** cultivation of psilocybe species, it   
can also be used to grow other edible

**[00:00:23]** mushrooms which I'll show you how to   
do in the second part of this video.

**[00:00:27]** For those of you unfamiliar with this channel,   
several years ago we released our first monotub

**[00:00:32]** tech video which received a lot of attention.   
Since then, the community of mushroom growers

**[00:00:37]** has grown rapidly and have developed many   
new and improved cultivation techniques.

**[00:00:41]** After looking through thousands of your comments   
and thoughtfully designing our very own monotub,

**[00:00:46]** we felt like it was time to   
release an updated tutorial.

**[00:00:54]** This spawn is super colonized. That's okay. Just   
got to get in there. Sometimes an elbow helps!

**[00:01:00]** If you're watching this and are realizing   
that you don't want to build your own monotub,

**[00:01:04]** or don't have the tools to do it, you can   
get your own monotub from us at North Spore.

**[00:01:09]** The BoomrBin is an all-in-one grow chamber   
designed by mycologists to grow edible or

**[00:01:13]** medicinal mushrooms using bulk substrates   
or fruiting blocks. Compared to other,

**[00:01:17]** pre-fabricated, monotubs the BoomrBin is   
modular. It has optional air exchange and

**[00:01:22]** humidity systems that allow you to grow   
a wider range of mushroom species. For

**[00:01:26]** more information on the BoomrBin,   
check out the description below!

**[00:01:30]** I want to thank you for watching   
this video. If you like our content,

**[00:01:34]** please consider subscribing. With your support   
we'll continue creating free educational content

**[00:01:38]** on all things mushrooms including cultivation   
techniques, foraging, and the world of

**[00:01:43]** mycology. Again thank you all new and current   
subscribers for being with us on this journey!

**[00:01:56]** The monotub is a self-contained, all-in-one   
mushroom grow chamber that began as a

**[00:02:00]** collaborative project by shroomery.org members   
working together to find a simpler method to

**[00:02:06]** grow bulk medicinal or edible mushrooms by   
improving or rather simplifying the already

**[00:02:11]** widely used Double Tub Tech, also known as Dub   
Tub, which has been around since the 1990s.

**[00:02:17]** While the exact origins remain unclear,   
the first documented references online to

**[00:02:21]** the monotub tech can be traced back to 2006   
through the contributions of Shroomery.org

**[00:02:26]** member Ohmatic. Ohmatic's documentation of the   
monotub tech laid the foundation for countless

**[00:02:32]** growers seeking an easier, more streamlined   
method for indoor mushroom cultivation.

**[00:02:37]** At this point, there are many... probably   
dozens of different documented ways to

**[00:02:41]** build a monotub. The technique that I'm   
showing you today is just what we've found

**[00:02:45]** to be the most versatile. However if you   
understand the principles of the monotub,

**[00:02:49]** which I'm going to explain, you   
can develop your own design.

**[00:02:56]** The construction is pretty straightforward.   
Monotubs are plastic bins with ports and

**[00:03:01]** fresh air exchange filters that   
facilitate air flow while also

**[00:03:04]** maintaining ambient humidity levels for   
optimal colonization, pinning, and fruiting.

**[00:03:10]** To build a monotub, you're going   
to need a plastic tub. About 64

**[00:03:14]** quarts. Sterilite is a great brand for that.

**[00:03:17]** You'll also need 1 inch and 2 inch   
adhesive filters. The filters are

**[00:03:22]** sized to the holes so they're going   
to be a little larger so they can fit

**[00:03:25]** around the rim. You'll also need a power   
drill... and you want to use a small bit

**[00:03:29]** to drill pilot holes. It makes the whole   
process smoother and reduces cracking.

**[00:03:34]** You're going to need a 1 inch and 2 inch hole   
saw bit. You're also going to need an x-acto

**[00:03:40]** knife to clean up those holes. There's often   
burrs around the edges after making those cuts

**[00:03:44]** and you want the filter patches to lay flat.   
You'll need a measuring tape and a marker.

**[00:03:50]** I'm going to be drilling a total of six, 2 inch   
holes around the perimeter of this tub. Two holes

**[00:03:56]** on each long side and one hole on each end about   
8 1/2 inches from the base of the tub. From that,

**[00:04:03]** I'm going to drill 1 inch holes positioned   
approximately 4 1/2 in from the base. Ideally your

**[00:04:11]** 1 inch holes should be just above the top of your   
substrate. This bin is roughly 20 inches wide,

**[00:04:17]** so my 1 inch holes will be positioned at   
5 inches, 10 inches, and 15 inches across.

**[00:04:24]** Though we are using two sizes of holes for   
this build, there's flexibility with hole

**[00:04:29]** placement and whole size depending on   
what types of species you're going to

**[00:04:32]** be growing in your tub. We're designing our   
tub with flexibility and airflow optimization

**[00:04:36]** in mind for growing the widest range of   
mushroom species. But for growing one

**[00:04:41]** certain variety of medicinal mushroom you   
can get away with just the two inch holes.

