

Introduction to 3D Printing

From Ideas to Reality...



3D Printing, or FDM "Fused Deposition Manufacturing"

- Additive manufacturing, not subtractive ("cutting away")
- Excellent for prototyping, art work, tooling, and part replacement



- Uses plastic filament, deposited layer by thin layer. Can be blended with wood, metal, carbon fiber, and other materials
- Users can create complex parts with less waste

Workflow

You -> Computer -> Slicer -> 3D Printer

BASIC STEPS

1. Search for and download a model in .stl or .3mf format
OR
create your own with 3D modeling software
(a list on the Make wiki: <https://wiki.makesantafe.org/resources/drafting-programs>)
2. Prepare model for 3D printer with a software "slicer" such as Bambu and Creality
3. Install filament of choice into printer
4. Copy model file onto SD card, USB drive, or computer
OR
download to the printer with Make wifi (the computers and printers are already connected to Make wifi)
5. Place model file onto printer (mini SD card)

->> Note that for Bambu slicers and using wifi, a mini SD card must be in the printer slot. Also, only use the Bambu slicer in Bambu printers.
6. Select your file and print (if using wifi, that file will be automatically selected and started by the printer)

Workflow Breakdown

1. Models: Search and download from:

printables.com

thingiverse.com

thangs.com

turbosquid.com

and others...

Advanced topic: Design your own with 3D modeling software:

<https://wiki.makesantafe.org/resources/drafting-programs>)

Workflow Breakdown

2. Prepare model for 3D printer with a software "slicer." A slicer digitally slices a computer model into instructions for the printer.

- Most models downloaded from internet sites are usually in *.3mf* or *.stl* format already

- Some models must be paid for, many others are free

- Models must be "sliced" to work in the printers

- Slicers on the Make computers include:

 - Bambu, Creality

 - >> Note, we recommend using the slicer for that company's printer

Advanced topics: Design your own with modeling software, changing slicer menu options for detail, speed, quality, etc.

Workflow Breakdown

3. Install filament into printer

- Bring your own, or Make has filament for sale
- Only use Make recommended filament and manufacturers
- Install so the filament does not kink or bend, and goes all the way through the tube into the extruder

- Slicers on the Make computers include:

Bambu and Creality (use the one for the printer)

->> Note: Always keep your filament at room temperature and dry, dust free or it can clog the printer nozzle.

Advanced topics: Use specialty filaments, and the four spool "Advanced Material System"



Workflow Breakdown

4. Copy model file onto SD card, USB drive, or computer

OR

download to the printer with Make wifi

- Use standard practice for the computer operating system
- Drives and cards are available at the computers or large Mac desktop next to the printers

Workflow Breakdown

5. Place model file into printer (mini SD card)

- Insert (or replace) mini SD card into printer.
- Using the control panel, find and select your file.
- Press print icon.

Workflow Breakdown

6. Select your file and press Print

- If using wifi, that file will be automatically selected and started by the printer).
- Watch the printer for the first layers to complete to improve chances of success.
- Users can stop or pause the print in progress.

Advanced topics: Controlling the printer (temperature, speed, nozzle position, etc.) from its control panel

Getting Help with 3D Printing

Sources

1. Experience! 3D printing is highly experiential.
2. Software help sites, YouTube
3. Online searches and printer websites
4. Make Wiki @ <https://wiki.makesantafe.org/en/tools>
5. Front desk Staff at Make
6. Instructors
7. Your experienced 3D printer friends at Make

3D Printing at Make Santa Fe

Best Practices (for you, and those that print after you):

1. Clean up after yourself!
2. Clean up after yourself! Return tools and filament to their proper places.
3. Reserve online your printer on day desired, before that day. Reservations are all day, due to possible hours-long print times.
4. If your print is done, remove filament and spool. Do not store filament at Make unless you sign up for a storage locker (\$).
5. Place others' prints that are finished into bin on the desk top, or use another printer if available.
6. Be aware that if you use a printer that is already reserved, that person can interrupt and use that printer.