



Bibliotech

3-D Printing Guide



3D Printing Liability & Copyright Information

Bodily Harm

Faculty and students wishing to use the 3D printer must read the relevant section of the Makerspace Resource Guide prior.

It is important to remember that most 3D printers run hot. You should never put your hands near the nozzle or build plate during printing. The door to the printing area should remain closed during the printing process to avoid harm.

FIMS Graduate Library is not responsible for bodily harm caused by inappropriate use of the 3D printer.

Product Liability

“The courts have yet to interpret product liability in the context of 3D printing” (ALA, 2014, p. 2). FIMS Graduate Library is not responsible for the quality or durability of any material printed on our 3D printers.

Copyright

Copying at Western is subject to the Canadian Copyright Act (R.S.C., 1985, c. C-42). Infringing copyright is a serious matter and can have consequences for you and Western. All members of the Western community need to be aware of and respect the intellectual property rights of others.

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See Western’s Copyright website for the Copyright Decision Map and additional information and resources at www.copyright.uwo.ca.

References

American Library Association (2014). *Progress in the Making: An Introduction to 3D Printing and Public Policy*. Retrieved from http://www.ala.org/offices/sites/ala.org.offices/files/content/3d_printing_tipsheet_version_9_Final.pdf

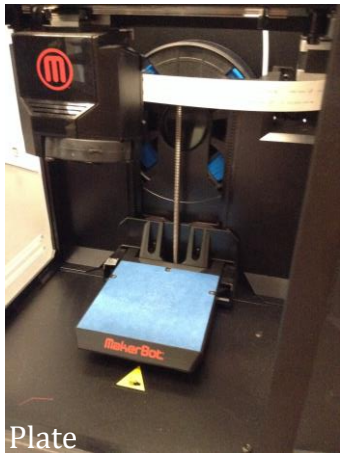
Available Resources

3D Printer: MakerBot Replicator Mini

Difficulty Level: Beginner

The [MakerBot Replicator Mini](#) is a compact 3D printer that prints objects using a plastic filament. 3D printers let you print any three-dimensional (3D) object you can imagine such as jewelry, appliance parts, toys, or phone accessories.

An average print job takes about 30 minutes; the software will give an estimated printing time before it begins to print. There is no fee for 3D printing, however, we ask you to not print items that take longer than 30 minutes to print in order to reduce costs and keep this service free.



The following rules apply:

- You must be a FIMS graduate student or faculty member
- Max. of 30 minutes per print job and 2 hours for each printing session
- Build volume maximum is 10.0 L x 10.0 W x 12.5 H cm
[3.9 L x 3.9 W x 4.9 H inches]

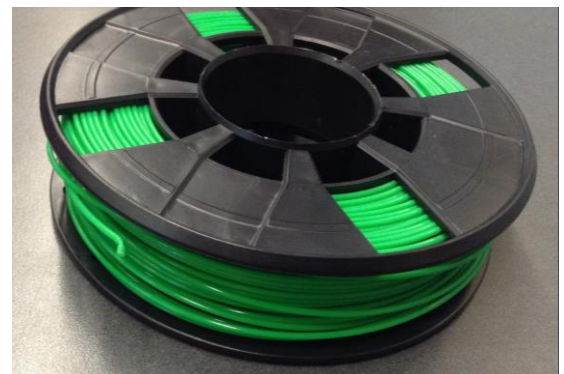
When printing an object, the printer first creates a [raft](#) that acts as a base for the object. This can be removed after the object is printed. [Scaffolding](#) helps support objects as they are built and can be easily removed once the design has been printed. When designing your object, the software gives you the option of turning scaffolding on or off. Taller objects or objects with overhanging elements will require scaffolding.

Be careful of heat!

It is important to remember that most 3D printers run hot, and you shouldn't put your hands near the nozzle or build plate during printing.

