MakerBot Replicator+ 3D Printer

Training:	Required
Reservation:	Required

Please check with Library staff to confirm minimum age certification requirements to use this machine with supervision and without supervision.

Table of Contents

Certification

To become certified on this piece of equipment you will need to attend a training class. By the end of the class, you should:

- Understand how 3D printing works
- Know where to find or design 3D objects for 3D printing
- Be able to print 3D objects using the MakerBot Replicator+
- Know what is involved in cleaning up the workstation and how to store materials

To sign up for a training session please check with staff at the front desk.

Reservations

To reserve this piece of equipment you will need to first be certified on this equipment by attending a training class. After you attended a training for the 3D printer, you may sign up for a time slot to use the equipment. Inquire at the front desk for more information and to check if other requirements may also apply.

Additional Resources & Online Training

This **Standard Operative Procedure** (SOP) manual, along with the **Manufacturer's Manual i**s available on the Nebraska Library Commission's website at: https://nlc.nebraska.gov/grants/InnovationStudios/Components/Equip_Instructions.aspx

Online Training--While the Library Innovation Studios project was active in Nebraska, an online training course for the MakerBot Replicator+ 3D printer was created (along with trainings on other makerspace machines). Makers and trainers may still access the courses at: https://my.nicheacademy.com/innovationtraining

Those who want to access the Library Innovation Studio lessons on Niche Academy must first create a free personal account with a login. To create an account, enter a first name, last name, and email address.

Those that go through the entire lesson for any of the subject matters/machines may print out a certificate of completion. Nebraska Library Commission staff will be able to view a list of those who have completed the lessons, but will not be using or sharing names or email information.

Design/Models Resources

For Design/Model resources see Page 11.

Reference Sheet

Approved Materials:

Only MakerBot brand filament may be used on the MakerBot Replicator+

Build Maximum:
11.6” x 7.6” x 6.5” (29.5 x 19.5 x 16.5 cm)

Layer Resolution:
.0039” (0.1 mm)

Filament Diameter:
0.069” (1.75 mm)

Nozzle Diameter:
.015” (0.4 mm)

Machine Accessories:

- BuildTak Spatula
- Glue stick
- Replacement Grip Surface (only accessible by staff)

Filament Storage:

Filament that is not in use should be stored in airtight plastic zip-top bags with moisture absorbing pouches. Makers should properly remove the filament spool from the machine and return it to its airtight bag after their prints are complete.

Bagged filament spools should be stored away from direct sunlight in a fairly low-humidity environment between 55 and 75 degrees Fahrenheit. To make sure the filament is not brittle or aged out from improper storage, bend the end of the filament. If it snaps off immediately, it is no longer usable (remember to snip off bent ends before inserting filament into the machine).

Note: The plastic zip-top bags often develop slices from the sharp ridges on the spool. The bags should be repaired with clear packaging tape as needed to restore them to an air-tight condition.

Workflow:

Load filament
Download or design
Process in MakerBot Print
Send file to the printer
Print 3D object
Remove finished object(s) and put waste filament in waste receptacle (although PLA is recyclable, it cannot be recycled with other plastics)
Return filament to airtight plastic bag

Software:

MakerBot Print
MakerBot Android app
MakerBot iOS app
Tinkercad
Fusion 360

3D Modeling and Printing Key Concepts

3D Modeling

3D modeling is the practice of using a virtual workspace in a computer to design 3-dimensional parts. Some 3D modeling programs cater to engineering purposes and are very accurate and precise, requiring the user to enter exact decimal dimensions. Other programs may cater towards artists that can work with a virtual piece of clay, stretching, pulling, and shaping it to their desired shape.

3D Printing

3D printing uses various technologies to bring a virtual 3D model into real space. There are nine different categories of 3D printing ranging from melting and depositing material onto a build plate (Fused Deposition Modeling--FDM) to using ultraviolet light to selectively cure liquid resin (Selective Deposits Layer--SLA). Each kind of 3D printing has its own set of challenges and costs associated with it.

FDM (Fused Deposition Modeling)

FDM printing is the most common and most affordable type of 3D printing. It utilizes a spool of plastic that is heated to the point where it will flow and bind to itself to create models. This type of 3D printing does come with some limitations.

The material must be a thermoplastic that melts within a certain temperature band, effectively limiting the material to about ten different kinds of plastics.

Geometry is limited to parts with no overhangs, or areas that are unsupported below. The size also has limits based on the size of the machine.

The MakerBot Replicator+ fits into the FDM (Fused Deposit Modeling) 3D printer category. The MakerBot Replicator+ will melt MakerBot PLA Filament and squeeze it out onto the build plate in thin lines to build your object layer by layer. The build chamber allows the extruded PLA to cool slowly, minimizing warping and curling. For this reason, you must wait for the print to cool and solidify before handling it as you could alter its shape and surface quality.

Training Materials, Accessories, and Software*

MakerBot Replicator+
BuildTak Spatula
MakerBot PLA Filament
Computer with MakerBot Print software

Certification/Training Overview*

Select sections in this "Standard Operative Procedures" (SOP) Manual should be covered during the MakerBot Replicator+ "Certification Training." Those sections covered in most trainings are so noted with an * behind the section title.