**[00:04:54]** These lower holes on the ends here   
should be evenly spaced. It's going

**[00:04:58]** to be different depending on the type   
of tub that you're using. Remember,

**[00:05:01]** it doesn't need to be super super exact that's   
not critical for the functioning of your monotub.

**[00:05:12]** I just marked every hole for our monotub. It's

**[00:05:16]** all ready to go for me to use our   
pilot bit here to make the holes.

**[00:05:35]** Now that we've got our 1 inch hole saw bit   
attached, we're ready to drill these holes in

**[00:05:39]** the tub and I'm going to do so in reverse. In   
our original monotub guide we drilled it, not

**[00:05:46]** in reverse, forward. And that rips at the   
plastic and can cause cracking and that

**[00:05:53]** was the number one comment we got on that   
video and so this time we're going to do

**[00:05:57]** it in reverse and that way you don't have to   
press very hard you're melting the plastic.

**[00:06:01]** So you're actually going to smell   
it melting, you're going to see it

**[00:06:04]** melting. Having good air flow in your space   
and maybe wearing a mask not a bad idea.

**[00:06:46]** Our monotub is looking good. We made our holes and   
they're nice and cleaned up. All you need to do

**[00:06:51]** is add your filter patches from here, before you   
start growing, very important step. Alternatively

**[00:06:57]** you can make your own filter patches using some   
polyfill tape and micropore tape. I find that

**[00:07:02]** stick on filter patches are a lot easier to   
work with and more effective for this design.

**[00:07:11]** To grow mushrooms in the monotub I just   
built, I need to create spawn. In order to

**[00:07:15]** create spawn at home, you're going to need   
a liquid culture syringe or spore syringe,

**[00:07:20]** sterilized media such as a grain bag,   
and a clean environment for inoculation.

**[00:07:24]** I'll be using a liquid culture syringe today   
because they offer greater consistency,

**[00:07:28]** faster colonization rates, and they're   
more cost effective. Liquid culture

**[00:07:32]** contains fungal mycelium suspended in a   
nutrient broth which has been selected

**[00:07:37]** for specific strain characteristics   
such as morphology, colonization rate,

**[00:07:41]** color of fruiting bodies, potency, preferred   
substrate, preferred fruiting conditions,

**[00:07:47]** and strain vigor. With the liquid culture syringe,   
you know exactly what genetics you're getting.

**[00:07:51]** On the other hand, spore syringes contain   
mushroom spores. Spores are microscopic,

**[00:07:56]** single celled structures that contain half of the   
genetic information needed to produce mycelium.

**[00:08:02]** Once you inject spores you don't know what   
you're going to get until your mushrooms fruit.

**[00:08:07]** For that reason, I prefer using liquid culture.   
However, people have and can use both kinds of

**[00:08:12]** syringes but I recommend using the former if your   
desired species is available as a liquid culture.

**[00:08:19]** One way to get a lot more use out of a single   
spore or liquid culture syringe is to use a

**[00:08:24]** liquid culture kit like the one made by us.   
It either allows you to turn a single Spore

**[00:08:29]** syringe into a full 300 milliliters of liquid   
culture, a 30X increase on that one syringe,

**[00:08:34]** or expand a single liquid culture syringe   
into even more liquid culture. You only

**[00:08:39]** have to inject a tiny bit maybe 1 to 2 CC's   
and it will be ready in just a couple weeks.

**[00:08:47]** I'm going to be doing all of my lab   
work inside the NocBox which is our

**[00:08:50]** portable version of a still-air-box. The   
NocBox is going to help me create a clean

**[00:08:55]** environment and reduce the possibility of   
contamination by limiting air movement. You

**[00:09:00]** can do this process in open air but it   
increases your chance of contamination.

**[00:09:05]** I'm first going to check my sterilized   
grain bag for any rips or tears in

**[00:09:09]** the packaging that may have occurred   
during shipping. Everything looks good,

**[00:09:15]** so I'm sanitizing my space hands and   
grain bag with 70% isopropyl alcohol.

**[00:09:31]** Here's my liquid culture syringe.   
I'm using a fresh needle so it

**[00:09:34]** doesn't require further sterilization,   
however if you're using one needle for

**[00:09:39]** multiple bags you'll want to clean it   
between uses. This bag is around 3 lbs

**[00:09:44]** so I recommend injecting between 2   
1/2 and 5 cc's of liquid culture.

**[00:09:51]** This is ready for incubation. It will take a   
few weeks before I start to see some mycelium!

**[00:09:56]** We inoculated this bag about a month ago so that   
we could show you what partial colonization looks

**[00:10:01]** like. This bag has spread about 2 or 3 inches from   
the injection port. At this point, things start

**[00:10:08]** to slow down quite a bit unless you break the bag   
up and distribute that colonized grain throughout

**[00:10:14]** the bag. From there it will recolonize very   
quickly. That usually only takes a couple weeks.

**[00:10:36]** If you were to inoculate this monotub as   
is, you might experience an undesirable