How to Print your 3D Object:

1. Read these guidelines for 3D printing
2. Reserve a time to print your design. If this is your first time printing, you must sign the an agreement that you will use the 3D printer safely and properly
3. Set up computer and Makerbot. Turn on Makerbot
4. Browse [Thingiverse](#) to find a design you'd like to print or design something yourself on [TinkerCad](#), [Blender](#), or [Makerbot Desktop](#). [Replicator G](#) translates Thingiverse designs into instructions MakerBot can understand
5. Once you have chosen the design you like in Thingiverse, click the download button beside the design
6. To find design, open downloads or click on the doc icon on the bottom left hand side of the browser tab. It will open in Makerbot Desktop



7. To resize object click on the scale object icon on the left hand side. Click on object and a box will pop up. Make sure that uniform scaling is checked. Increase or decrease the dimensions of the box using the arrows
8. To look at a 3D view of the design click on the eye icon and move the cursor over the image to see how it is located on the platform. For further information on the icons and capabilities of the Makerbot Desktop see the reference guide following these instructions
9. Send the file via USB cable or through Wi-Fi. The [Action Button](#) on the printer will blink when it is ready (only if using Wi-Fi)
10. Check that the build plate is clear and make sure the door to the printer is closed.
11. On the menu at the top of the Makerbot desktop click on settings and ensure that supports (if needed) and raft are checked
12. Press the button to begin printing
13. MakerBot will make a sound to alert you that the print job is complete

Protip:

Design your object with the largest surface area lying flat to minimize the scaffolding involved.

Learn more:

- [MakerBot Print Flow](#)
- Basics of [3D Design & Printing](#) by Mallory Austin, MLIS Candidate.
- [Intellectual Property, Makerspaces and 3D Printing by Mallory Austin, Dr. Michael B. McNally, and Dr. Samuel E. Trosow](#) (opens a Powerpoint)

MakerBot Troubleshooting

Changing Filament:

The most frequent issues with 3D printing are with filament. You can change filament when the MakerBot Replicator Mini is not heating up or printing.

To Load

In the print monitor panel, click Change. Then click Load. The Smart Extruder will start to heat up. When the Smart Extruder is fully heated, the extruder motor will start to turn. When you hear the motor turning, grasp the top of the extruder assembly and push the free end of filament into the loading tube at the top of the Smart Extruder. Keep pushing on the filament until you feel the Smart Extruder pulling it in. You may need to add some pressure. Wait until you begin to see plastic emerging from the extruder nozzle. Then click Done to stop the process.

To Unload

In the print monitor panel, click Change. Then click Unload. The Smart Extruder will start to heat up. When the Smart Extruder is fully heated, it will go through a two-part unloading process. Remove the filament from your Smart Extruder only when MakerBot Desktop directs you to. Then click Done.

Pro Tip:

- Before loading, cut the end of filament to create a clean edge
- Before removing current filament spool, unclip the filament guide tube from the spool pocket
- Clip the filament guide tube back into place after inserting a new filament spool
- Clear away any excess extruded filament before printing

Other Problems

Problems	Solutions
Can't unload filament from the MakerBot Replicator Smart Extruder.	In the print monitor panel of MakerBot Desktop, click Change, and then select Load Filament. Let the filament extrude for a few seconds, then click Done and Unload Filament to try unloading again.
Can't remove filament from the MakerBot Replicator Smart Extruder.	Make sure to wait to remove the filament until MakerBot Desktop has instructed you to do so. If you still cannot remove the filament, try squeezing the tabs on the side of the Smart Extruder and pulling on the filament.
Filament breaks between the spool and the MakerBot Replicator Smart Extruder.	Ensure that the filament unwinds counterclockwise from the spool. Always unload any filament left in the Smart Extruder before reloading. Make sure the filament guide tube is secured to the filament spool pocket.
Filament won't extrude from the Smart Extruder.	Try unloading and then reloading the filament. Repeat this process a few times if necessary. You may be able to avoid jams in the future by allowing the Smart Extruder to cool to 50° C before removing the Smart Extruder or turning off your MakerBot Replicator Mini.