# 3D Printing
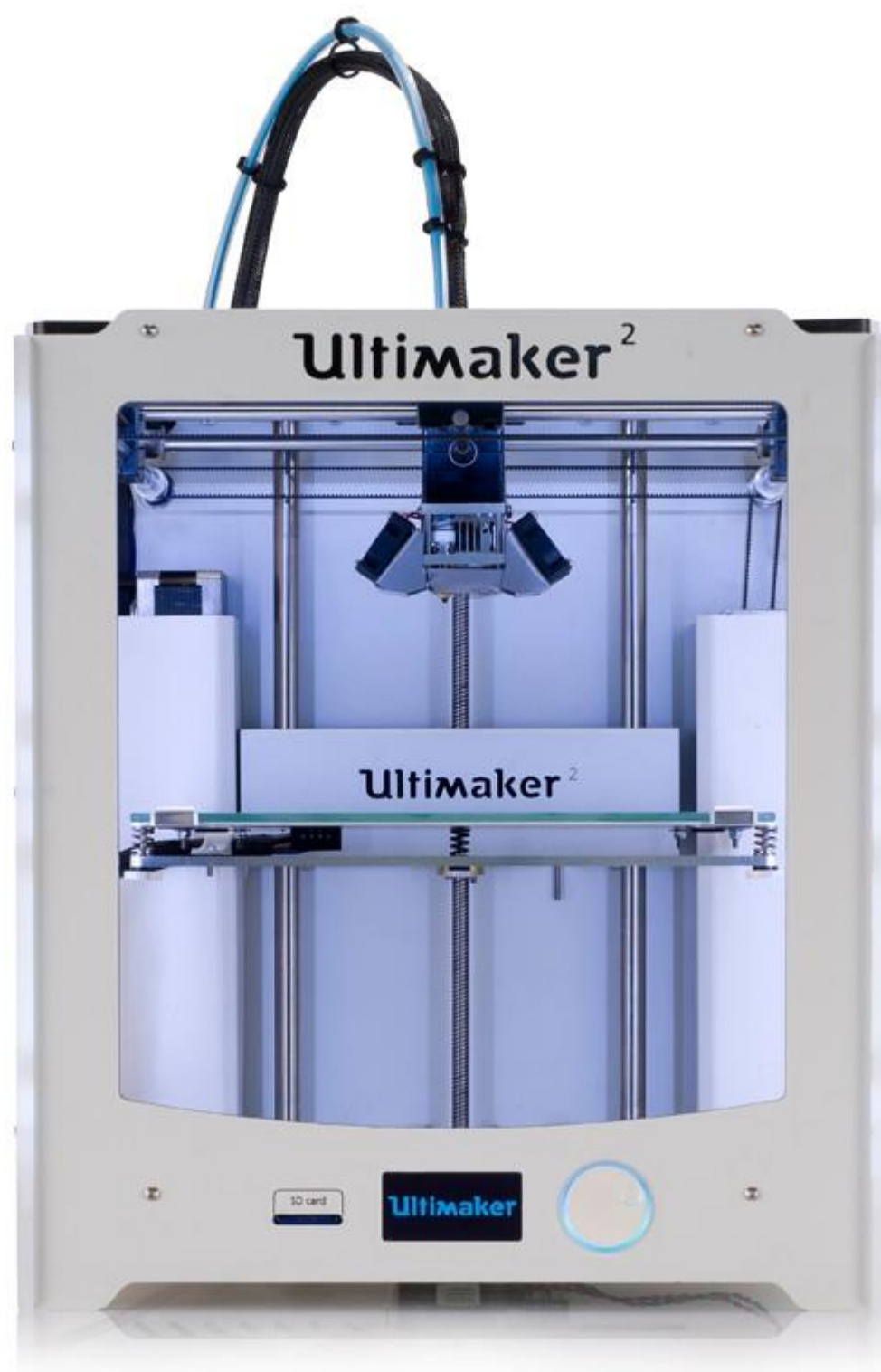## Patron Resource Guide



MASTICS
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# COMMUNITY LIBRARY
## Digital Services Department

# What is 3D Printing?

"3D printing or additive manufacturing is a process of making three dimensional solid objects from a digital file. The creation of a 3D printed object is achieved using additive processes. In an additive process an object is created by laying down successive layers of material until the entire object is created.

It all starts with making a virtual design of the object you want to create. This virtual design is made in a CAD (Computer Aided Design) file using a 3D modeling program, for the creation of a totally new object."

