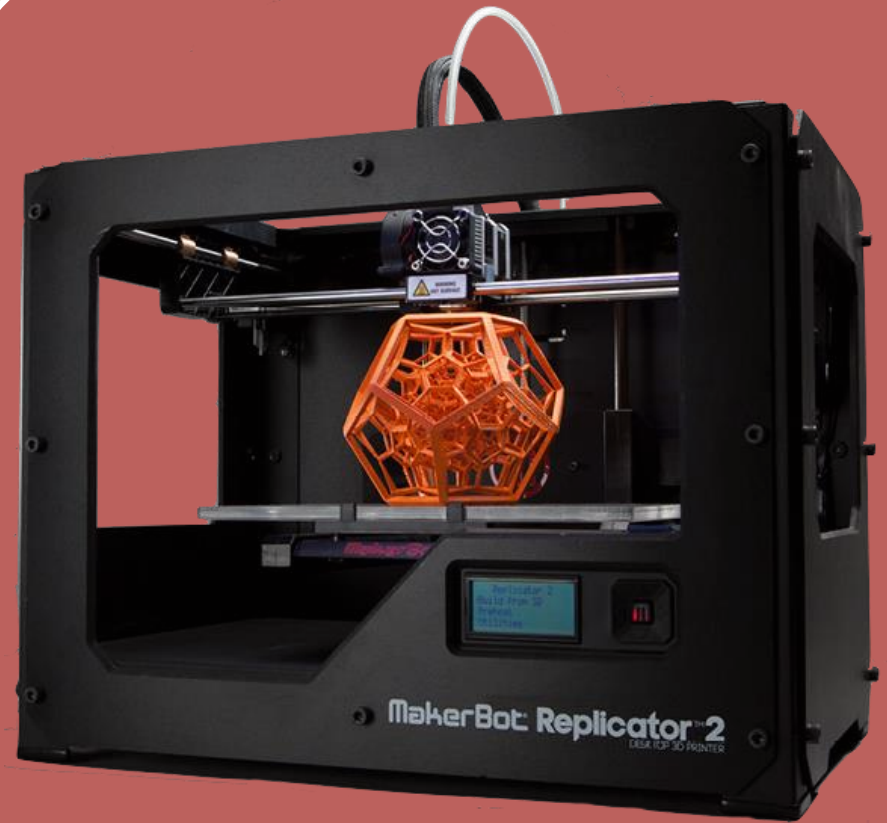


# #Maker Camp

Polylactic Acid, Partnerships, & Payouts

**Michael Casey**  
**Christopher Baker**

# In the



# Beginning (Fall 2013)



<http://chattlibrary.org/4th-floor>

# 4th Floor at Chattanooga Public Library





<http://tic.ocls.info/>

**Melrose Center at Orange County Library System**

# MakerCamp vs. MakerSpace

## MakerCamp:

Flexibility in Location

Minimal - Flexible Staffing

County-Wide Partnerships

Minimal Equipment Needed

Easily Reproducible Program

Facilitated Pilot Approach

Lower Cost of Entry

Financial

Educational

Failure

## MakerSpace:

Purpose-Built Space

Dedicated Staffing

Limited Geographical Reach

Larger Equipment Investment

Heavier System Investment

Greater Public Expectations

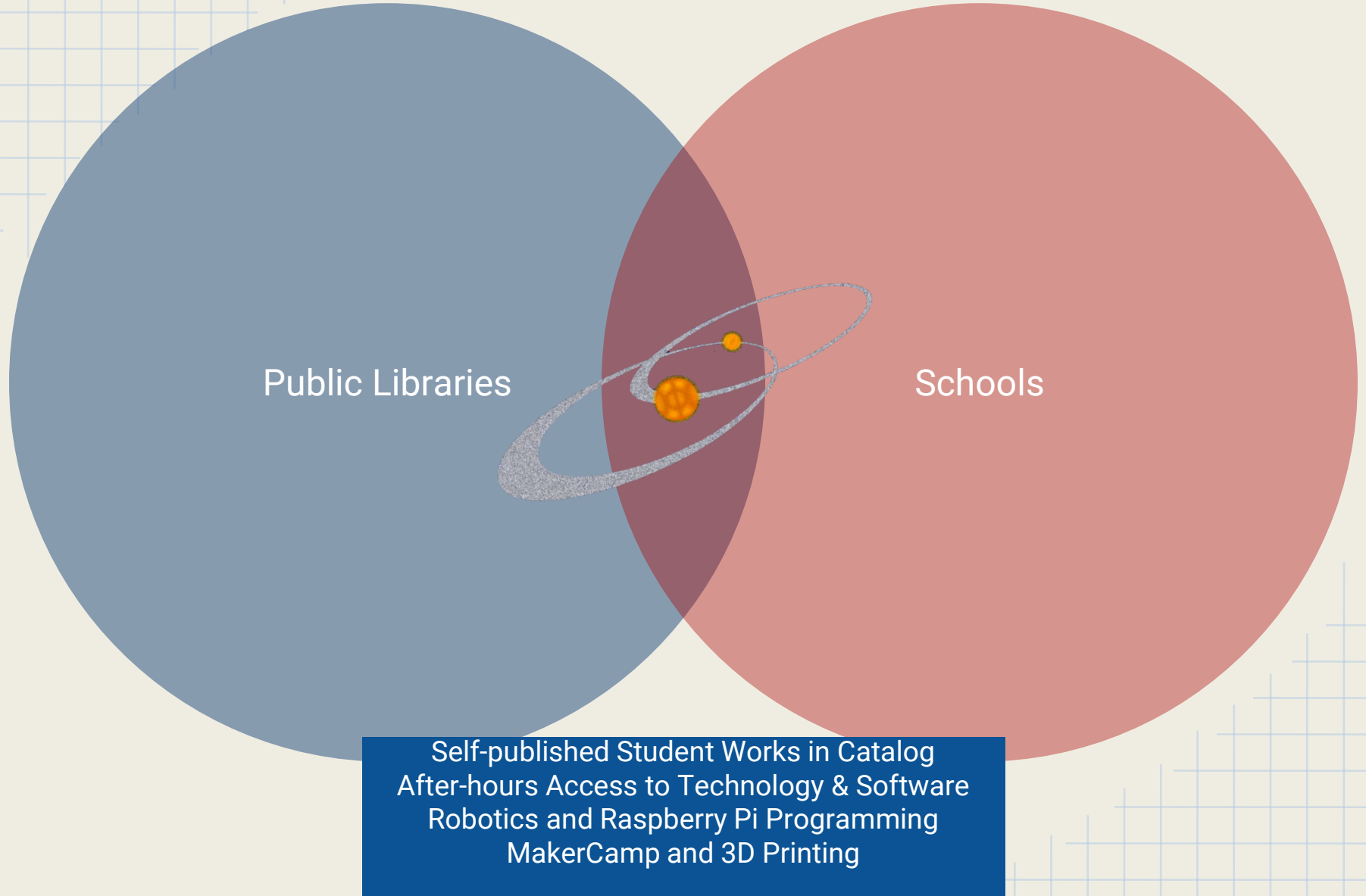
Higher Cost of Entry

Financial

Educational

