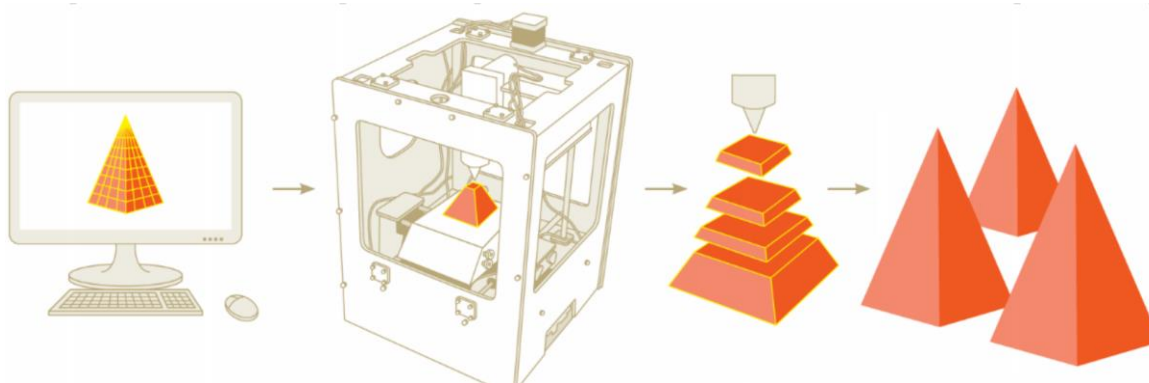


3D Printing at Harris County Public Library

What is 3D printing?

3D printing is an “additive manufacturing” process that begins with a computer model and builds a three-dimensional object. The 3D printers in Harris County Public Library branches use a technique called Fused Filament Fabrication (FFF) where a computer-controlled hot nozzle is used to melt plastic (much like a hot-glue gun) which is deposited layer-by-layer until the final form is completed. HCPL printers use a non-toxic plastic called PLA (polylactic acid).



What can I print?

3d printing starts with a computer model which is typically obtained in one of three ways:

Design using CAD (Computer-Aided Design): There are number of free 3D design tools available. One of the most popular for beginners is [Tinkercad](#), a browser-based tool that requires no download or installation. More advanced users may consider [Fusion 360](#) which has free licenses for educators, students and hobbyists. Other free options include [OpenSCAD](#), [Sculptris](#), [FreeCAD](#) and [Onshape](#).

Download existing models: You can find designs online that are creative commons-licensed and public domain for personal use. Check out [Thingiverse](#), [Pinshape](#) or other 3D model repositories for a large variety of models.

3D scanning: It is possible to use special tools and computer software to scan existing objects and create 3D models. The technology isn't perfect and often requires significant “post-processing” to prepare the model for 3D printing.

How can I 3D print at a HCPL branch library?

Patrons who wish to use one of the library 3D printers are expected attend a free orientation class (check the [Events Calendar](#) for dates and times) and earn a “3D Printing Badge” created on HCPL’s [Maker Central](#) site for the printer you wish to use. The orientation class covers the basic operation of 3D printers, the tools and techniques to create 3D models and HCPL’s 3D Printing Policy. After earning the badge, patrons may reserve time on a 3D printer to print their project. If you’ve already earned a 3D printing badge for a different 3D printer than the one you wish to use, you will earn a new badge during the hands-on portion of your orientation/reservation on the new machine.

Patrons must be present to begin the print. The cost of printing is 10¢/gram for the final project. Estimating the project cost and printing time may be done using software taught during the orientation classes or ahead of time with the free slicer linked on the reservation form. Patrons under age of 12 must be accompanied by an adult.

[Click here to access or create your Maker Central account.](#)

I've taken the orientation class – now what?

- Sign into your existing Maker Central account or [sign up for a free account now](#). (If you registered for HCPL's Summer Reading Program, you may already have an account)
- Under the “Programs” tab, click on “Maker Central”.
- Click on the appropriate badge. For example, if you've taken the orientation class for the Full Spectrum Laser, then click on the Full Spectrum Laser badge.
- Staff will register your orientation completion in the Beanstack system within 2 business days.
- You will receive a confirmation email for receipt of your badge.
- After being badged you are able to click on the rewards tab and make a reservation.
- Fill out the Equipment Reservation Form and click “Submit”. You will receive an initial email confirming receipt of your request. Within one business day, you should receive an email confirming your request.
- Upon completion of the full orientation, you are able to earn additional model-specific machine badges. Utilize other machine models throughout the county by simply scheduling the machine at that branch. (Retaking the full orientation class is not required.)
- If you have any questions, please contact the branch library for assistance.
- Enjoy the perks of being a badged HCPL Maker!

Which HCPL branches have 3D printing equipment available for patron use?

- **Clear Lake City-County Freeman Branch Library**
 - Ultimaker 3
 - Prusa MINI+
 - Gigabot 4 (Pending Verification)
- **Evelyn Meador Branch Library**
 - Polyprinter 229
- **North Channel Branch Library**
 - Makerbot 5th Generation
- **HCPL Administration**
 - Lulzbot Taz 6
- **Kingwood Branch Library**
 - Ultimaker 2+
- **Barbara Bush Branch Library**
 - Makerbot 5th Generation
- **Katherine Tyra Branch Library**
 - Makerbot 5th Generation
- **Tomball Community Library**
 - Monoprice Maker Select V2
 - Lulzbot Taz Workhorse
- **Stratford Branch Library**
 - Lulzbot Mini
- **Jacinto City Branch Library**
 - Lulzbot Mini
- **Spring Branch Memorial Branch Library**
 - Lulzbot Taz Workhorse
- **Parker Williams Branch Library**
 - Ultimaker 3
- **Northwest Branch Library**
 - Lulzbot Mini 2
- **Maud Marks Branch Library**
 - Dremel Digilab 3D45