3DPrinting.com
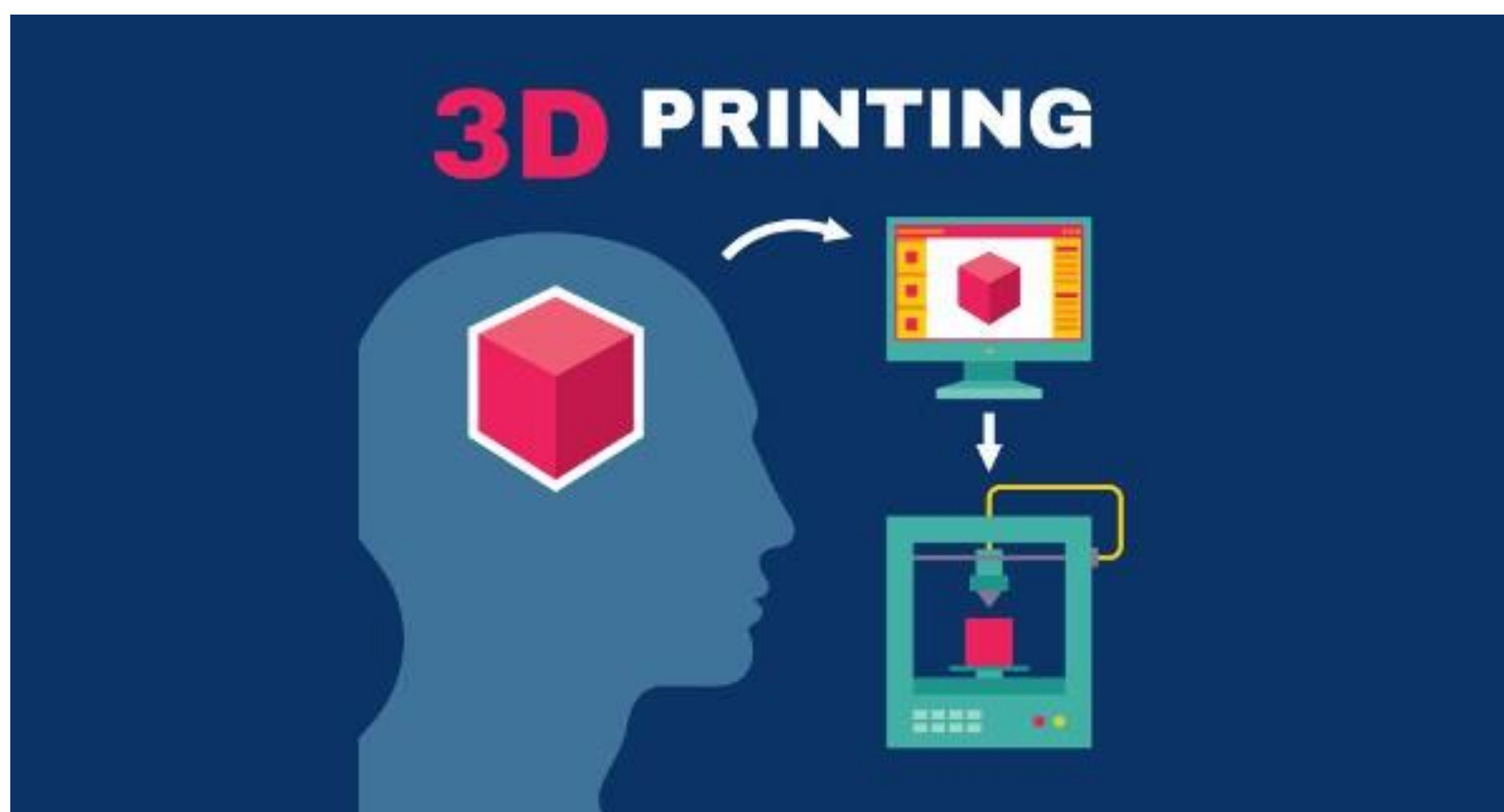
# How Can I Find Prints?

You can browse and download .STL files from various open-source marketplaces such as:



**THINGIVERSE** is the ultimate 3D printing community. *Thingiverse* is comprised of over 500,000 3D models downloadable for free, under the Creative Commons License.

www.thingiverse.com

**YOUMAGINE**'S 3D community consists of 10,000 designs which are customizable and sharable, for free. Like *Thingiverse, Youmagine* also has design reviews and images of prints made.

www.youmagine.com

**MYMINIFACTORY** consists of free downloadable 3D designs, as well as 3D prints for sale. 3D designers have the ability to earn tips for their original designs.

www.myminifactory.com

**SHAPEWAYS** is a marketplace for 3D printed objects. With *Shapeways*, you can either Shop or Create which enables you to turn your digital designs into actual products for sale.

www.shapeways.com

# Design Your Own 3D Object

You can also create your own designs and 3D prints using free CAD (computer aided design) software.