**[00:10:40]** phenomenon known as side pinning. Side pinning   
occurs when your substrate pulls away from the

**[00:10:44]** sides of the bin as it colonizes, leaving   
space for the mushrooms to fruit from.

**[00:10:49]** This area typically provides the perfect   
level of humidity to initiate fruiting.

**[00:10:53]** There are a few issues with side   
pinning. As your mushrooms mature,

**[00:10:57]** they will be difficult to harvest, become   
particularly dirty with substrate or casing,

**[00:11:02]** or stop growing altogether due to low oxygen   
levels. One way to avoid this situation is

**[00:11:07]** to use a liner. This goes at the base   
of your tub and contains all of your

**[00:11:11]** substrate. I used 3.5 mil plastic sheeting to   
make this one. Liners are completely optional,

**[00:11:17]** but the addition of one may ease cleanup,   
ease harvesting, and increase total yield.

**[00:11:25]** Making a liner is fairly simple. For this one   
I cut a square of plastic sheeting and measured

**[00:11:29]** it 3 to 4 in away from the base of the tub.   
I put the sheeting over the bottom of the tub

**[00:11:39]** with even overhang on each side. From there, I   
fold each corner and secure it with duct tape.

**[00:11:53]** My liner is sitting in there snug my filters   
are in place we're ready to inoculate.

**[00:12:02]** I have everything I need to inoculate this   
tub right here: 70% isopropyl alcohol,

**[00:12:08]** gloves, a bag of fully colonized   
grain spawn, and two BoomerBags,

**[00:12:12]** North Spore's manure-based substrate for   
growing those beautiful canopies. If you're

**[00:12:16]** not growing dung loving mushrooms, you can also   
experiment with different kinds of substrate,

**[00:12:20]** such as WoodLvr (wood-based substrate). Just   
make sure you have the right substrate for the

**[00:12:25]** right mushroom species before you get started   
otherwise the results may be less than ideal.

**[00:12:40]** I'm at a stage where I want to sanitize my space.   
70% alcohol is the best thing for that. I'm going

**[00:12:45]** to spray my hands down as well and I'm going   
to spray my table down so my workspace is a

**[00:12:54]** little bit cleaner. As you can see we're doing   
this in open air. You want to try and do it in

**[00:13:00]** the cleanest place you have available to   
you. A small room with minimal air flow is

**[00:13:05]** great. If you've got a NocBox, even better. First   
things first, we've got our Boomer material here.

**[00:13:10]** This is a 5 lb bag and we just want it nice   
and loose for when we pour it into the tub.

**[00:13:19]** This is just sterile material,   
there's no mycelium holding it

**[00:13:22]** together so that should be good. Take   
the second one and do the same thing.

**[00:13:43]** This spawn is super colonized. That's okay.   
Just got to get in there. Sometimes an elbow

**[00:13:48]** helps just be careful not to break the bag   
but you want to really get it broken up so

**[00:13:55]** that there's lots of inoculation points and it's   
well distributed amongst the Boomer material.

**[00:14:01]** There could be a whole tutorial on   
different massage techniques for your spawn.

**[00:14:09]** It doesn't have to be perfect,

**[00:14:12]** that's looking pretty good. This one 3 lb   
bag of grain spawn can inoculate two to

**[00:14:19]** three 5 lb bags of substrate depending on   
the size of your tub and your preference.

**[00:14:51]** I'm getting the mixture as even as   
possible, breaking up any chunks and

**[00:14:54]** making a flat surface. A homogeneous mix of   
grain and substrate will result in even and

**[00:15:00]** complete colonization. I'm also making sure   
to gently pack down the substrate which can

**[00:15:05]** help reduce side pinning further   
and get rid of large air pockets.

**[00:15:13]** Being as clean as I could, I combined my Boomer

**[00:15:15]** material with my grain spawn now   
the tub is ready for incubation.

**[00:15:22]** A common misconception is that mycelium   
and mushrooms in general prefer to grow

**[00:15:26]** in the dark. They don't. In the wild   
mushrooms tend to fruit in darker,

**[00:15:30]** shaded areas due to higher levels of humidity.   
In fact, ambient light plays an important role

**[00:15:35]** informing the fungus where to fruit, it's   
necessary for the production of certain

**[00:15:39]** natural chemicals within the fungus, and   
aids in color and fruit body formation.

**[00:15:43]** With that in mind, the environment in   
which you're growing your mushrooms

**[00:15:47]** plays a big role in the success of your   
grow. It's best practice to store your

**[00:15:51]** tub away from direct sunlight and in a   
temperature controlled room between 65

**[00:15:56]** and 75° F. An area that's too hot will dry   
out your mycelium and promote contamination,

**[00:16:03]** an area that's too cold will slow the colonization   
process down significantly, if not completely.

**[00:16:09]** If all goes well my tub should take around 2   
to 3 weeks to fully colonize in this space.

**[00:16:17]** My substrate is now fully colonized with mycelium.   
There's also some condensation on both the lid,

**[00:16:23]** and on the top of the substrate, which   
is a good sign that this tub is properly

