3D PRINTING BASICS

ELMHURST
PUBLIC LIBRARY

125 S. Prospect Avenue, Elmhurst, IL 60126

(630) 279-8696 ● elmhurstpubliclibrary.org

Create, Make, and Build

WHAT IS 3D PRINTING?

A 3D printer works essentially like a traditional printer except it prints in plastic layers to make 3-dimensional designs. 3D printers can print in several different materials including plastic, limestone, and even wood, ceramic and metal. Elmhurst Public Library uses a **MakerBot 5th Generation Replicator** which uses a PLA filament: a corn-based plastic. 3D printing has been around as early as the 1990's but has exploded in popularity due to technology advances and lowered costs. Although many 3D printers themselves can cost hundreds, if not thousands of dollars, the materials are relatively inexpensive after the initial purchase.

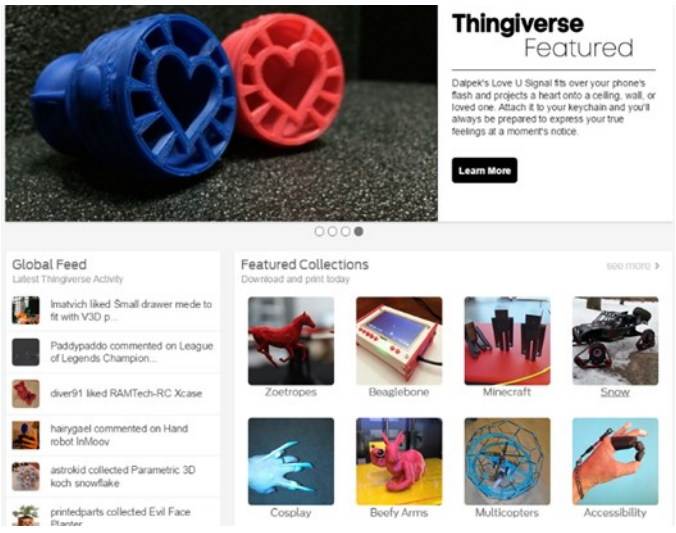
Why 3D print?

Many different types of people use 3D printers for different things. Several news stories have covered incredible 3D printing projects like parents creating prosthesis for their children or the development of 3D printed cars, but there are plenty of uses for everyone. Some reasons you may use a 3D printer include:

- Replacing a broken cabinet handle
- Making fun gifts
- Printing the case for a prototype electronic component
- And maybe most importantly learning to use 3D printing software is a valuable skill

Ways to Print

The easiest way to start printing is to use a design created and uploaded on the Internet. Several websites have large libraries of user-uploaded designs which can be printed freely. **Thingiverse.**com is one of the largest and easiest to use.



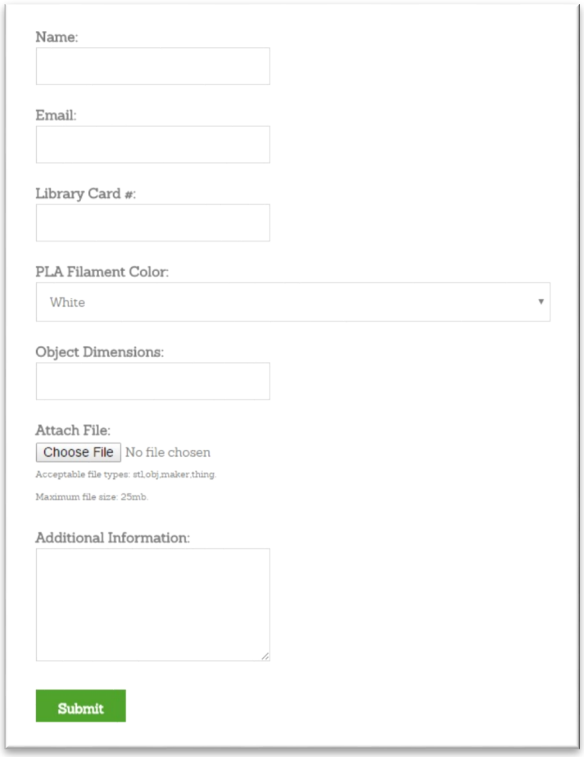
PRINTING AT EPL

To print at EPL you will need to submit your print through:

http://elmhurstpubliclibrary.org/about-us/building-information/3d-print-request/3d-form/

Please note that there are a few limitations to printing:

- 8-hour print limit
- Maximum size:
- 25.2 L x 19.9 W x 15.0 H cm
- 9.9 x 7.8 x 5.9 in
- .10 per gram, with a one dollar minimum (Elmhurst Public Library cardholders only)
- Printing is done by Library staff and is attended to on a first come, first served basis
- Priority printing given to Library programs and events
- Email will be sent once the print job is complete
- Item may be picked-up at the Circulation Desk



Files should be submitted as .obj, .stl, or .MakerBot

If you have any questions about how to submit, exporting your file or anything else feel free to contact us at maker@elmhurst.org.