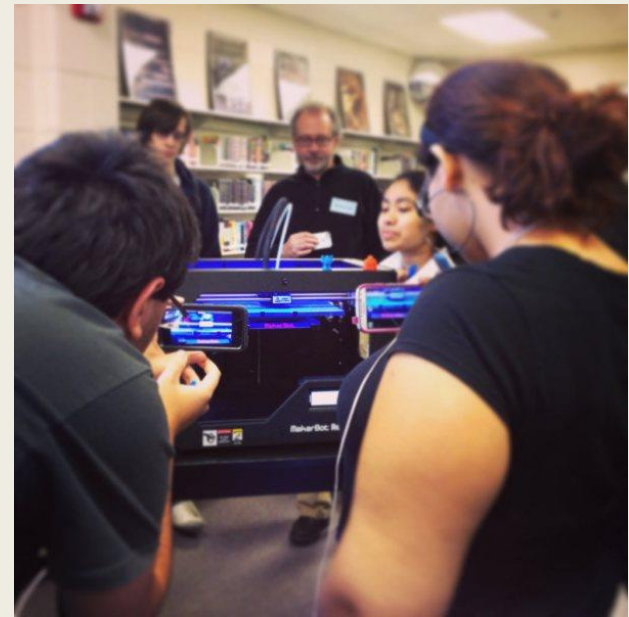
Failure

# Partnerships



# HANDS-ON DEMO

Partnerships: Hands-On  
NORCROSS HIGH SCHOOL MEDIA CENTER



Photos  
Courtesy  
Buffy Hamilton  
<http://theunquietlibrarian.wordpress.com/>

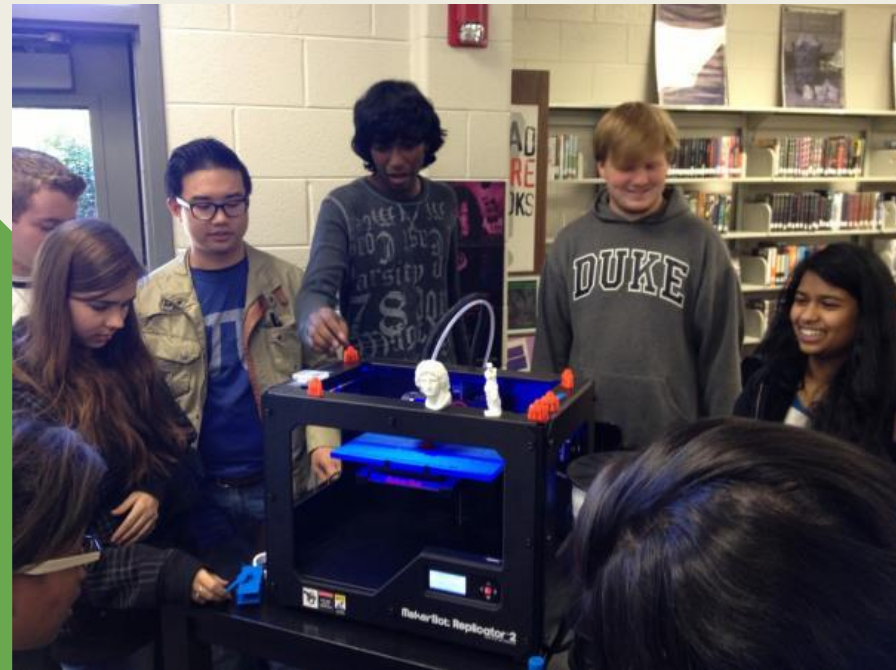




# HANDS-ON DEMO

NORCROSS HIGH SCHOOL MEDIA CENTER

*"...Watching the 3D printer make stuff was an amazing experience. I hope to see it make stuff again in the future at the public library because I really liked watching designs people created get made. I also hope to come up with with a design of my own to be with the 3D printer."*



*"The 3D printing machine was an awesome thing to see at work. I think that if the school had one, it would be really cool because we could use it to do prototypes for a project. So I would really like for there to be one, or for us to do or help to get one."*