**[00:16:26]** hydrated. You might also see droplets of amber   
colored liquid called exudate on the substrate,

**[00:16:31]** this is a normal byproduct of fungal   
metabolism. Coloration of mycelium varies

**[00:16:36]** species to species, with some mycelium   
even turning slightly blue over time.

**[00:16:40]** To promote fruiting I'm going to add   
a thin casing layer to the top of the

**[00:16:44]** substrate. Think of the casing layer like   
leaves on a forest floor. They provide an

**[00:16:48]** excellent environment for pinning mushrooms.   
The casing layer mimics this natural system.

**[00:16:53]** You can use many different materials such as coco   
coir, peat moss, or vermiculate. If you plan on

**[00:16:59]** using vermiculite, make sure that   
it's certified to be asbestos free.

**[00:17:02]** We'll link to both coco coir and clean   
vermiculite in the ingredients below.

**[00:17:08]** Today I'm using coco coir for my casing layer.   
For rehydration, I'm going to bring a total of 2

**[00:17:13]** liters of water to boil. Hot water will expand   
the coir instantaneously. Make sure the water

**[00:17:30]** is coming in direct contact with dry coir as   
you pour. Using a fork to scrape and mix will

**[00:17:42]** help reduce leftover dry chunks. Before using,   
let it sit until it reaches room temperature.

**[00:17:55]** To go the extra mile, you could   
consider a longer pasteurization.

**[00:17:59]** This just ensures a cleaner material and further   
reduces contamination potential. To do this,

**[00:18:03]** you'd want to boil the casing material   
for 30 minutes. Just make sure that you

**[00:18:07]** let it cool and squeeze it out to field   
capacity. I'm going to start by spreading

**[00:18:12]** a thin layer of coir on the surface   
of this mycelium around 1 inch deep.

**[00:18:27]** If in a couple of weeks your   
still not seeing any pins,

**[00:18:29]** your mycelium might require an environmental   
change such as additional moisture or a change

**[00:18:35]** in temperature. I made a secondary tub   
with a BoomrBin that's already started

**[00:18:39]** to pin. It's in the time-lapse tent   
now so we can watch our mushrooms grow!

**[00:19:01]** That is an excellent flush, almost the canopy.   
These mushrooms are just about perfect for

**[00:19:06]** harvest. Some are further along than others. As a   
general rule, you want to harvest your mushrooms

**[00:19:11]** before the caps flatten out. Often once they   
get to that flat stage, they'll release a bunch

**[00:19:16]** of spores and that typically just means you'll   
get less shelf life out of your mushrooms. The

**[00:19:20]** texture starts to suffer and they have a better   
density when they're a little bit younger.

**[00:19:25]** These could have been harvested yesterday, some   
of them could be harvested harvested tomorrow.

**[00:19:29]** Just remember that doesn't apply to things   
like Lion's Mane because it doesn't have a

**[00:19:33]** cap. But this species very very happy, so   
I'm going to go ahead and harvest we have.

**[00:19:38]** I have our Opinel knife here to do   
so. This is a great knife. Really

**[00:19:42]** simple locking mechanism here.   
Make sure that when you open it,

**[00:19:45]** that's locked so that when you push down,   
the knife can't flop back onto your hand.

**[00:19:49]** There's a brush at the end and that's really   
really nice for getting rid of excess substrate,

**[00:19:54]** why bring that with you, you know? So I'm   
going to harvest. I'm going to trim on

**[00:19:58]** this paper towel here and then we have a   
scale so we can weigh what we've harvested.

**[00:20:04]** I'm going to start by taking them out as clusters.   
Look at that first one! Stick it in there.

**[00:20:13]** Another thing to think about, you can cook your   
mushrooms but a lot of times you're going to dry

**[00:20:16]** your mushrooms and you'll get about 10% at the end   
of that so 90% of the weight of these mushrooms

**[00:20:23]** is water. Sometimes you can even just do like a   
partial harvest because there's a lot of babies,

**[00:20:28]** there's like a whole understory in here.   
You just let them go until that's done.

**[00:20:32]** Some people would be a little bit more   
um discerning about how they're cutting

**[00:20:37]** these. I'm leaving a bunch of stem, and that's   
valuable, but I don't worry too much about that.

**[00:20:43]** I harvested everything but some tiny little   
guys in here. We have about a pound and a half,

**[00:20:49]** look at that beautiful bin. So now what you can   
put them in the fridge, in a bin like this. You

**[00:20:55]** can take some parchment paper, put it on   
top and that will keep them pretty well.

**[00:21:00]** Another thing to do is to put them in a paper bag.   
So a paper bag in the fridge really is sort of

**[00:21:05]** the the gold standard for long-term storage,   
though you'll want to dry them. Investing in

**[00:21:09]** a dehydrator isn't a huge investment. You can   
get them for like 50 bucks and it's worth it.

**[00:21:14]** Desiccant packets are a really   
really useful thing as well,

**[00:21:17]** put them in a in a mason jar or even a plastic bag   
and just have that desiccant packet in there and