**TINKERCAD**- is the ultimate free tool for creating your own 3D designs. *Tinkercad* is a powerful, browser-based CAD program suitable for all ages and levels of skill.
www.tinkercad.com

**123DDESIGN**- Autodesk's *123D Design* is a free 3D modeling program which not only works on your computer, but is also available for download in the App Store and works with iPads.
www.123dapp.com/design

**SKETCHUP**- For the intermediate to advanced CAD users, *Sketchup* is used by architects, engineers and professionals because of its specific drawing tools and options.
www.sketchup.com/products/sketchup-make

**BLENDER**- For those skilled in CAD, *Blender* is another free alternative for designing your own models. *Blender* is known to have advanced tools for more complex modeling designs and is available for download on PCs and Mac computers.
www.blender.org

# Achieving the Perfect Print

Understanding 3D printing settings can be helpful for the success and quality of your prints. The following settings are found within slicing software such as Cura or Slic3r.

**INFILL-** infill refers to how densely filled the inside of your print will be. Your software will typically use an infill density of 20% to produce a good 3D print. Infill ranges from 0% (hollow) to 100 % (completely solid).

**SHELLS-** are the outer thickness layer or the walls of your 3D object. Shells determine the stability of your print.

**SUPPORTS-** think of Supports as scaffolding under your object. Supports are used when objects have overhang, shallow angles, or just don't print well on their own.

**RAFT-** is a type of platform adhesion that helps objects stick more securely to the build plate of the printer.

**BRIM-** is a thinner type of platform adhesion.
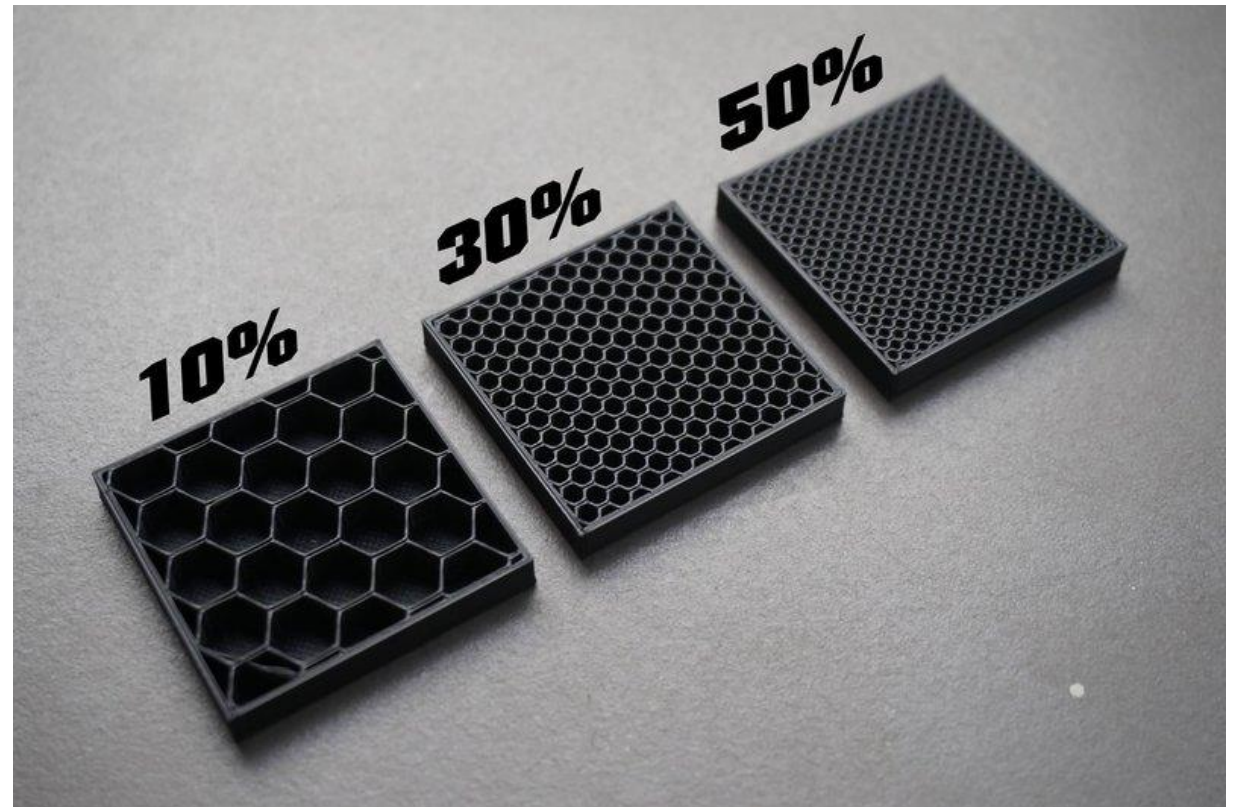


Infill Density- the inside of your 3D print.