Photos & Quotes  
Courtesy  
Buffy Hamilton

<http://theunquietlibrarian.wordpress.com/>





Buffy  
Hamilton

Jennifer  
Lund



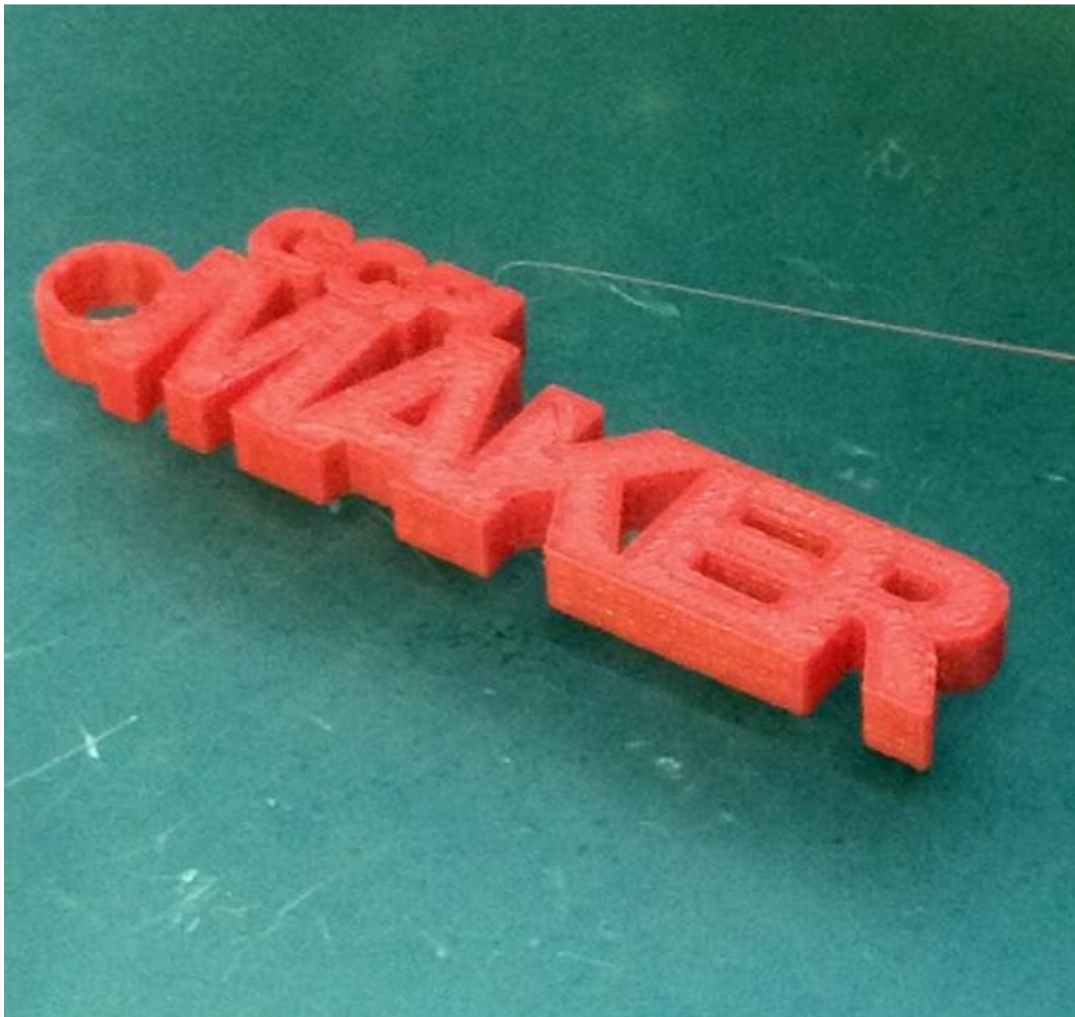
Steve  
Thomas



Amy  
Billings

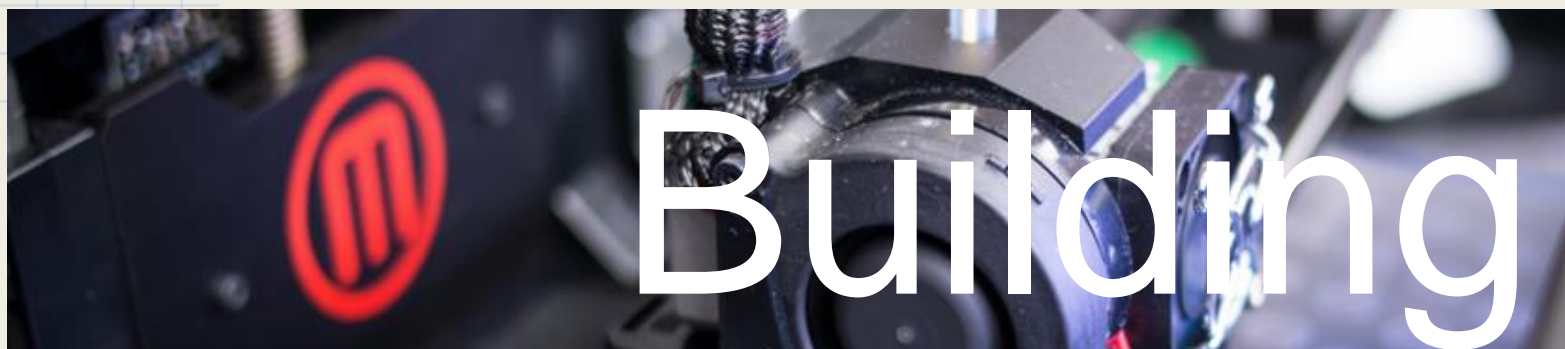
# MakerCamp: People

# MakerCamp: Tools & Resources



- MakerBot Replicator 2
- Google Apps (Forms/Drive)
- Samsung Chromebook
- TinkerCad
- Thingiverse
- MakerWare
- Meshmixer
- netfabb Basic