**[00:21:24]** your mushrooms will last for a very long time.   
Stable temperatures, out of direct sunlight.

**[00:21:28]** For the second flush, all I'm going to do   
is really give the top of the cake a good

**[00:21:34]** heavy misting, and then I'm going to close it up   
again and wait. And that's it. A lot of people,

**[00:21:40]** especially for subsequent flushes beyond   
the second, will choose to dunk the cake,

**[00:21:45]** they may dump a bunch of water in, and float the   
cake. They may even inject water into the cake.

**[00:21:51]** You just don't want it swimming, you   
don't want pools of water. You're just

**[00:21:55]** trying to rehydrate. It can take a while for   
a cake like this to really absorb the water,

**[00:22:00]** so remember give it some time. Maybe a couple   
hours. If the environment and conditions are

**[00:22:04]** good, you're going to get a lot more   
mushrooms out of a monotub like this.

**[00:22:08]** Thank you for watching this video it was   
a blast to make. This concludes part one

**[00:22:12]** of the monotub video guide. Feel free to let   
us know what you think in the comments. Stick

**[00:22:16]** around for part two, where we'll dive   
into automating monotubs to expand the

**[00:22:20]** number of compatible mushroom species.   
Also, special thanks to David from Eden

**[00:22:25]** Shrooms and our awesome content team here   
at North Spore! See you in the next video.

# Full Text (without timestamps)

Monotubs are simple, highly effective,   
discreet, require minimal infrastructure   and minimal cost. In part one of this video, I'm   
going to show you how to build a DIY monotub,   create your own master grain spawn,   
and grow your first flush of mushrooms. Although the monotub tech is   
most often associated with the   cultivation of psilocybe species, it   
can also be used to grow other edible   mushrooms which I'll show you how to   
do in the second part of this video. For those of you unfamiliar with this channel,   
several years ago we released our first monotub   tech video which received a lot of attention.   
Since then, the community of mushroom growers   has grown rapidly and have developed many   
new and improved cultivation techniques. After looking through thousands of your comments   
and thoughtfully designing our very own monotub,   we felt like it was time to   
release an updated tutorial. This spawn is super colonized. That's okay. Just   
got to get in there. Sometimes an elbow helps! If you're watching this and are realizing   
that you don't want to build your own monotub,   or don't have the tools to do it, you can   
get your own monotub from us at North Spore. The BoomrBin is an all-in-one grow chamber   
designed by mycologists to grow edible or   medicinal mushrooms using bulk substrates   
or fruiting blocks. Compared to other,   pre-fabricated, monotubs the BoomrBin is   
modular. It has optional air exchange and   humidity systems that allow you to grow   
a wider range of mushroom species. For   more information on the BoomrBin,   
check out the description below! I want to thank you for watching   
this video. If you like our content,   please consider subscribing. With your support   
we'll continue creating free educational content   on all things mushrooms including cultivation   
techniques, foraging, and the world of   mycology. Again thank you all new and current   
subscribers for being with us on this journey! The monotub is a self-contained, all-in-one   
mushroom grow chamber that began as a   collaborative project by shroomery.org members   
working together to find a simpler method to   grow bulk medicinal or edible mushrooms by   
improving or rather simplifying the already   widely used Double Tub Tech, also known as Dub   
Tub, which has been around since the 1990s. While the exact origins remain unclear,   
the first documented references online to   the monotub tech can be traced back to 2006   
through the contributions of Shroomery.org   member Ohmatic. Ohmatic's documentation of the   
monotub tech laid the foundation for countless   growers seeking an easier, more streamlined   
method for indoor mushroom cultivation. At this point, there are many... probably   
dozens of different documented ways to   build a monotub. The technique that I'm   
showing you today is just what we've found   to be the most versatile. However if you   
understand the principles of the monotub,   which I'm going to explain, you   
can develop your own design. The construction is pretty straightforward.   
Monotubs are plastic bins with ports and   fresh air exchange filters that   
facilitate air flow while also   maintaining ambient humidity levels for   
optimal colonization, pinning, and fruiting. To build a monotub, you're going   
to need a plastic tub. About 64   quarts. Sterilite is a great brand for that. You'll also need 1 inch and 2 inch   
adhesive filters. The filters are   sized to the holes so they're going   
to be a little larger so they can fit   around the rim. You'll also need a power   
drill... and you want to use a small bit   to drill pilot holes. It makes the whole   
process smoother and reduces cracking. You're going to need a 1 inch and 2 inch hole   
saw bit. You're also going to need an x-acto   knife to clean up those holes. There's often   