Other sections contain important information for reference and continued learning, but may not need to be covered during the training session. Additional information not included in this Standard Operating Procedures (SOP) manual is likely to be covered in the Manufacturer's Manual. That manual is accessible at: https://nlc.nebraska.gov/grants/InnovationStudios/Components/Equip_Instructions.aspx

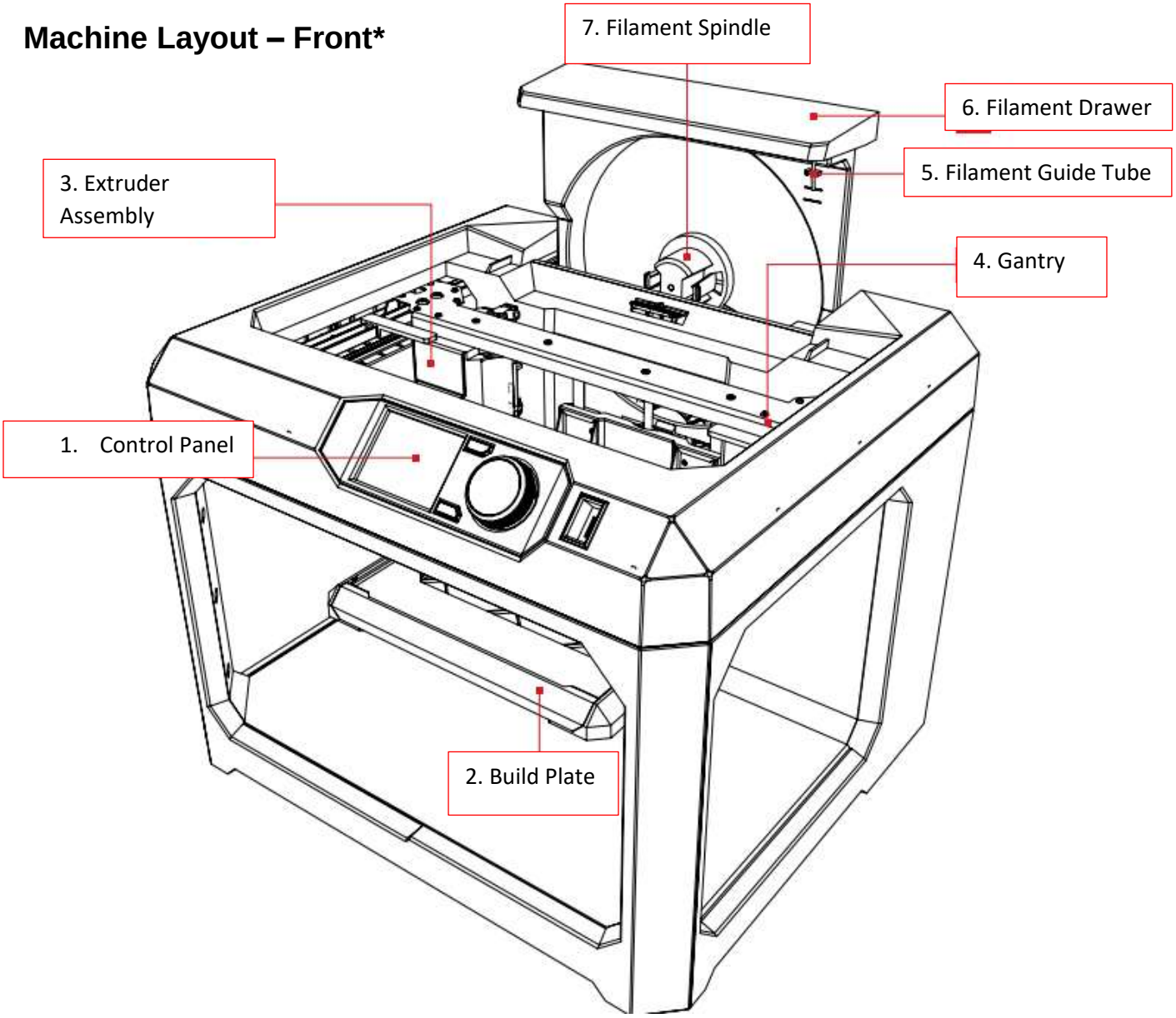
During the MakerBot Replicator+ training, makers will learn how to operate the 3D printer. By the end of the class, they should:

- Understand how 3D printing works
- Know where to find or design 3D objects for 3D printing
- Be able to print 3D objects using the MakerBot Replicator+
- Know what is involved in cleaning up the workstation and how to store materials