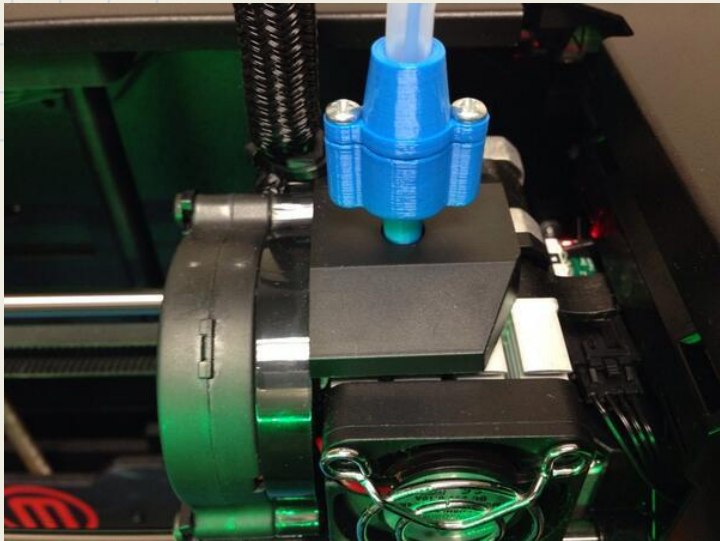






# Building

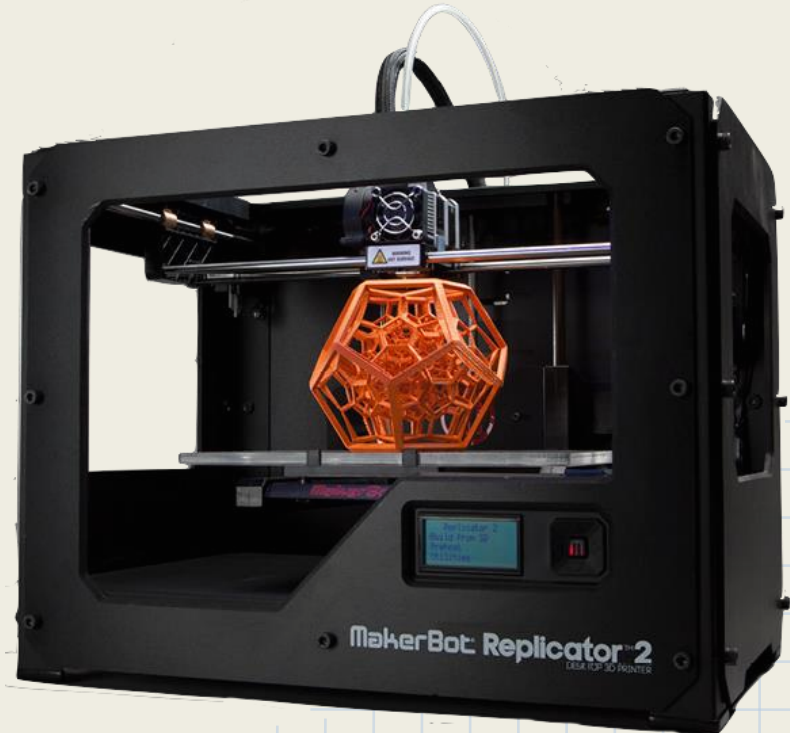
# Building: MakerBot Replicator 2



**Cost:** \$2,399 (now under \$2k)

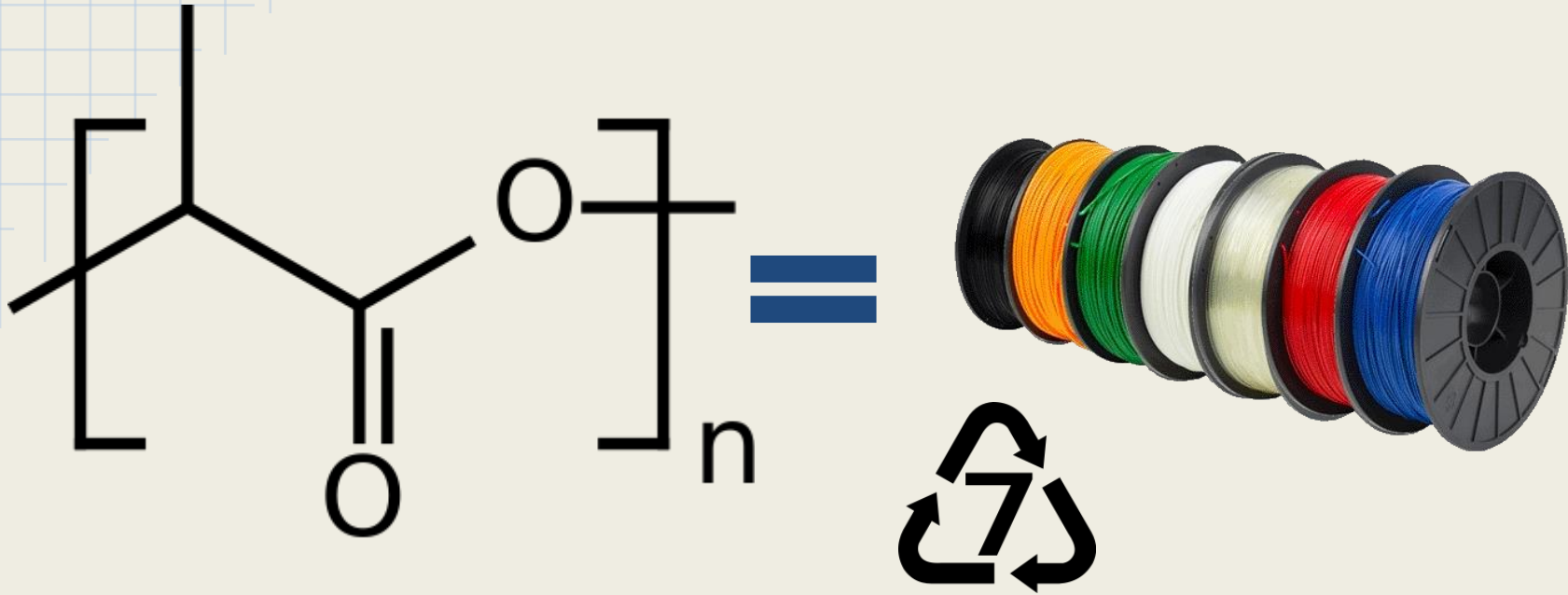
**Material:** PLA plastic

\*Modified with Poly-Carbonate Glass Panels, Lid, and Filament Dust Filter





# Building: Polylactic Acid (PLA)





# Building: Google Apps (Forms/Drive)

## 2014 MakerCamp (FULL)

\*\*\*PLEASE NOTE: MakerCamp 2014 is now FULL and registration for this event has been closed. If you would like to add your name to a waiting list please fill out the form below\*\*\*

Signup to participate in the 4-day MakerCamp at the Gwinnett County Public Library Peachtree Corners Branch on June 9 through June 12. From 1PM to 3PM daily.