burrs around the edges after making those cuts   and you want the filter patches to lay flat.   
You'll need a measuring tape and a marker. I'm going to be drilling a total of six, 2 inch   
holes around the perimeter of this tub. Two holes   on each long side and one hole on each end about   
8 1/2 inches from the base of the tub. From that,   I'm going to drill 1 inch holes positioned   
approximately 4 1/2 in from the base. Ideally your   1 inch holes should be just above the top of your   
substrate. This bin is roughly 20 inches wide,   so my 1 inch holes will be positioned at   
5 inches, 10 inches, and 15 inches across. Though we are using two sizes of holes for   
this build, there's flexibility with hole   placement and whole size depending on   
what types of species you're going to   be growing in your tub. We're designing our   
tub with flexibility and airflow optimization   in mind for growing the widest range of   
mushroom species. But for growing one   certain variety of medicinal mushroom you   
can get away with just the two inch holes. These lower holes on the ends here   
should be evenly spaced. It's going   to be different depending on the type   
of tub that you're using. Remember,   it doesn't need to be super super exact that's   
not critical for the functioning of your monotub. I just marked every hole for our monotub. It's   all ready to go for me to use our   
pilot bit here to make the holes. Now that we've got our 1 inch hole saw bit   
attached, we're ready to drill these holes in   the tub and I'm going to do so in reverse. In   
our original monotub guide we drilled it, not   in reverse, forward. And that rips at the   
plastic and can cause cracking and that   was the number one comment we got on that   
video and so this time we're going to do   it in reverse and that way you don't have to   
press very hard you're melting the plastic. So you're actually going to smell   
it melting, you're going to see it   melting. Having good air flow in your space   
and maybe wearing a mask not a bad idea. Our monotub is looking good. We made our holes and   
they're nice and cleaned up. All you need to do   is add your filter patches from here, before you   
start growing, very important step. Alternatively   you can make your own filter patches using some   
polyfill tape and micropore tape. I find that   stick on filter patches are a lot easier to   
work with and more effective for this design. To grow mushrooms in the monotub I just   
built, I need to create spawn. In order to   create spawn at home, you're going to need   
a liquid culture syringe or spore syringe,   sterilized media such as a grain bag,   
and a clean environment for inoculation. I'll be using a liquid culture syringe today   
because they offer greater consistency,   faster colonization rates, and they're   
more cost effective. Liquid culture   contains fungal mycelium suspended in a   
nutrient broth which has been selected   for specific strain characteristics   
such as morphology, colonization rate,   color of fruiting bodies, potency, preferred   
substrate, preferred fruiting conditions,   and strain vigor. With the liquid culture syringe,   
you know exactly what genetics you're getting. On the other hand, spore syringes contain   
mushroom spores. Spores are microscopic,   single celled structures that contain half of the   
genetic information needed to produce mycelium.   Once you inject spores you don't know what   
you're going to get until your mushrooms fruit.   For that reason, I prefer using liquid culture.   
However, people have and can use both kinds of   syringes but I recommend using the former if your   
desired species is available as a liquid culture. One way to get a lot more use out of a single   
spore or liquid culture syringe is to use a   liquid culture kit like the one made by us.   
It either allows you to turn a single Spore   syringe into a full 300 milliliters of liquid   
culture, a 30X increase on that one syringe,   or expand a single liquid culture syringe   
into even more liquid culture. You only   have to inject a tiny bit maybe 1 to 2 CC's   
and it will be ready in just a couple weeks. I'm going to be doing all of my lab   
work inside the NocBox which is our   portable version of a still-air-box. The   
NocBox is going to help me create a clean   environment and reduce the possibility of   
contamination by limiting air movement. You   can do this process in open air but it   
increases your chance of contamination. I'm first going to check my sterilized   
grain bag for any rips or tears in   the packaging that may have occurred   
during shipping. Everything looks good,   so I'm sanitizing my space hands and   
grain bag with 70% isopropyl alcohol. Here's my liquid culture syringe.   
I'm using a fresh needle so it   doesn't require further sterilization,   
however if you're using one needle for   multiple bags you'll want to clean it   
between uses. This bag is around 3 lbs   so I recommend injecting between 2   
1/2 and 5 cc's of liquid culture. This is ready for incubation. It will take a   
few weeks before I start to see some mycelium!   We inoculated this bag about a month ago so that   
we could show you what partial colonization looks   like. This bag has spread about 2 or 3 inches from   
the injection port. At this point, things start   to slow down quite a bit unless you break the bag   