Example of an object with both Rafts & Supports used for stability. Rafts and supports are later removed from the print.

# Filament and Materials

3D Printers use material called Filament which is melted at a high temperature in the heated extruder head of the printer. The melted filament quickly hardens as your object starts to build.

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Filament can be made of various materials such as: metal, wood, resin, clay, and the most commonly used, plastic (ABS, PLA, Nylon, HIPS, PVA, PET, nGEN).

Our 3D printers use:

**PLA-** a biodegradable thermoplastic made out of corn starch and sugar cane. PLA is considered to be more environmentally friendly.

**ABS-** thermoplastic that is harder and more durable than PLA.  This is the same plastic used to make Legos.

**Flexible- TPE/TPU-** thermoplastic elastomer with rubber-like qualities. Flexible filament has stretch to it and can be used to make automotive parts like tires, wearables such as shoes, watches, jewelry, or even smart phone cases.  Flexible filament is also popular for household appliances and medical supplies.

# Learn More with Lynda

Access Lynda by going to [wwww.communitylibrary.org/learning](wwww.communitylibrary.org/learning)
Click on *Log On* and sign in with your library barcode and pin.

Use Lynda, our free online learning tool, to watch instructional videos on everything from 3D basics to more advanced demonstrations of CAD software design.

There are over 1,400 results for *3D Printing* on Lynda. Filter your search by subject, software, skill level and become an expert on 3D printing!
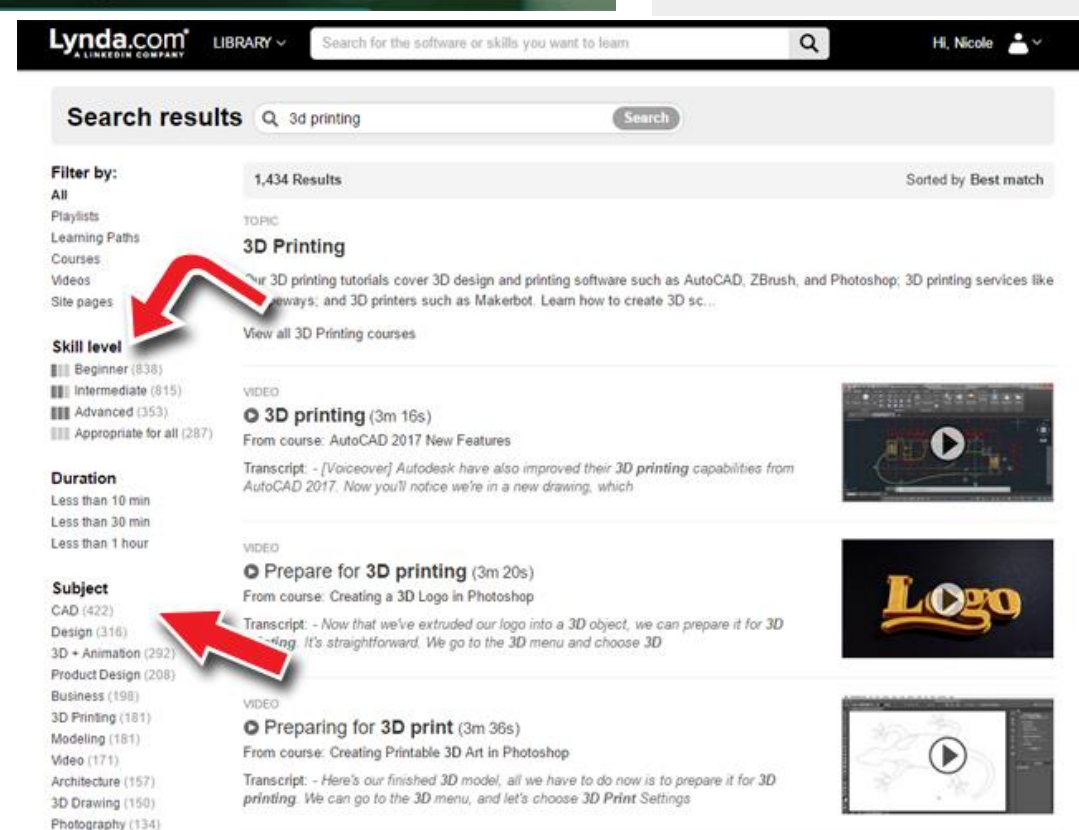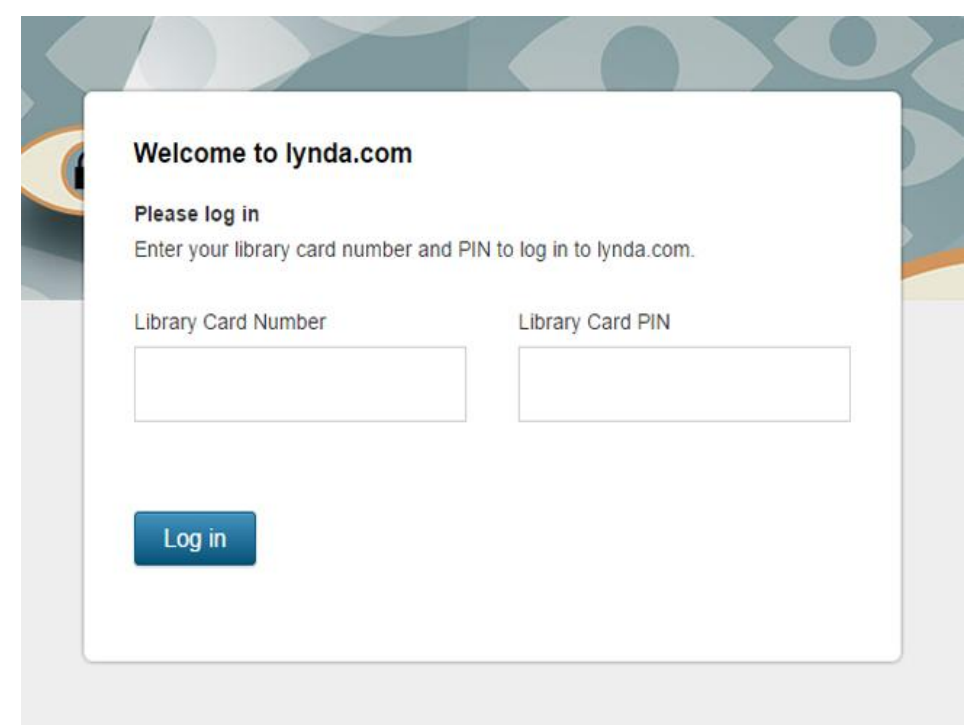