Learn the basics of 3D design and then print your creation on the library's MakerBot 3D Replicator printer.

Participants will be required to attend all 4 days of the MakerCamp and must be rising high school students (entering 9th, 10th, 11th or 12th grade as of August 2014).

\* Required



Name \*

Age \*

Phone Number

Email Address \*

School Name

Grade (as of August 2014) \*

Submit

Never submit passwords through Google Forms.

Powered by  
Google Forms

This form was created inside of Gwinnett County Public Library.

[Report Abuse](#) - [Terms of Service](#) - [Additional Terms](#)

## My Drive > MakerCamp 2014 Part

### Name

Completed Prints

Cory Doctorow Books as Free eBook

Empty Maker Folders

3D Printing - Tech Quarterly - Econom

3D printing\_ 3D printing scales up \_ The Economist.pdf

3D printing\_ How 3D printers work \_ The Economist.pdf

mc invite.jpg

Turning Students Into Engineers with 3D Printing.pdf

Video links

Maker 2 - Sam

Maker 20 - Ben

Maker 3 - Alysa

Maker 4 - Alex

Maker 5 - Patrick



# Building: Samsung Chromebook

## Cost:

\$199 (\$235 w/ Apps Management)

## Versatility:

TinkerCad, Thingiverse, and other browser-based resources.

Supported Google Apps infrastructure for MakerCamp participant accounts and sharing.

## Features:

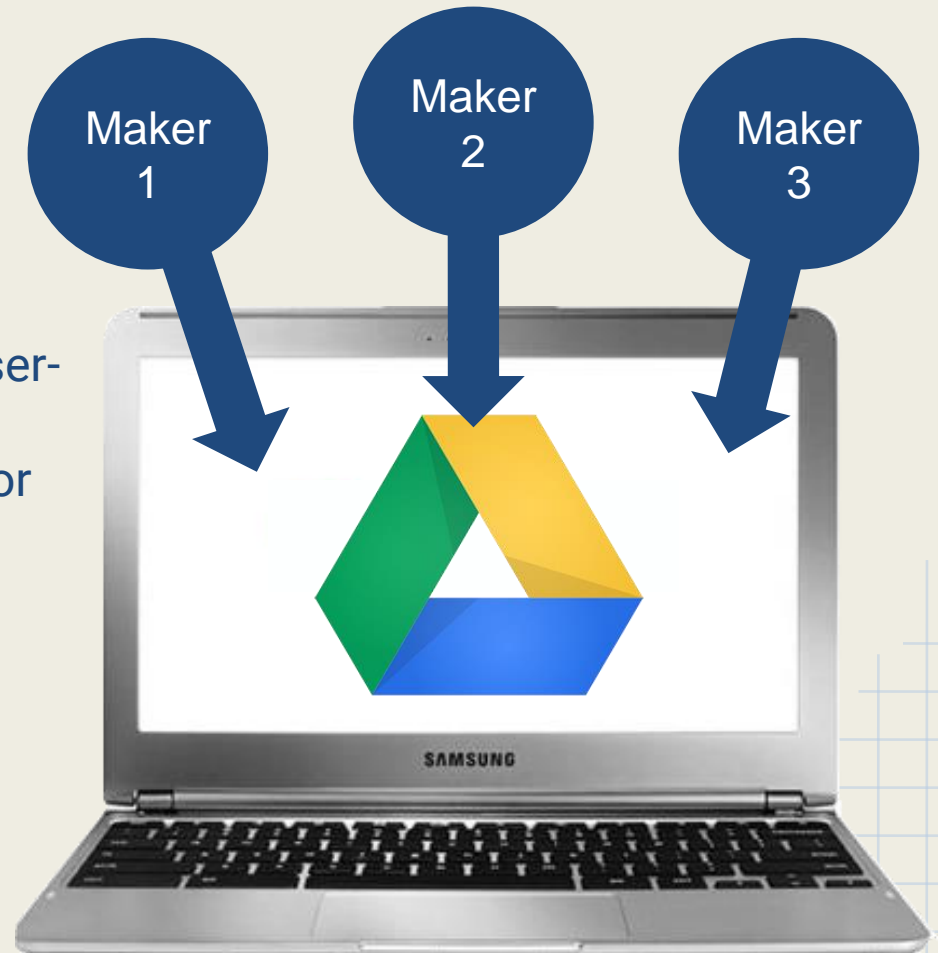
8+ hours battery life

Lightweight

Easily portable

HDMI-out port

USB 2 and 3 ports



# MakerBot @ GCPL

A resource guide for the MakerBot Replicator 2 and 3D Printing at Gwinnett County Public Library.

[MakerCamp](#)[What is 3D Printing?](#)[The MakerBot](#)[MakerWare](#)[3D Design](#)[What is 3D Printing?](#)[Print Page](#)Search: [This Guide](#) ▾[Search](#)

## Books



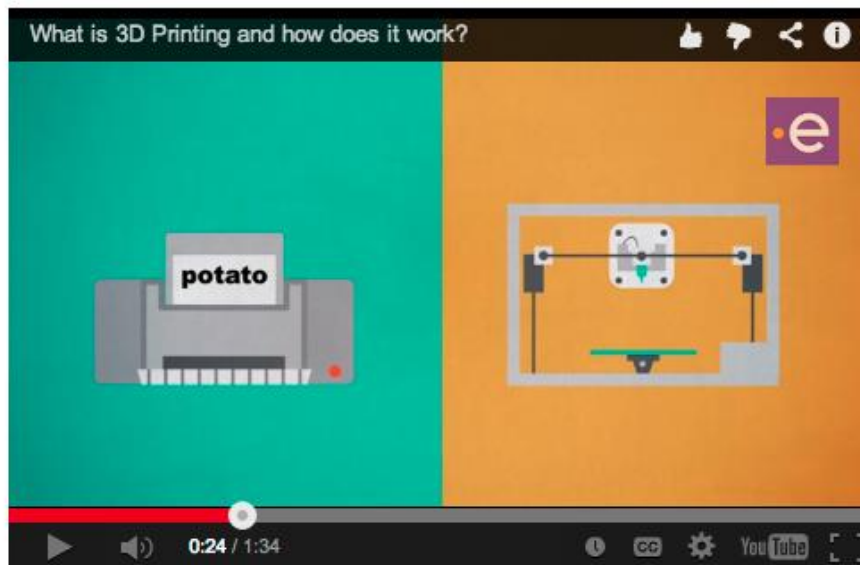
**Fabricated** - Hod Lipson; Melba Kurman  
Call Number: 686.2254 LIPSON  
ISBN: 9781118350638  
Publication Date: 2013-02-11