up and distribute that colonized grain throughout   the bag. From there it will recolonize very   
quickly. That usually only takes a couple weeks. If you were to inoculate this monotub as   
is, you might experience an undesirable   phenomenon known as side pinning. Side pinning   
occurs when your substrate pulls away from the   sides of the bin as it colonizes, leaving   
space for the mushrooms to fruit from.   This area typically provides the perfect   
level of humidity to initiate fruiting. There are a few issues with side   
pinning. As your mushrooms mature,   they will be difficult to harvest, become   
particularly dirty with substrate or casing,   or stop growing altogether due to low oxygen   
levels. One way to avoid this situation is   to use a liner. This goes at the base   
of your tub and contains all of your   substrate. I used 3.5 mil plastic sheeting to   
make this one. Liners are completely optional,   but the addition of one may ease cleanup,   
ease harvesting, and increase total yield. Making a liner is fairly simple. For this one   
I cut a square of plastic sheeting and measured   it 3 to 4 in away from the base of the tub.   
I put the sheeting over the bottom of the tub   with even overhang on each side. From there, I   
fold each corner and secure it with duct tape. My liner is sitting in there snug my filters   
are in place we're ready to inoculate. I have everything I need to inoculate this   
tub right here: 70% isopropyl alcohol,   gloves, a bag of fully colonized   
grain spawn, and two BoomerBags,   North Spore's manure-based substrate for   
growing those beautiful canopies. If you're   not growing dung loving mushrooms, you can also   
experiment with different kinds of substrate,   such as WoodLvr (wood-based substrate). Just   
make sure you have the right substrate for the   right mushroom species before you get started   
otherwise the results may be less than ideal. I'm at a stage where I want to sanitize my space.   
70% alcohol is the best thing for that. I'm going   to spray my hands down as well and I'm going   
to spray my table down so my workspace is a   little bit cleaner. As you can see we're doing   
this in open air. You want to try and do it in   the cleanest place you have available to   
you. A small room with minimal air flow is   great. If you've got a NocBox, even better. First   
things first, we've got our Boomer material here.   This is a 5 lb bag and we just want it nice   
and loose for when we pour it into the tub. This is just sterile material,   
there's no mycelium holding it   together so that should be good. Take   
the second one and do the same thing. This spawn is super colonized. That's okay.   
Just got to get in there. Sometimes an elbow   helps just be careful not to break the bag   
but you want to really get it broken up so   that there's lots of inoculation points and it's   
well distributed amongst the Boomer material. There could be a whole tutorial on   
different massage techniques for your spawn. It doesn't have to be perfect,   that's looking pretty good. This one 3 lb   
bag of grain spawn can inoculate two to   three 5 lb bags of substrate depending on   
the size of your tub and your preference. I'm getting the mixture as even as   
possible, breaking up any chunks and   making a flat surface. A homogeneous mix of   
grain and substrate will result in even and   complete colonization. I'm also making sure   
to gently pack down the substrate which can   help reduce side pinning further   
and get rid of large air pockets. Being as clean as I could, I combined my Boomer   material with my grain spawn now   
the tub is ready for incubation. A common misconception is that mycelium   
and mushrooms in general prefer to grow   in the dark. They don't. In the wild   
mushrooms tend to fruit in darker,   shaded areas due to higher levels of humidity.   
In fact, ambient light plays an important role   informing the fungus where to fruit, it's   
necessary for the production of certain   natural chemicals within the fungus, and   
aids in color and fruit body formation. With that in mind, the environment in   
which you're growing your mushrooms   plays a big role in the success of your   
grow. It's best practice to store your   tub away from direct sunlight and in a   
temperature controlled room between 65   and 75° F. An area that's too hot will dry   
out your mycelium and promote contamination,   an area that's too cold will slow the colonization   
process down significantly, if not completely.   If all goes well my tub should take around 2   
to 3 weeks to fully colonize in this space. My substrate is now fully colonized with mycelium.   
There's also some condensation on both the lid,   and on the top of the substrate, which   
is a good sign that this tub is properly   hydrated. You might also see droplets of amber   
colored liquid called exudate on the substrate,   this is a normal byproduct of fungal   
metabolism. Coloration of mycelium varies   species to species, with some mycelium   
even turning slightly blue over time. To promote fruiting I'm going to add   
a thin casing layer to the top of the   substrate. Think of the casing layer like   
leaves on a forest floor. They provide an   excellent environment for pinning mushrooms.   