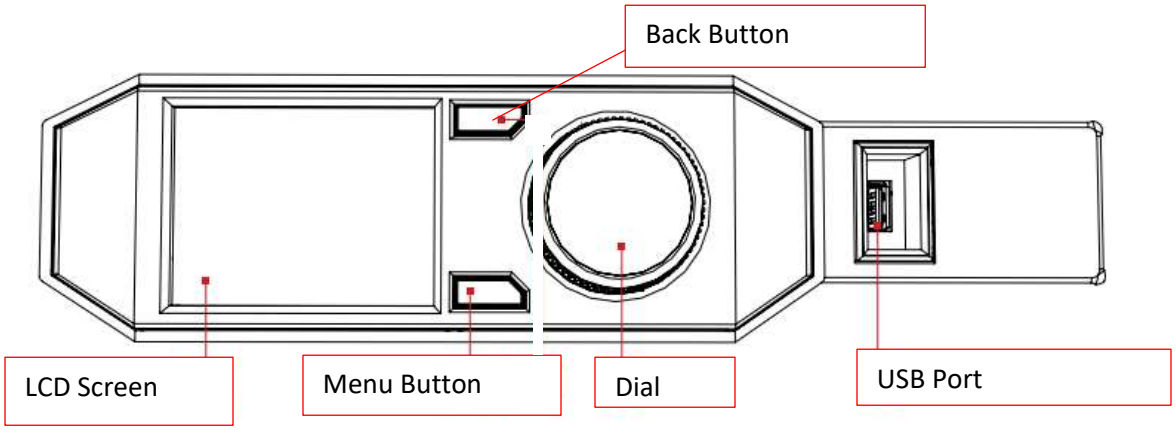
Safety*

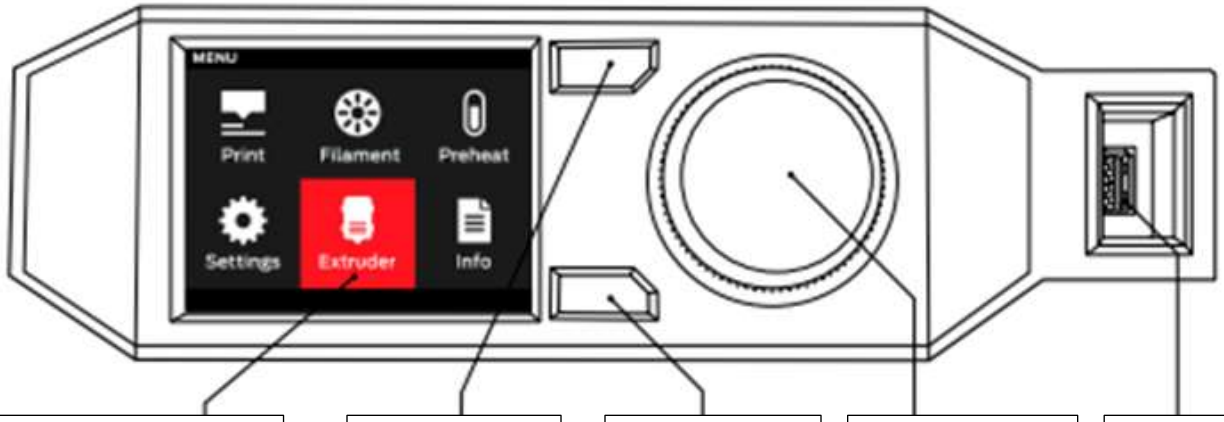
- The nozzle heats up to 424 °F and will burn skin. Take care not to touch it.
- The filament will also be hot when it is extruded. Filament should be allowed to cool down (5-10 minutes) after it is extruded before removing it from the build plate.
- Hair and loose clothing may be caught in the machine's gantry that moves during the machine's operation. Long hair should be tied back, necklaces removed, sweatshirt strings tucked in, and loose long sleeves rolled up.
- STAFF ONLY: Never remove the Smart Extruder+ from your MakerBot Replicator+ during or immediately after printing. Always allow the extruder to cool completely for 10 minutes before removing it from the printer. Keep in mind that it generally does not need to be removed unless it is not working properly.

Machine Layout – Front*



Machine Layout - Control Panel* (see diagram on next page for additional notes)





LCD Screen Selections:
Print Filament Preheat
Settings Extruder Info

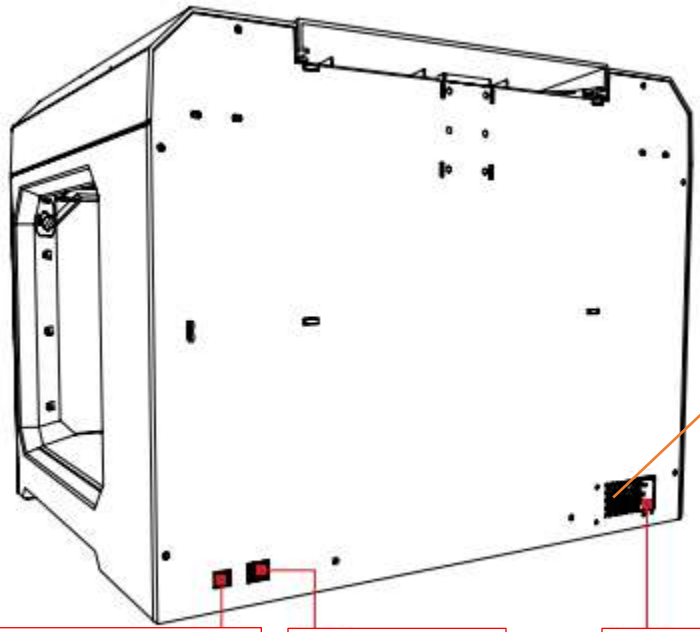
Back Button – Push to go back or cancel an action

Menu Button – Push to see additional options

Dial – Rotate to scroll/highlight; Push to Select

USB Port

Machine Layout – Rear*



Power On/Off Switch

USB Port

Ethernet Port

Power Input Port

Unloading Filament Spool*

Whether you are unloading or loading a filament spool, you will be using the control panel—the LCD screen and the Dial. (Check out the control panel in the "Machine Layout – Control Panel Section shown on Pages 7-8).

1. To remove the filament spool, rotate the dial to highlight "Filament" and then press in on the dial. Then select "Unload Filament." The Replicator+ will walk you through the process of removing the filament. However, those steps are also shown here.

2. Wait for the Smart Extruder+ to heat.

3. Allow the Smart Extruder+ to unload the filament.

4. When the extruder has stopped pushing the filament out and the control panel indicates that the filament is ready to be removed, gently pull the filament free. If the filament cannot be removed easily, depress the release lever on the Smart Extruder+ and pull the filament free. Select "Continue" with the dial to return to the previous menu screen.