**Make - 3D Printing** - Anna Kaziunas France (Editor)  
Call Number: 686.2254 MAKE  
ISBN: 9781457182938  
Publication Date: 2013-12-13



## 3D Printing



## 3D Printing - Links

Follow these links to find 3D projects that are ready to be printed, customized, or downloaded for modification.

- ◊ [MakerBot - 3D Printing Guide](#)
- ◊ [MakerWare](#)
- ◊ [Thingiverse](#)
- ◊ [YouImagine](#)
- ◊ [CubeHero](#)
- ◊ [ReplicatorG](#)
- ◊ [Smithsonian x 3D](#)

Learn more at:  
[lib.gwinnettpl.org/MakerBot](http://lib.gwinnettpl.org/MakerBot)

# MakerCamp: Building

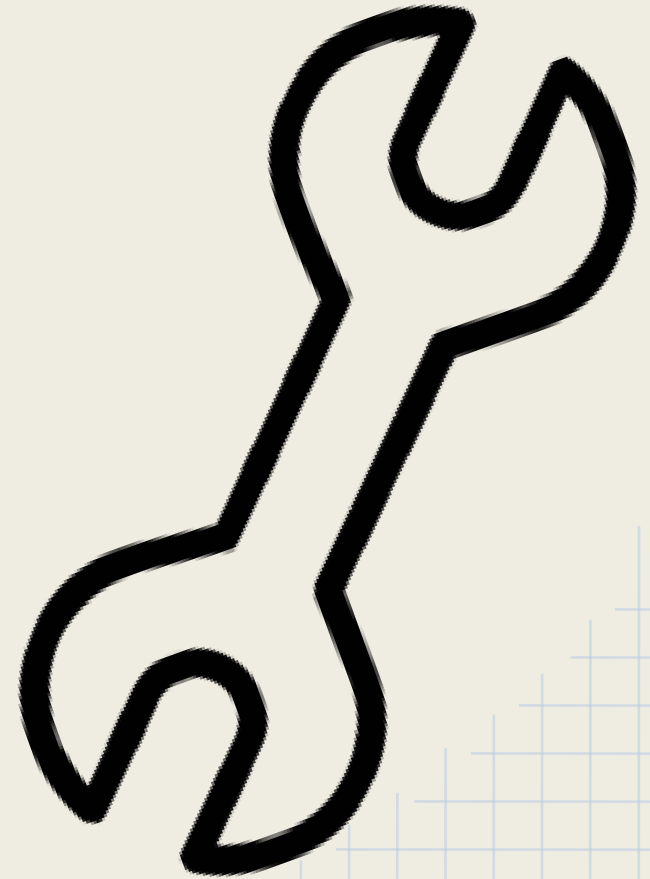




# Learning

# Learning

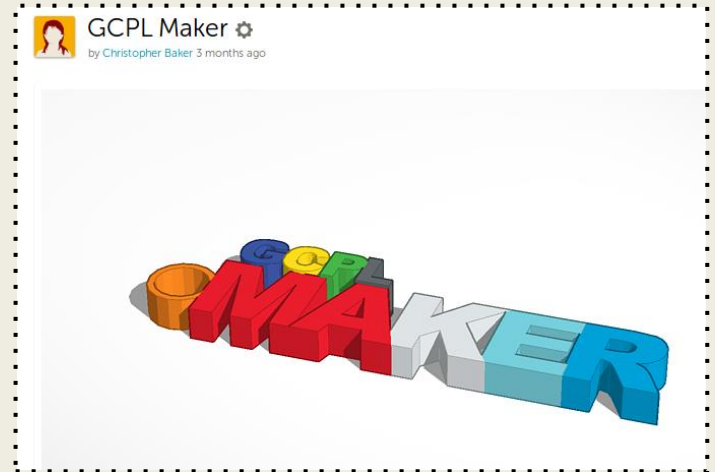
- Exposure to new technologies and tools
- Basic 3D modeling and design software
- 3D printing issues - dimensional printing, negative space, design strength, design angles, etc.
- Functionality of design
- Self-directed projects more engrossing than supplied projects
- Develop a passion learning through design and creation of unique and personal item
- teaches power of invention and building



# Learning: TinkerCad



- All-in-one 3D Design package
- Lessons: Basics - Complex techniques
- Browser-based; no installation
- Free account
- Share Projects
- Gallery of Customizable Objects
- Many Import/Export options



## Basics



Lesson: Learning the moves

Begin Lesson

A 3D model of a wooden barrel with a green 'DONE!' badge in the top right corner.



Lesson: Camera controls

Begin Lesson

A 3D model of a wooden base with several red cylindrical pillars on top, with a green 'DONE!' badge in the top right corner.



Lesson: Creating holes

Begin Lesson

A 3D model of a silver wrench, with a green 'DONE!' badge in the top right corner.



