

Empty Spool Desk Organizer Workshop Guide



Table of Contents

1. Purpose	2
2. Required Trainings	2
3. Materials (Provided by The NJIT Makerspace)	2
4. Tools	2
5. Process	3
5.1. 3D Printing Drawers	3
5.2. Drilling The Spool	3
5.3. Assembly	6
6. Challenge	7

1. Purpose

The Makerspace has accumulated many empty 3D printing filament spools. Rather than discarding them, this workshop invites users to upcycle these spools, providing an opportunity to learn new skills and work with various tools along the way.

2. Required Trainings

- Make 101 - Introduction to the Makerspace
- Make 103 - Introduction to 3D Printing

3. Materials (Provided by The NJIT Makerspace)

- Qty. 4: 10-32 x 2.75" socket head cap screw
- Qty. 4: 10-32 lock nut
- Qty. 1: Empty Matterhackers Filament Spool
- 3D Printing filament

4. Tools

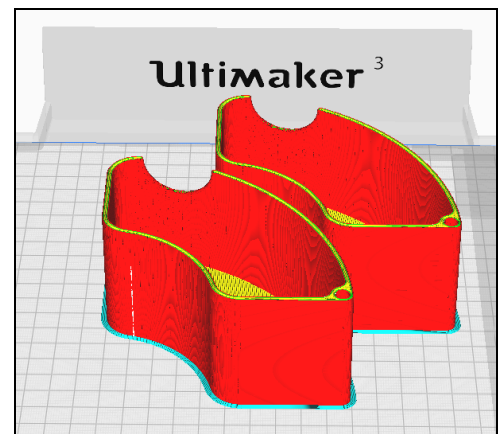
- Ultimaker 3 FDM Printer
- Custom Hole Template
- Pencil
- Drill Press
 - 13/64" Drill Bit
 - C-Clamp
- 5/32" Hex Key
- 3/8" Wrench

5. Process

5.1. 3D Printing Drawers

4 drawers will need to be 3D Printed for the organizer. The NJIT Makerspace provides a base drawer file that can be modified.

- 5.1.1. Acquire the STEP file of a base drawer from the NJIT Makerspace website.
- 5.1.2. Open the drawer model in your preferred CAD software. Make edits to the drawer if desired. Edits can include partitions in the drawer or decoration on the outer surface. Keep the overall dimensions of the drawer the same as the base model. You can repeat this process if you'd like any of the 4 drawers to be different from one another.
- 5.1.3. Export your drawer design(s) as STL files and 3D Print using the process outlined in the NJIT Makerspace Make 103 training.

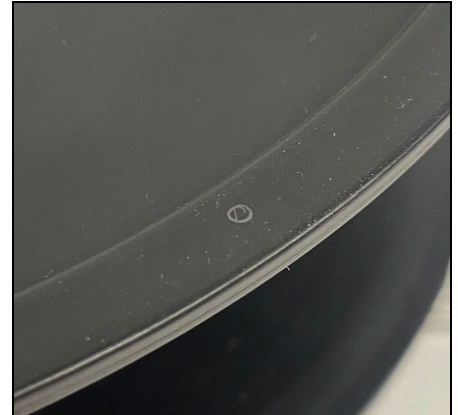


5.2. Drilling The Spool

There must be 4 evenly spaced holes drilled into the spool so that a bolt can pass through and act as a hinge for each drawer.



- 5.2.1. Acquire an empty filament spool and hole template from Makerspace staff and mark the 4 hole positions with a pencil.



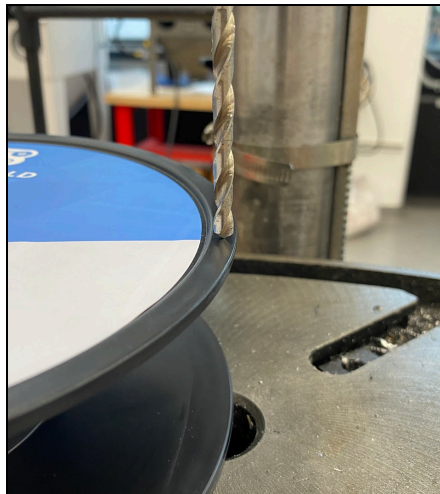
- 5.2.2. Acquire a 13/64" drill bit and a C-Clamp and go to the drill press station. If this is your first time using the drill press, or if you have any uncertainties, ask Makerspace staff for assistance. In the drilling operation, we want to drill through both sides of the spool in one pass to ensure the holes are aligned. To achieve this, mount the drill bit into the chuck of the drill press, making sure that the tip of the drill bit is 2.625 inches below the chuck. This length is necessary so that we can drill through both sides of the spool before the chuck comes into contact with the top face of the spool. Tighten the chuck fully with the chuck key.



- 5.2.3. By adjusting the table height and the depth stop of the drill press, ensure that the tip of the drill bottoms out just below the surface of the table. This will make certain that the drilling operation passes fully through the spool. The 2.625 inch drill bit length includes about 0.1 inches of additional clearance for this reason. Also make adjustments so that the drill rises high enough to position the spool beneath it.



- 5.2.4. Position one of the marked hole locations on the spool beneath the tip of the drill. Clamp the spool to the table in this position. Clamp the center of the spool as shown in the image below so that the clamping force is supported by the center cylinder of the spool and not the free edges.



5.2.5. Complete the drilling. Keep light pressure when drilling the hole through the top edge of the spool since it is unsupported and can deflect downwards. Once the drill has made it through the top, continue down and drill through the bottom edge.

5.2.6. Repeat steps 5.2.4 and 5.2.5 for the qty. 3 remaining hole locations.

5.3. Assembly

5.3.1. Acquire the following items:

- Qty. 1: Drilled Spool
- Qty. 4: 3D printed drawers
- Qty. 4: 10-32 x 2.75" socket head cap screws
- Qty. 4: 10-32 lock nut
- Qty. 1: 5/32" hex key
- Qty. 1: 3/8" wrench

5.3.2. Line up the hole in a drawer with a hole in the spool and pass a bolt through. Secure this with a nut but do not over tighten or the drawer will be difficult to open. Once all 4 drawers are mounted, the project is complete.



6. Challenge

To improve the project further, try to design your own rotating base for the organizer.

Alternatively, you could design and produce some feet to cover the nuts on the bottom of the organizer.