DESIGN YOUR OWN

Using 3D Printing as a Creation Tool

Create your own 3D designs with this FREE software

Tinkercad

- Web-based 3D modeling software
- Includes lesson modules that lead you through 3D design basics
- Great beginner design platform

Sculptris

- Beginner digital sculpting tool
- Great stepping stone for more advanced digital sculpting software, like ZBrush

Scanning

The Elmhurst Public Library owns a **MakerBot Replicator** which will scan objects and create a 3d model of them. In addition there are several apps for smartphones, which allow you to take a series of photos and convert them into a 3d model. While the Replicator will produce a better result, the quality of the generated 3d object will be nowhere near the quality of the original, as small details are hard to generate, and scanned objects will most likely need to be brought into software for additional work.

3D Printing Limitations

While 3D printing is extremely cool and useful, there are several limitations on what is possible right now. A few warnings before starting your project may include:

- 3D printing takes time! Printing a larger or more detailed design may take several hours of printing to complete and using some of the 3D printing creation software can be difficult at first.
- Size of prints is limited to the size of the MakerBot's work area and objects that are too large for the base will need to be cut into pieces and prints separately, and then combined after.
- Overly complicated designs may print incorrectly or with minor to major errors in the layers.
- At this point you can only 3D print in one color at a time per print

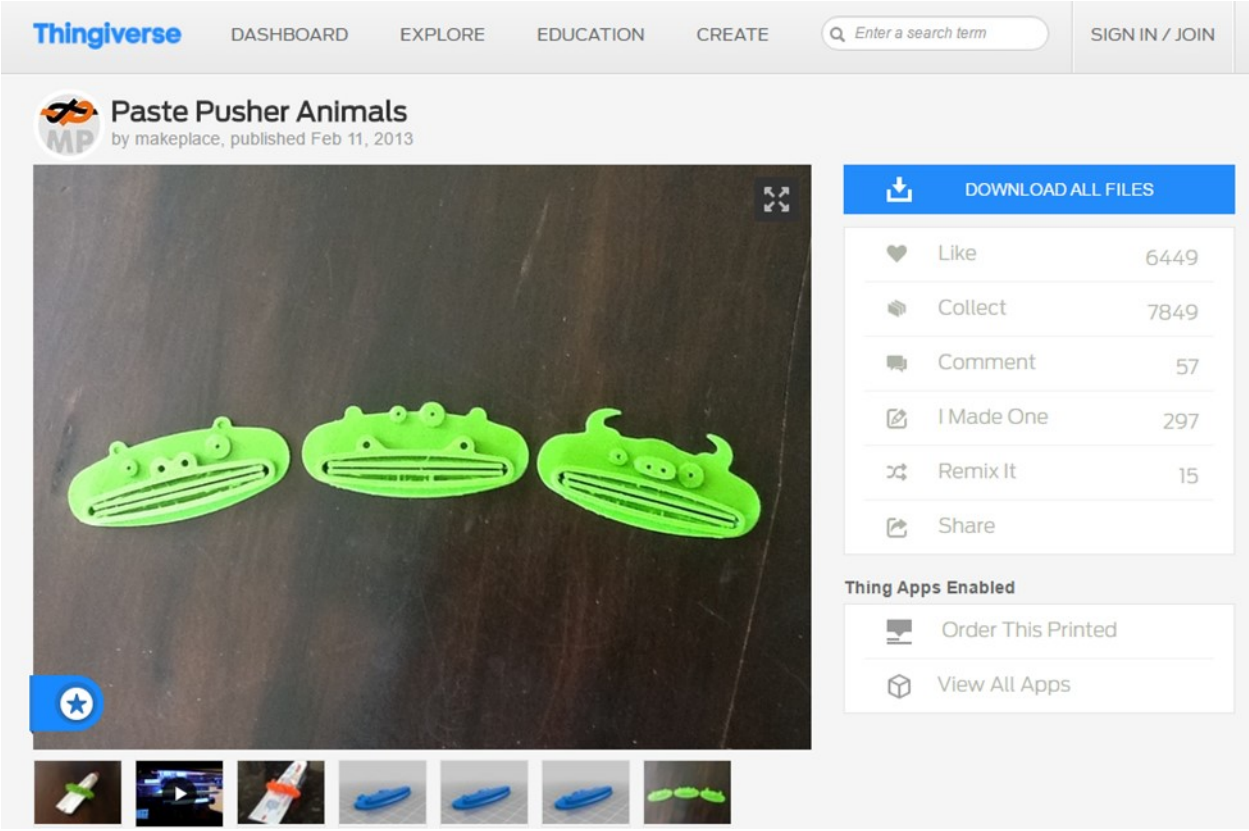
EXERCISE

During this class we will practice downloading and preparing a design to 3D print.