❖ *Other branches may occasionally have 3D printers at their location for special programs. Ask your local HCPL branch for details.*

Equipment Descriptions



Lulzbot Taz 6

- Max Build Volume: 280 x 280 x 250 mm (11 x 11 x 9.8 in)
- Max nozzle temperature: 300°C
- Print Bed: glass with PEI surface, heated
- Layer resolution: 0.05 – 0.5 mm (0.002in - 0.020 in)
- Recommended slicing software: [Cura Lulzbot Edition](#)



Lulzbot Taz Workhorse

- Max Build Volume: 280 x 280 x 285 mm (11.02" x 11.02" x 11.22")
- Max nozzle temperature: 290°C
- Print Bed: glass with PEI surface, heated
- Layer resolution: 0.05 mm - 0.4 mm (0.002 in - 0.02 in)
- Recommended slicing software: [Cura Lulzbot Edition](#)



Lulzbot Mini 2

- Max Build Volume: 160mm x 160mm x 180mm (6.30" x 6.30" x 7.09")
- Max nozzle temperature: 290°C (554°F)
- Print Bed: glass with PEI surface, heated
- Layer resolution: 0.05mm-0.4mm (0.002"-0.015")
- Recommended slicing software: [Cura Lulzbot Edition](#)



Lulzbot Mini

- Max Build Volume: 152 mm x 152 mm x 158 mm (6 in x 6 in x 6.2 in)
- Max nozzle temperature: 300°C (572°F)
- Print Bed: glass with PEI surface, heated
- Layer resolution: 0.05 mm - 0.50 mm (0.002in - 0.020 in)
- Recommended slicing software: [Cura Lulzbot Edition](#)



MonoPrice

- Maximum Build Volume: (200 x 200 x 180 mm) 7.9" x 7.9" x 7.1"
- Max Extruder Temp: 500°F (260°C)
- Filament: 1.75 mm
- Bed: Heated; Aluminum
- Bed leveling: Manual
- Max heated bed temperature: 167 °F / 75 °C
- Layer resolution: 100 Microns (0.1 - 0.4 mm)
- Recommended slicing software: Cura, Repetier, or Simplify 3D



Dremel Digilab 3D45

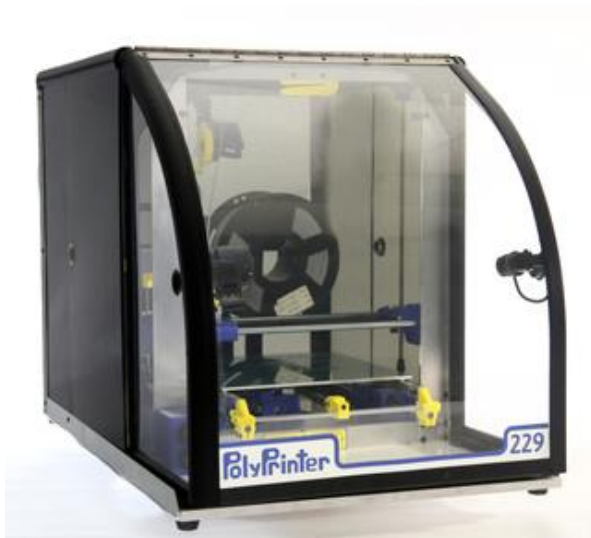
- Max Build Volume: 255 x 155 x 170 mm (10" x 6" x 6.7")
- Max nozzle temperature: 536°F (280°C)
- Print Bed: Heated glass
- Layer resolution: 50-300 microns (0.05 mm)

Recommended slicing software: Dremel Digilab 3D Slicer, Dremel Print Cloud, Simplify 3D, Polar3D



Makerbot 5th Generation

- Max Build Volume: 252 x 199 x 150 mm (10 x 7.8 x 5.9 in)
- Max nozzle temperature: 260°C
- Print Bed: glass, unheated
- Layer resolution: 0.1 – 0.3 mm
- Recommended slicing software: [Makerbot Print](#)



Polyprinter 229

- Max Build Volume: 229 x 229 x 299 mm (9 x 9 x 9 in)
- Max nozzle temperature: 300°C
- Print Bed: aluminum with PET surface, heated
- Layer resolution: 0.05 – 0.25 mm
- Recommended slicing software: [KISSlicer](#)



Ultimaker 2+

- Maximum Build Volume: 223 x 223 x 205 mm (8.8 x 8.8 x 8.1 in)
- Max nozzle temperature: 260°C
- Print Bed: glass, heated
- Layer resolution: 0.02 – 0.2 mm
- Recommended slicing software: [Cura Ultimaker Edition](#)



Ultimaker 3

- Maximum Build Volume: 223 x 223 x 205 mm (8.8 x 8.8 x 8.1 in)
- Max nozzle temperature: 260°C
- Print Bed: glass, heated
- Layer resolution: 0.02 – 0.2 mm

Recommended slicing software: [Cura Ultimaker Edition](#)



Prusa MINI+

- Maximum Build Volume: 180mm x 180 mm x 180mm or 7in x 7in x 7in
- Max Nozzle Temperature: 280 C/536 F
- Print Bed: Removable magnetic steel sheets with different surface finishes, heat bed with cold corners compensation
- Layer Resolution: 0.05mm-0.25mm

Recommended Slicing Software: [PrusaSlicer](#)