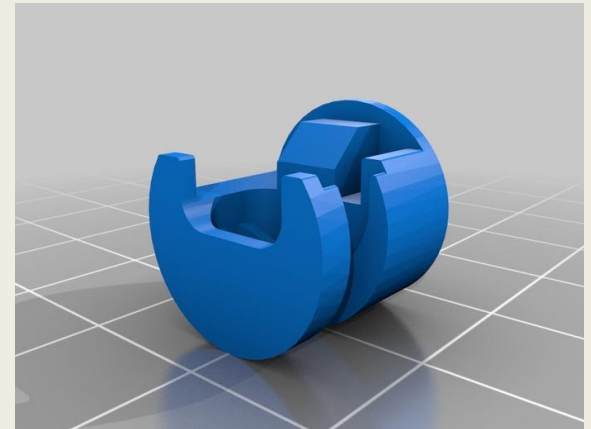
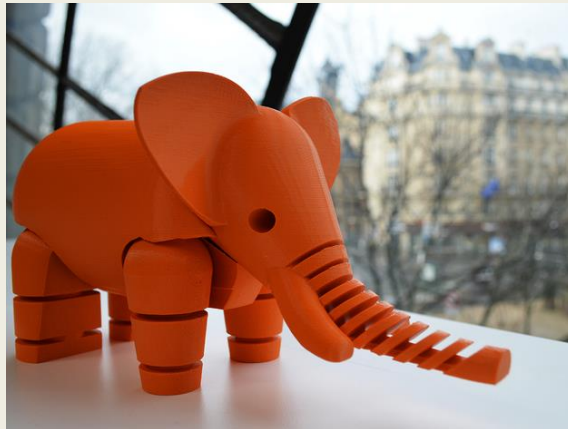
Lesson: Scale, Copy & Paste

Begin Lesson

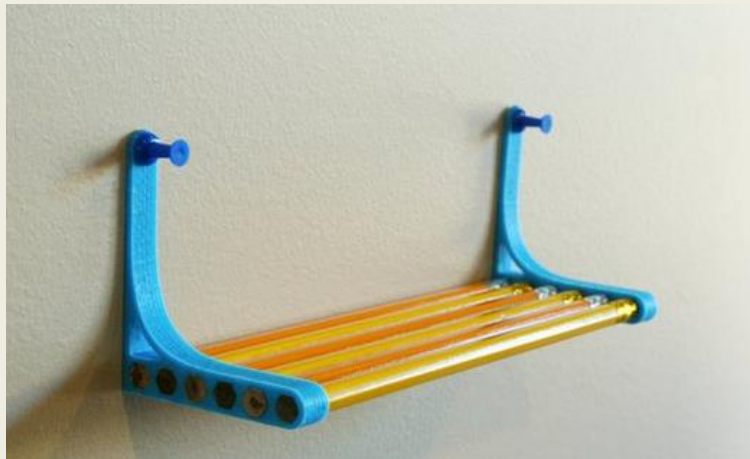
A 3D model of three red cylinders of different sizes, with a green 'DONE!' badge in the top right corner.



