

3D Printing at RHPL

What is 3D Printing?

3D printing is the process of creating a physical object from a digital model. It is also known as additive manufacturing because the physical model is built one layer at a time from the bottom up. 3D printing provides an opportunity for everyone to take an idea from their imagination, design it, and create a physical model. RHPL is actively building a community environment that nurtures creativity while stimulating and supporting learning and innovation.



[3D Print Request Form](#)

What types of 3D printers are available?

The LulzBot Taz 6 and the Lulzbot Mini are available at RHPL.

LulzBot Taz 6:

- Filament options: Materials that can be used include: PLA, HIPS, PVA, wood filled filaments, Polyester (Tritan), PETT, bronze, copper, stainless steel-filled filaments, Polycarbonate, Nylon, PETG, conductive PLA and ABS, UV luminescent filaments, PCTPE, PC-ABS, Alloy 910, and more. (Users who require filament besides PLA will have to provide their own material, and must be approved by library staff). Library staff reserves the right to determine whether or not a print can be completed with the requested material.
- LulzBot Taz 6 can create a two color object

- one example of a two color object that we have successfully printed:
<https://www.thingiverse.com/thing:62536>
- Maximum print size (inches): 11 in x 11 in x 9.8

LulzBot Mini:

- ABS, PLA, HIPS, PVA, wood filled filaments, Polyester (Tritan), PETT, bronze and copper filled filaments, Polycarbonate, Nylon, PETG, conductive PLA and ABS, UV luminescent filaments, PCTPE, PC-ABS, Alloy 910. (Users who require filament besides PLA will have to provide their own material, and must be approved by library staff). Library staff reserves the right to determine whether or not a print can be completed with the requested material.
- Maximum print size (inches): 6 in x 6 in x 6.2
- LulzBot Mini can print in one color

What software is available to create 3D models?

We recommend the free, browser-based program called [Tinkercad](#) for beginners. Other free programs are [Blender](#) and [Sketchup](#). Designs can also be downloaded from [Thingiverse](#), a design community for sharing 3D printable objects.

FAQs about printing your design:

To print an object, provide us with your .stl file on a flash drive. Files can be no larger than 250 MB. We will download your file to our computer and return the flash drive to you.

All submitted prints must adhere to RHPL's 3D Printer Acceptable Use Policy. (Link to our policy)

3D printing pricing is based on the weight of the object in grams at a cost of 20 cents per gram. Users will also incur a fee of 50 cents per hour beginning at 4 hours. Library staff will calculate total fees prior to printing.

Our printers print in layers, from the bottom up, and each layer must be supported by something beneath it. If part of a model has nothing beneath it, like the wings of an airplane, the printer has to print supports beneath that part. Brims are used to stabilize small parts or isolated sections of the model that need help staying connected to the print bed. A raft is a horizontal latticework located underneath your print to help stabilize models with small footprints if you need a stronger foundation than can be provided by a brim. (Prior to printing, staff will review the print job with the customer to show them how the printer is interpreting their file—this includes pointing out potential problems and where supports or brims may be necessary.)

Library staff are not responsible for removing any supports, brims, or rafts. Staff can direct you to resources on how to remove supports and finish your printed model.

Printing will be first-come, first-served. Your file will be placed in the queue in the order it was received. Printing time varies based on the size of the object. Small objects can take less than an hour, while large projects can take five or more hours. We do retain the right to reorder the

queue based on printing times and staff availability. Library staff will print your file and notify you when it is ready to be picked up and paid for. If the item is not picked up within two weeks, the object will become the property of the library.

RHPL staff can direct customers to online resources, however, we will not be assisting in the design of customer models. Staff will not modify or change models once submitted. If you decide that you want to increase/decrease the size of your model once seeing it in the printer software, you will need to re-work the object in the software used to create the object.

Print Time

Print times can vary depending on the size or complexity of your print. We ask that you try to keep your print times to less than 10 hours. This way we can complete the print job during our regular hours.

Misprints

We are defining a misprint as a bad print that is the fault of the machine, a power outage, etc. We will re-print these at no charge. Otherwise, if the printer did complete the print as designed, you will be charged for the print.

If you have created your own object file, you will be responsible for the cost of the print regardless of the success of the print. This includes files that have been downloaded and modified and prototype objects that require multiple prints until the design is perfected.

Weighing Objects

The software that is used to create the print file for the printer will provide an estimate of the final weight of the object in grams. This weight includes any supports necessary to print the object. We will provide you with the estimate prior to printing.

What type of filament should I use?

For general applications you should use the PLA (Poly Lactic Acid) filament. For items that may require greater strength or may be subjected to higher temperatures (the inside of a car or dishwasher), use the HIPS (High Impact Polystyrene) or ABS (Acrylonitrile Butadiene Styrene) filament.

We recommend that if any of your printed items will come into direct contact with food, use plastic wrap or aluminum foil as a barrier between food and the plastic. While PLA filament is listed as safe for direct contact with food, it is still fairly porous and fully cleaning/disinfecting the item can be difficult.

Filament Colors

You do have the option to select the color used for your print. We do have a limited number of colors and, due to cost, cannot purchase filament colors for specific print jobs.

Print Job Queue

We will print your object as soon as we can. There are a number of factors that can affect how long it will take us to print your object. There could be other people ahead of you, and their object print times could vary from 1 – 10 hours. We also conduct programs with these printers, so it may be in use to support a program. We do reserve the right to adjust the queue to most efficiently print items. We may have times where we move a shorter print job ahead of a longer job because it will complete before the end of the day or before a program.

How do I finish my 3D print?

Support material can be carefully removed using X-ACTO knives and needle nose pliers. If you are interested in more advanced finishing techniques, we suggest the following resources.

- <http://makezine.com/projects/make-34/skill-builder-finishing-and-post-processing-your-3d-printed-objects/>
- <https://www.youtube.com/watch?v=NhyufhNpVTo>