# MMSCL 3D Print Policy

The Mastics-Moriches-Shirley Community Library offers patrons the opportunity to print out their own original designs or those found on various open-source websites. Prints will be priced according to weight in grams; our fee is 10 cents per gram. Printing time is limited to a maximum of 3 hours per print. Formats accepted are as follows: .stl, .obj and .thing. Patrons are permitted to submit their file for review via the online form on our website. Upon approval, patrons will be notified of a print price and pickup time. Prints that are not picked up within 14 days of notification will be discarded and the print cost will be applied to their Library accounts.

No project shall be printed that Library staff determines is:
- Prohibited by local, state, or federal law
- Unsafe, harmful, dangerous, or posing as a threat to others
- Obscene or offensive to the community's standards/mores.
- In violation of intellectual property rights-copyright, patent, trademark.

In addition to the above restrictions, the Library reserves the discretionary right to refuse any 3D print request that it deems inappropriate or unwarranted.

**NEW**

# 3D Print Your Own Designs at MMSCL!

1. Go to https://www.communitylibrary.org/Services/3dprint and fill out the *3D Print Request*

2. Agree to the 3D Print Policy Terms

3. Upload your .stl, .obj or .thing file

4. A Digital Services librarian will get back to you with a print price (10 cents per gram)

5. You will be notified once the print is ready

6. Go to the Circulation Desk to pay the print fee and pick up your new print!

**For more information, please contact *Digital Services* at (631) 399-1511 ext. 363 and 372**

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Kerri Rosalia

director@communitylibrary.org

## Department Head, Digital Services
Nick Tanzi

digitalservices@communitylibrary.org

407 William Floyd Parkway, Shirley, NY 11967
(631) 399-1511  www.communitylibrary.org