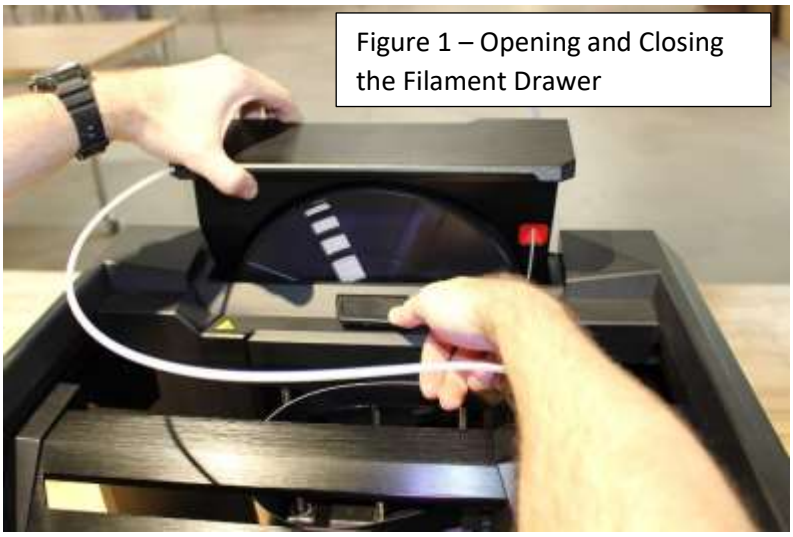


Figure 1 – Opening and Closing the Filament Drawer

5. Once the filament is ejected from the extruder, you may lift the filament drawer by pressing down on the toggle lock and lifting the filament drawer (Figure 1).

6. Rotate the spool clockwise to retract the filament free of the guide tube, and gently press the tabs inwards on the filament spindle while pulling the spool towards you to remove it from the machine. Take care to keep the spool tightly wound, if you do not, the filament could unravel or tangle on the spool, which could ultimately ruin the spool of filament.

7. Once removed, be sure to properly feed the filament through the filament holder holes on the spool (Figure 2) so as not to loosen the filament on the spool. Doing so also makes it easier to find the filament's end. Filament spools not in use should be kept in airtight zip-top plastic bags (along with the desiccant/moisture absorbing packet), so that the filament is not affected by changes in humidity.

Figure 2 – Securing Loose Filament End

Loading Filament Spool*

To load a filament spool, you will use the control panel—the LCD screen and the Dial. (Check out the control panel diagram on Pages 7-8 for reference).

1. To load a filament spool, first open the filament drawer by pressing the toggle lock and lifting the filament drawer up until it locks in place. (Figure 1 on previous page).

2. Remove the roll of filament from the zip-top bag. Make sure to keep the spool tightly wound as you pull the filament end out of the holder holes (Figure 3). (Loose spools will tangle and may become useless if they are not able to be untangled.)

Figure 3 – Filament End

3. Press the spool onto the raised filament spindle, making sure the windows in the front of the spool are facing forward and the MakerBot sticker is facing back. Doing so makes sure the filament will unwind counterclockwise (Figure 4).

Figure 4 – Loading Filament Spool

4. Locate the end of the filament. Cut the end of the filament to create a clean, fresh edge (bent ends may cause "feeding" issues). Then insert the filament into the white hollow Filament Guide Tube and continue to feed the filament through the tube until an inch of material is sticking out the other end of the plastic tube.

5. From the control panel, navigate by rotating the dial to highlight "Filament" and then press the dial to select. From here, use the dial to select "Load Filament" (Figure 5). The machine will beep and the control panel's screen will indicate that the Smart Extruder+ is heating.

Figure 5 – Control Panel Navigation

6. Wait for the Smart Extruder+ to heat.

7. Once the extruder has reached the correct temperature, a graphic appears on the printer's screen showing a graphic of the extruder part. It will read: "Push your filament into the extruder until you feel it being pulled in." Grasp the top of the extruder assembly (the part that heats and expels the melted filament), and push the filament into the Smart Extruder+'s loading tube until you feel the motor pulling the filament in.

8. When you see filament extruding through the extruder nozzle, select "Filament is Extruding" on the control panel. After waiting a few minutes for it to cool, you may remove and toss the "waste" PLA filament that was extruded. It cannot be recycled alongside other plastics.

9. Now is an ideal time to lower the filament drawer by holding the lid of the drawer and pressing the toggle switch (Figure 1 on Page 9).

Choose or Design a 3D Model*

1. In order to print something, a 3D file is required. 3D files may either be created or found in an online repository such as Thingiverse.

2. Because the MakerBot Replicator+ is a machine made by MakerBot, makers must establish a free MakerBot account to use MakerBot Print (needed to process prints on the machine). To make a free account, go to https://login.makerbot.com/register or https://accounts.thingiverse.com/register to create your MakerBot account. Children under the age of 16 are not able to create accounts without MakerBot's receipt of verifiable parental consent from the child's parent or guardian. It is also easy to delete your MakerBot account by logging into your account and clicking "Edit Profile" and selecte "Delete User."

3. Creating a file often requires expensive software and a lot of training. People interested in learning 3D modeling should check out free services like TinkerCAD. If you want to print a 3D model you designed yourself, export it from your 3D modeling application in a compatible format such as a .stl file. (MakerBot print accepts 3D files in a number of file types. However, .stl files tend to be the highest quality and import the cleanest.)

4. Multiple online repositories exist for downloading pre-made 3D files. Some are free, others are available for a price. One specific free website is www.tinkerCAD.com. Their files may be downloaded for use with the MakerBot Replicator+. Thingiverse (by Makerbot) also has hundreds of thousands of free 3D printable files.