Today we'll cover:

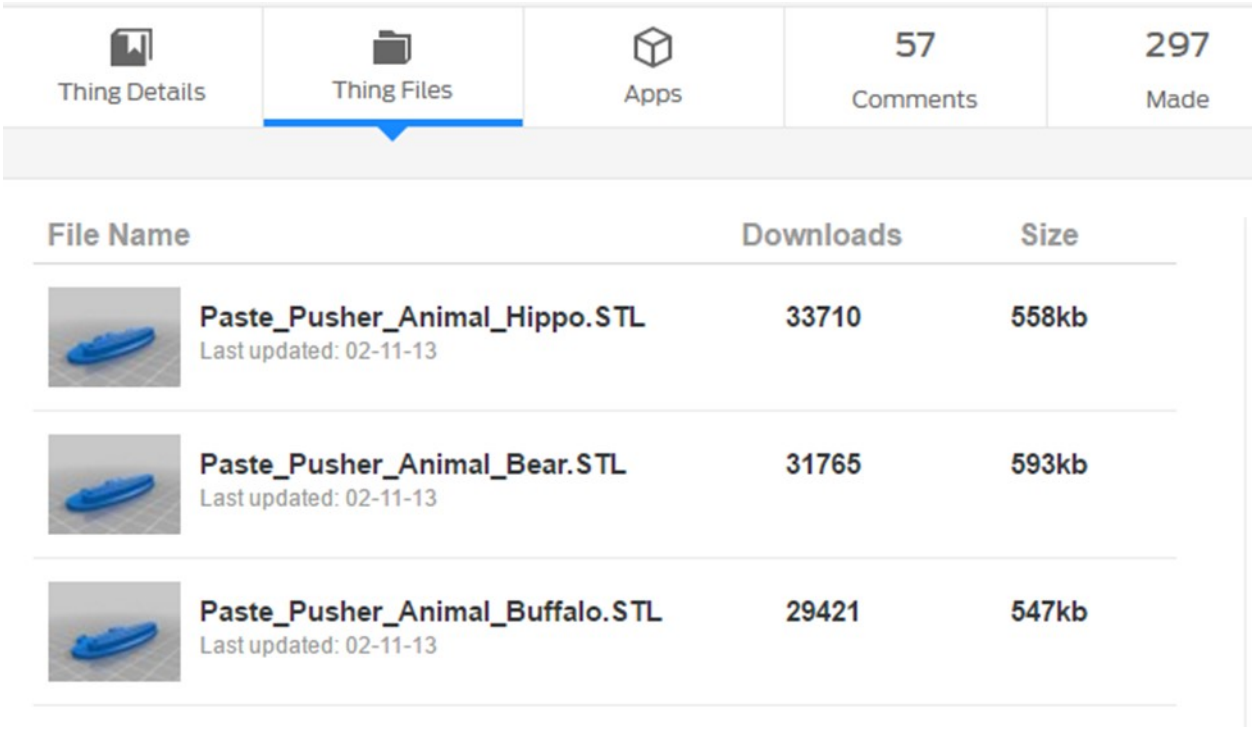
- Pulling a model down from Thingiverse
- Importing into the Tinkercad software
- Preparing the item to print by rotating, moving, and resizing the object
- Uploading file to be printed through EPL website

1. First, we'll go to Thingiverse.com
2. Search the design "Paste Pusher."



EXERCISE

3. Select “Thing Files” tab. Download the file for the animal of your choice to the *Downloads* directory of the computer.



4. Go to Tinkercad.com (register, or sign in if necessary). Start new project and then upload this file.
5. When you are done viewing or altering the file, download to the *Downloads* directory. Use this .stl file when uploading the print via the EPL website.

Conclusion:

Today we’ve covered the basics of 3D printing but there is a lot more to learn; the next step is to dive in! The best way to learn is to experiment and make mistakes. Creative Studio staff members will be available to help troubleshoot or assist you in starting a project. Also be on the lookout for our Intermediate 3D printing courses which cover various creation software. Thanks so much for attending and we hope to see what cool and creative projects you come up with!