The casing layer mimics this natural system. You can use many different materials such as coco   
coir, peat moss, or vermiculate. If you plan on   using vermiculite, make sure that   
it's certified to be asbestos free.   We'll link to both coco coir and clean   
vermiculite in the ingredients below. Today I'm using coco coir for my casing layer.   
For rehydration, I'm going to bring a total of 2   liters of water to boil. Hot water will expand   
the coir instantaneously. Make sure the water   is coming in direct contact with dry coir as   
you pour. Using a fork to scrape and mix will   help reduce leftover dry chunks. Before using,   
let it sit until it reaches room temperature. To go the extra mile, you could   
consider a longer pasteurization.   This just ensures a cleaner material and further   
reduces contamination potential. To do this,   you'd want to boil the casing material   
for 30 minutes. Just make sure that you   let it cool and squeeze it out to field   
capacity. I'm going to start by spreading   a thin layer of coir on the surface   
of this mycelium around 1 inch deep. If in a couple of weeks your   
still not seeing any pins,   your mycelium might require an environmental   
change such as additional moisture or a change   in temperature. I made a secondary tub   
with a BoomrBin that's already started   to pin. It's in the time-lapse tent   
now so we can watch our mushrooms grow! That is an excellent flush, almost the canopy.   
These mushrooms are just about perfect for   harvest. Some are further along than others. As a   
general rule, you want to harvest your mushrooms   before the caps flatten out. Often once they   
get to that flat stage, they'll release a bunch   of spores and that typically just means you'll   
get less shelf life out of your mushrooms. The   texture starts to suffer and they have a better   
density when they're a little bit younger. These could have been harvested yesterday, some   
of them could be harvested harvested tomorrow.   Just remember that doesn't apply to things   
like Lion's Mane because it doesn't have a   cap. But this species very very happy, so   
I'm going to go ahead and harvest we have. I have our Opinel knife here to do   
so. This is a great knife. Really   simple locking mechanism here.   
Make sure that when you open it,   that's locked so that when you push down,   
the knife can't flop back onto your hand. There's a brush at the end and that's really   
really nice for getting rid of excess substrate,   why bring that with you, you know? So I'm   
going to harvest. I'm going to trim on   this paper towel here and then we have a   
scale so we can weigh what we've harvested. I'm going to start by taking them out as clusters.   
Look at that first one! Stick it in there. Another thing to think about, you can cook your   
mushrooms but a lot of times you're going to dry   your mushrooms and you'll get about 10% at the end   
of that so 90% of the weight of these mushrooms   is water. Sometimes you can even just do like a   
partial harvest because there's a lot of babies,   there's like a whole understory in here.   
You just let them go until that's done. Some people would be a little bit more   
um discerning about how they're cutting   these. I'm leaving a bunch of stem, and that's   
valuable, but I don't worry too much about that. I harvested everything but some tiny little   
guys in here. We have about a pound and a half,   look at that beautiful bin. So now what you can   
put them in the fridge, in a bin like this. You   can take some parchment paper, put it on   
top and that will keep them pretty well. Another thing to do is to put them in a paper bag.   
So a paper bag in the fridge really is sort of   the the gold standard for long-term storage,   
though you'll want to dry them. Investing in   a dehydrator isn't a huge investment. You can   
get them for like 50 bucks and it's worth it. Desiccant packets are a really   
really useful thing as well,   put them in a in a mason jar or even a plastic bag   
and just have that desiccant packet in there and   your mushrooms will last for a very long time.   
Stable temperatures, out of direct sunlight. For the second flush, all I'm going to do   
is really give the top of the cake a good   heavy misting, and then I'm going to close it up   
again and wait. And that's it. A lot of people,   especially for subsequent flushes beyond   
the second, will choose to dunk the cake,   they may dump a bunch of water in, and float the   
cake. They may even inject water into the cake. You just don't want it swimming, you   
don't want pools of water. You're just   trying to rehydrate. It can take a while for   
a cake like this to really absorb the water,   so remember give it some time. Maybe a couple   
hours. If the environment and conditions are   good, you're going to get a lot more   
mushrooms out of a monotub like this. Thank you for watching this video it was   
a blast to make. This concludes part one   of the monotub video guide. Feel free to let   
us know what you think in the comments. Stick   around for part two, where we'll dive   
into automating monotubs to expand the   number of compatible mushroom species.   
Also, special thanks to David from Eden   Shrooms and our awesome content team here   
at North Spore! See you in the next video.