5. Generally the process of finding and using files to use are as follows:

    a. Find an object on Thingiverse.com (or other repository) using the search bar
    b. Download file
    c. Unzip file
    d. Open file in MakerBot Print

Free Resources related to Designs/Models

3D Model Repository - Thingiverse
https://www.thingiverse.com/

Beginner Design - TinkerCAD
https://www.tinkercad.com/

Fusion360 for Personal Use
https://www.autodesk.com/products/fusion-360/personal

Process in MakerBot Print (training activity)*

1. Open the MakerBot Print application on the computer. (If you do not have a MakerBot account, see Page 11 for establishing one.) A blank print area will appear (Figure 6).

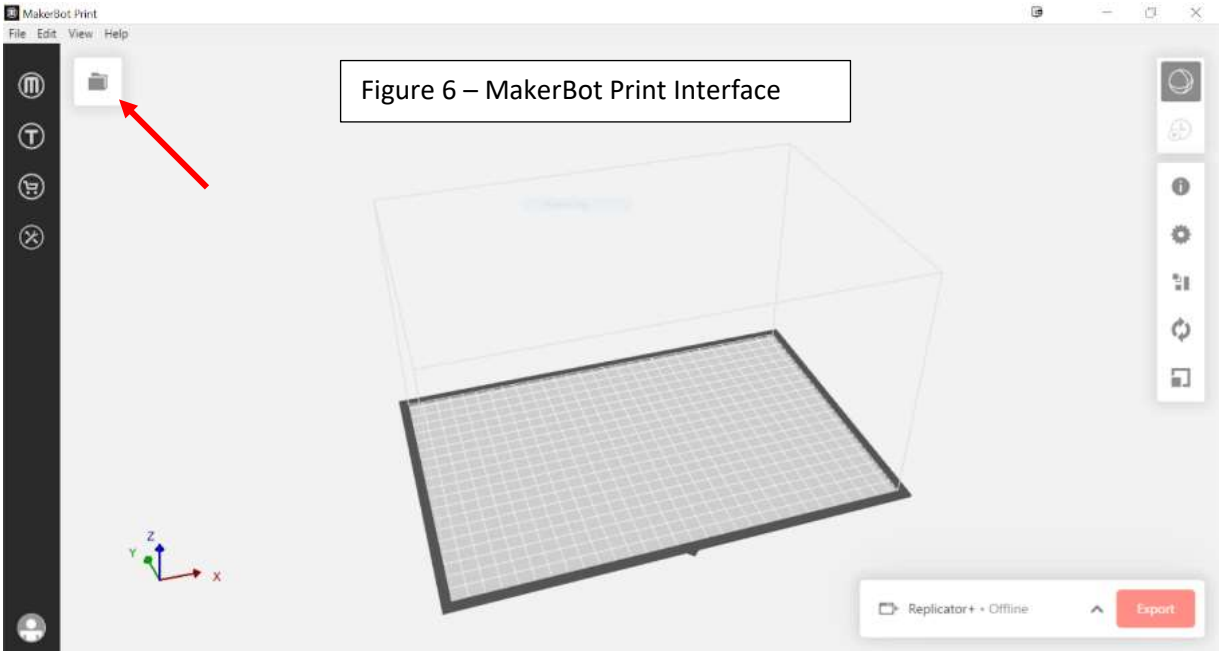


Figure 6 – MakerBot Print Interface

2. Open the Project Panel (file icon) in the upper left hand corner. To add the example model to the build plate select "Add Models" and add the example file.
   - To move the view, click and hold the middle mouse button while moving the mouse to pan.
   - To rotate the view, click and hold the right mouse button while moving the mouse.
   - To zoom in and out, scroll up and down on the scroll wheel.
   - To move the object around the build plate, click and drag on the object.
   - Pressing delete when the model is selected will remove it from the build plate.

3. In the upper right-hand corner, there are six buttons to edit your object and print settings (Figure 7).

4. Clicking on the first "Clock" icon (labeled 1 in Figure 7) will show an estimate of print time and how much material will be consumed.

5. Clicking on the second "i" or Model Info icon (labeled 2 in Figure 7) will allow you to change the units of your imported model. You can cycle between mm, cm, m, inches, and ft.

Figure 7 – MakerBot Print Edit Options

6. Clicking on the third “Cog/Gear” or Printer Settings icon (labeled 3 in Figure 8) will allow you to change the print settings. Printer settings include:

   - Extruder Type: If the computer is connected to the printer, the extruder type will automatically be selected for you. The extruder is probably a Smart Extruder+.
   - Select “Layer Height” to set the thickness of your object’s layers. A lower layer height will result in a smoother surface and will look better. A higher layer height will print faster.
   - Select “Shells” to set the number of outlines the extruder prints on each layer before printing the infill. More shells make an object stronger and heavier but it increases print times and the amount of filament used.
   - Adjust the “Infill” percentage to set the density of your project’s internal support structure. Zero percent is completely hollow and 100 percent is completely solid. A higher percentage will result in a heavier, stronger object but it will use up more filament and take longer to print. For most prints, makers will select an infill between 10 and 25 percent.
   - Select “Supports” checkbox to print “removable” support structures on your model when there are overhangs to print on your object. It is best to leave this enabled (box checked).
   - Select the “Rafts” checkbox, which is selected by default, to have your object printed on a raft. The raft acts as a base for your object and any support structures. It ensures that everything adheres well to the build plate. The raft will be easily removable once you detach your finished object from the build plate.

Figure 8 – MakerBot Print Edit Options

7. If there are multiple objects on the build plate, select the “Arrange” icon (labeled 4 in Figure 8) to automatically arrange multiple items on the build plate. You can use the right click menu to copy, paste, hide, or delete your model from the build plate.

8. Click “Adjust Orientation” icon (labeled 5 in Figure 8) to orient the part. Some parts will print better when they are facing a certain direction. Select “Place Face on Build Plate” to lay your model flat. Rotate your model by 90 degrees or by a specific number of degrees along the x, y or z axis.

9. Click “Adjust Scale” icon (labeled 6 in Figure 8) to scale the object. Enter the percentage of how much you want your model scaled. Make sure “Uniform Scaling” is selected if you want your object to retain the same proportions as the original object. “Scale to Max” will print the biggest model the printer can make. You can also move back to the original size by clicking “Reset.”

Preheat the Smart Extruder+

You may notice a Preheat selection on the LCD screen. You can preheat the extruder by selecting the preheat icon. Preheating is not necessary but does speed up the printing process. That is because when you go to print an object, the machine must first heat the extruder before it can begin printing if it is not already preheated.

When you select Preheat, the current and target temperatures will be visible on the main screen. Generally, the machine is preheating the extruder to 180 degrees Celsius. When you use the preheat feature, the MakerBot Replicator+ will take less time to heat the extruder, thus beginning your print job faster.

A maker may choose to use the Preheat feature or not.

Storage of Print Files

Files to print could be stored in multiple locations.

Select “Print” with the dial to initiate a print stored on a flash drive or on the “limited” internal storage of the MakerBot Replicator+. The computer may also have stored files. You cannot depend that files stored in the machine or the computer will not be deleted by another user or makerspace staff.

Turn the dial to scroll through the list of available locations; push dial to select.

USB Storage: Select to print a file on a USB drive inserted into the USB Port.

Internal Storage: Select to print a file stored on the MakerBot Replicator+. The internal storage has a 2GB capacity.

My Library and Purchased files are also options to select.

Three Ways to Begin a Print

There are three ways in which you can begin your print job. You can use the MakerBot Mobile App (if installed), the Control Panel on the machine, or through MakerBot Print that is loaded onto your connected computer.

From the Computer/MakerBot Print (the most common way): Click “Print” to slice the model using the current settings and send a **.MakerBot print file** to your 3D printer. You will be reminded to clear the build plate and asked to initiate the print on the control panel. You can also select “Begin Printing” on the control panel after starting the file transfer or tap Print on the MakerBot Mobile App.

If MakerBot Print is connected to your MakerBot Replicator+, the print file will be sent directly to your 3D printer. If MakerBot Print is not connected to your machine, this button will open a dialog allowing you to export and save a .MakerBot print file. You can transfer the print file to your MakerBot Replicator+ using a USB Drive. Click “Show Print Preview” in MakerBot Print to open a preview of the sliced model.

- Select “Print” with the dial to initiate a print stored on a flash drive or on the internal storage.
- Select “Info” for more information on the print. Turn the dial to toggle between three screens that contain a rendering of your model along with additional information about your print.
- Select “Copy” to copy a file to internal storage or to an attached USB drive.
- Select “Delete” to delete a file from internal storage or from an attached USB Drive.

During your Print Job*

During a print, you will be able to view your print’s progress (Figure 9). The dial will glow red during printing. Information provided includes:

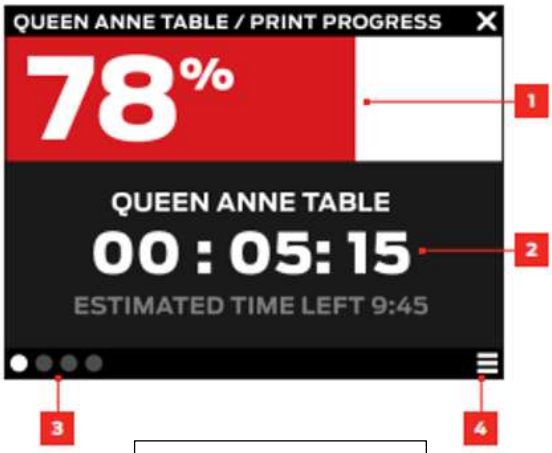


Figure 9 – Print Progress Window

1. Percentage of print completed.
2. Time elapsed and estimated time remaining. If the Smart Extruder+ is still heating, this area will display current and target temperatures.
3. Location in active print screens. Turn the dial to scroll between the following screens:
    - Print Progress
    - Model rendering/layout
    - File information
    - Print options information
    - Extruder temperature
4. Print Menu. Press the control panel’s menu button to open the Print menu. The Print menu contains the following options:
    - Pause – to pause your print (you can also pause by pressing in on the Dial)
    - Change Filament – select to load or unload filament
    - Extruder Info – to view more info about your extruder in use
    - Printer Info – select to view more info like network info, and print statistics
    - Take a Picture – select to take a picture of the build area with the built-in camera. Push the dial to take the picture, then use the dial to save the picture to the internal storage or to a USB drive. Select ‘Continue’ on the dial to return to print menu screen.
    - Cancel – select this option to cancel your print. You can also cancel a print by pressing the back button on the control panel.

Sending your file to the Printer - USB Link*

1. When you are ready to print, make sure the MakerBot Replicator is turned on and connected to your computer. Make sure your filament has been loaded per the "Loading Filament Spool" section (see Page 10). In the lower right-hand corner of the MakerBot Print application, click on the box labeled "Replicator+" or "Select A Printer" (Figure 10). Select the Online Replicator+. Press the red "Print" button in the lower right hand corner and the software will begin generating the necessary code.

Figure 10 – MakerBot Print Printer Select

2. The MakerBot Print Software will show an estimate of how much filament will be used (Figure 11). (Note: the filament estimate for your print may be listed as "7 grams, less than 1/3 large spool." Seven grams would be correct but that is <u>much</u> less than 1/3 spool since each new large spool contains about 900 grams of filament.) If there is not enough on the spool, you can cancel the job and insert a new spool or you can change a spool midway through a print job if necessary.

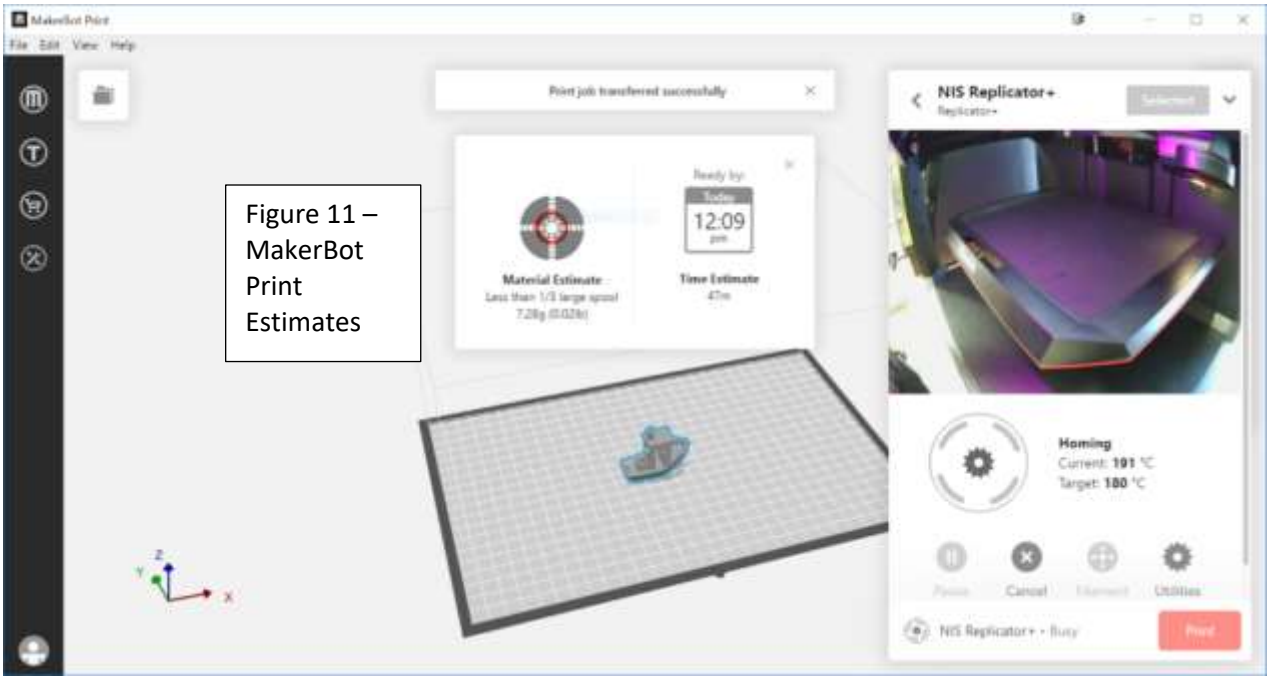


Figure 11 – MakerBot Print Estimates

3. The MakerBot Print Software will also give an estimate of the time it will take to print your job.

4. The MakerBot Replicator+ will begin initializing and heating the extruder head.

5. When the MakerBot Replicator+ is printing, the Control Panel will show "Time Elapsed" and an estimate of "Time Remaining."

6. You will notice that the on-board camera was automatically turned on so you can see the actual build plate on the screen. Under the camera view is the extruder's

temperature. The first number is the current temperature and the second number is the target temperature in Celsius.

7. Stay with the machine and make sure the initial layer properly adheres. After it proceeds to the second layer, you may walk away from the machine (however, you should inform makerspace staff that you have a print in process). If your print is not properly adhering on all sides, you will want to stop the print job and start over so your entire model is not ruined.

   When print jobs are not adhering to the surface, you may wish to check with makerspace staff to prevent that issue in the future. Some options they might approve of may include:
   - Properly cleaning the build plate surface—oily fingerprints can be an issue
   - Rubbing a glue stick on the surface to add a little tackiness
   - Replace the MakerBot Replicator+ Grip Surface (Makerspace Staff Only)
   - Recalibrating the print bed and nozzle distance (if all else fails)

How to Pause or Cancel a Print*

To pause a print, push the menu button on the MakerBot Replicator+ and select "Pause" with the dial. You can also select the printer in MakerBot Print on the computer and select 'Pause.'

To cancel a print, push the menu button on the machine and select "Cancel" with the dial. Again, you can also select the printer in MakerBot Print and select 'Cancel.'

Print Complete*

After the print is complete, the dial will glow white. Push the dial to continue to the next menu. The machine will ask if you would like to print the object again, or return to the storage menu screen. If you wish to print the object again, make sure to clear the build plate. Generally, you would not store your file on the makerspace's machine but instead you would have it saved on a USB drive if you want to keep the file.

Sending your file to the Printer Alternative—Using Flash Drive

1. From time to time, the USB connection the MakerBot Replicator+ may become disconnected or just stop working. In those cases, the job may be exported onto a USB drive and then plugged into the MakerBot Replicator+.

2. Begin by plugging your flash drive into the computer's USB port.

3. In the lower right hand corner of the MakerBot Print software click on "Save to Removable Drive."

4. When the file has been saved, remove the USB drive from the computer and plug it into the MakerBot Replicator+. Use the on-screen commands to print from your USB drive. Select "Print." Then select "USB Storage."

Removing your Object from the Build Plate*

1. When the MakerBot Replicator+ is done with the print job, the machine will automatically lower the build plate and the screen will indicate the job is finished. Allow five to ten minutes before separating the part from the base so that it cools down sufficiently. Prints that did not have time to solidify may be deformed and could lose some finishing quality. Some objects will pull off the bed easily. When they are being stubborn, remove the flexible build plate (Figure 12) and flex or bend the build plate to pop the print loose.

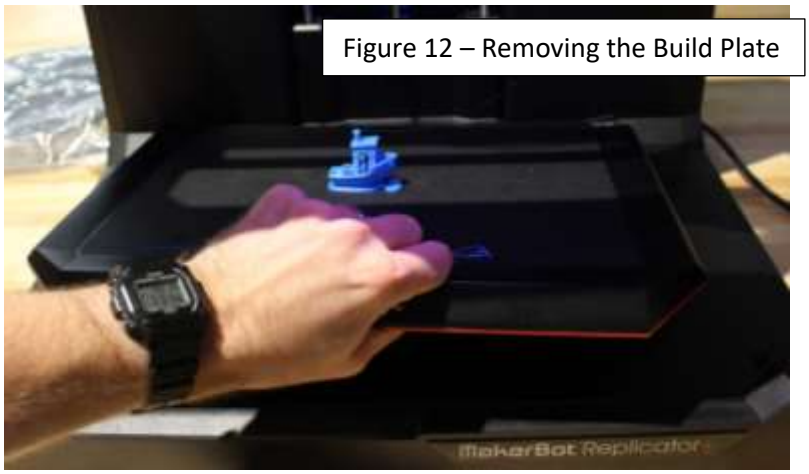


Figure 12 – Removing the Build Plate

2. If your print does not come off after flexing the build plate, you may slide the BuildTak spatula under the creation as perpendicular as possible so you do not scratch the surface. (Figure 13).

Figure 13 – Removing Stuck Pieces

3. If your piece was printed with a “Raft” as its base, remove the raft by hand by pushing through the thin lines that connect the raft to the base of your object. It is possible that some of the raft will be too difficult to remove by hand. You may need to smooth out your object with fine clippers or sandpaper. The raft is waste and should be thrown away. (Although PLA filament can be recycled, it should NOT be recycled with everyday plastic because its melting point remains lower than that of other plastics. It could ignite during processing if it is recycled with other plastics.)

4. Make sure to clean the build plate of any debris before reloading the build plate onto the MakerBot Replicator+. Follow the cleanup procedures listed below. Check with makerspace staff to see if they would like you to power off the MakerBot Replicator+ by flipping the switch on the back of the machine.

Cleanup Procedure*

1. Pick up the area and put any waste filament in a waste receptacle, as they cannot be recycled with general plastics.
2. Ensure that all filament to include the one used to print your object is stored in their airtight sealed zip-top bags.

MAKERSPACE STAFF SECTION

Purchase the Correct Filament, Extruder, and Grip Surfaces

Always use MakerBot branded filament in the MakerBot Extruder+. Using off-brands could ruin the extruder that is around $250 to replace. There are two types of filament that work in this machine. Use MakerBot PLA filament if your extruder is the Smart Extruder+. Use MakerBot Tough filament if the machine features the Tough Smart Extruder+. (During the Library Innovation Studios project, all of the filament purchased was the MakerBot PLA filament.)

Although you will likely have to replace your extruder on occasion, generally we recommend that you do not order a replacement extruder until you need one. Extruders come with a 6-month warranty so keeping one in stock will limit the time you have left on its warranty.

You can also purchase Replacement Grip Surfaces in 3-packs for the MakerBot Replicator+. When surfaces become, worn, scratched, or uneven, your prints will no longer be affixing to the build plate, replacing the surface will solve that issue.

Proper Filament Storage

Store filament rolls in airtight plastic bags away from direct sunlight and in a fairly low-humidity environment between 55 and 75 degrees. Keep the moisture absorbing packets that come with the filament inside the filament bags. Many times when you purchase filament (or as time passes), you will notice that the bags have been damaged by excessive rubbing against the spool's ridges. Repair these air holes with clear packaging tape to bring the zip-top bags to an airtight condition.

After print jobs are completed, make sure the filament spools were removed from the machine and returned to their airtight bags. Make sure the filament is not brittle or aged out from improper storage before loading the filament into the 3D printer. The best way to check is to bend the end of the filament. If it snaps off immediately, it is no longer usable.

Notification Settings

Makerspace staff can enable or disable notification settings such as: notification sound, auto-unload, and filament error detection. Staff should view the manufacturer's manual on how to reset these notification settings if a change is needed.

Important Information Covered in the Manufacturer's Guide at:

https://nlc.nebraska.gov/grants/InnovationStudios/Components/Equip_Instructions.aspx

- Maintenance
- Trouble Shooting
- Glossary
- How to Add an Offline Printer
- Settings (Updates, Plate Leveling, Diagnostics, etc.)
- Connecting to MakerBot Print (if the connection is lost)