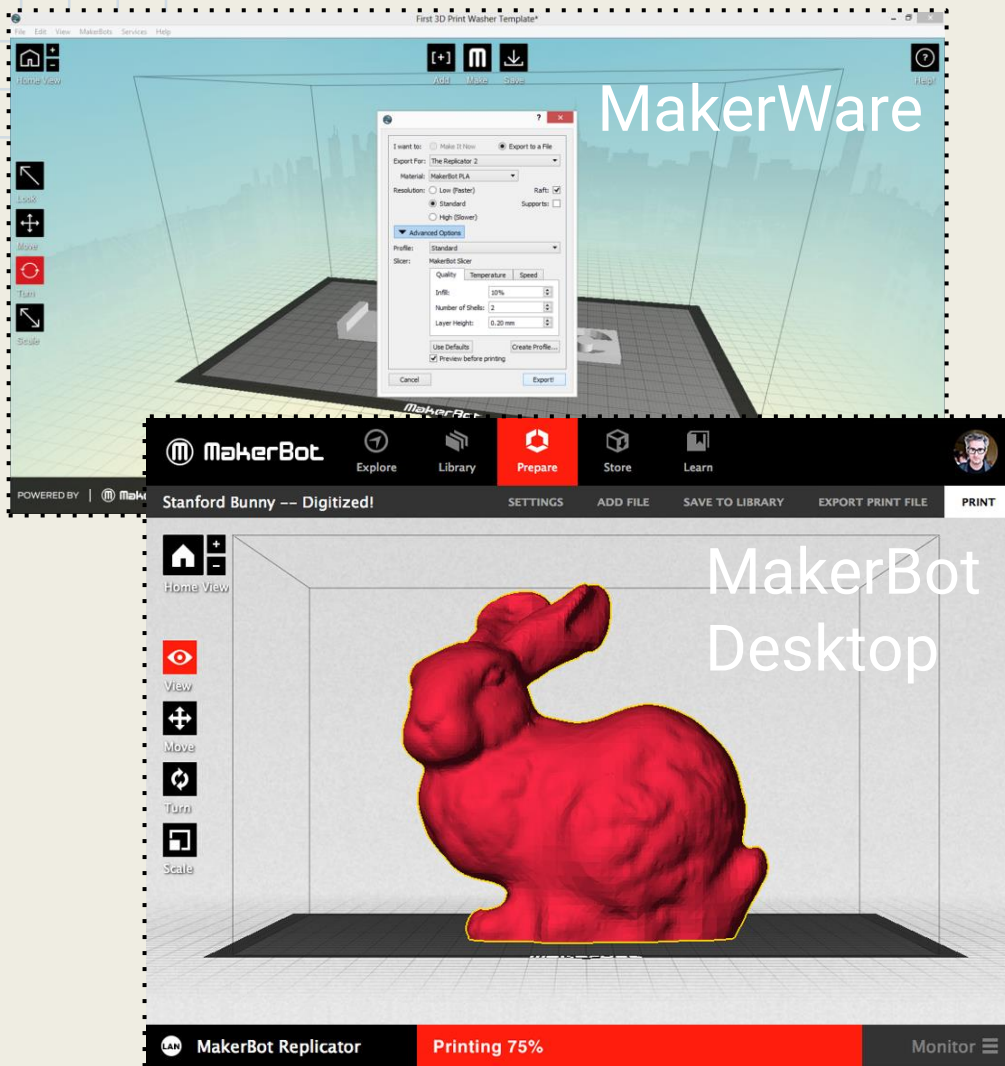
# Learning: Thingiverse



PRACTICAL ✦ EDUCATIONAL ✦ CUSTOMIZABLE ✦ FUN

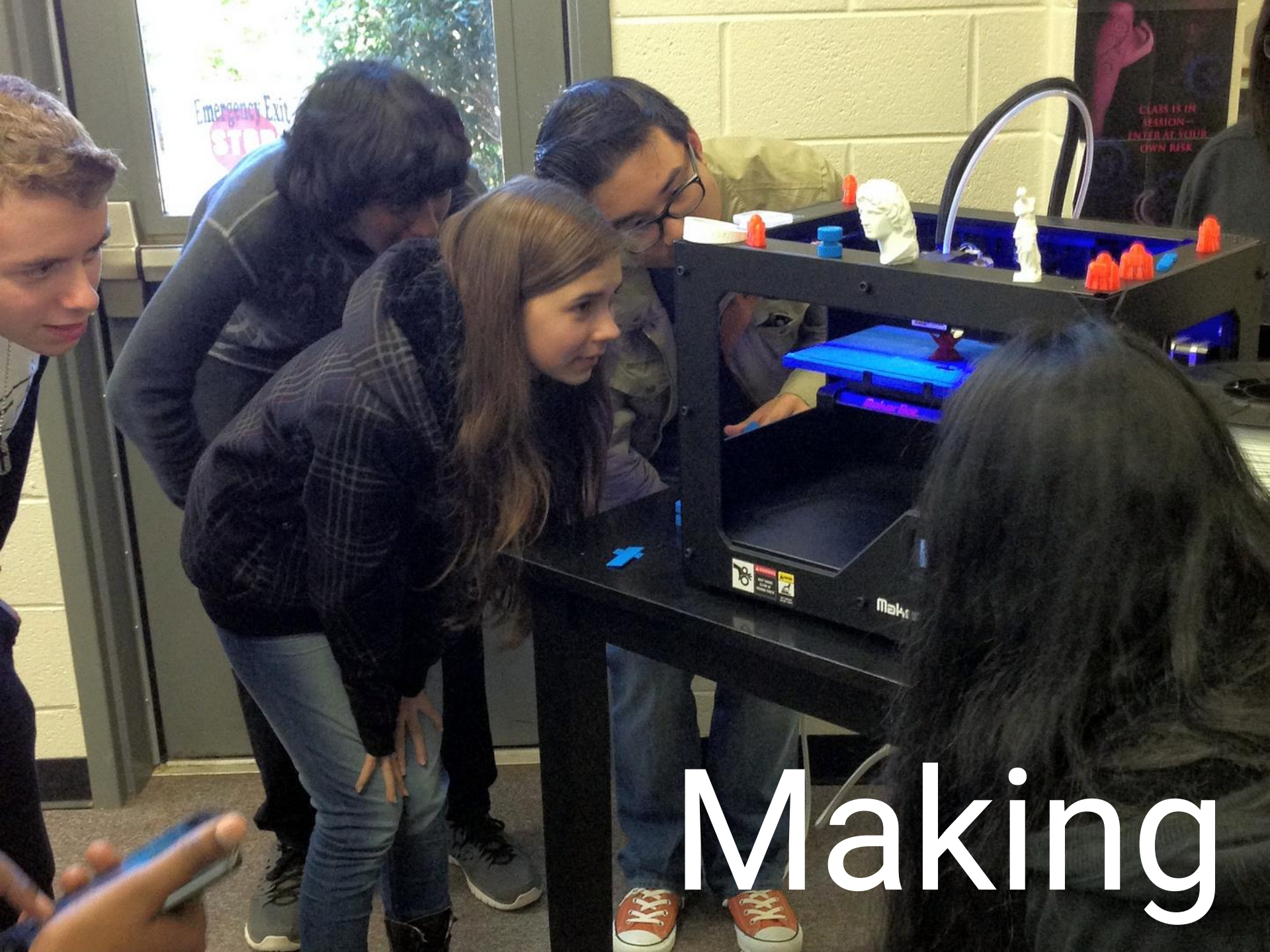


# Learning: MakerWare



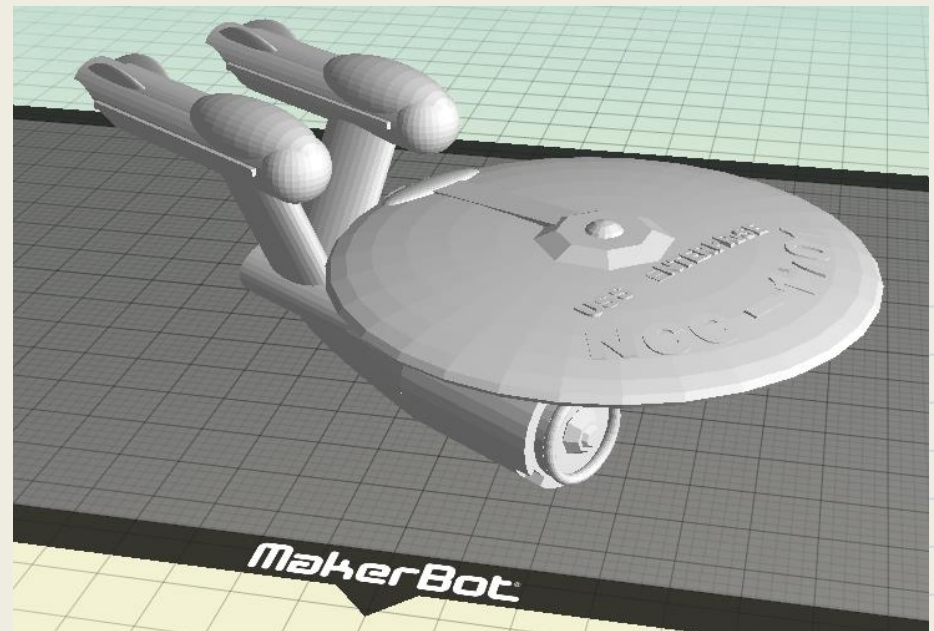
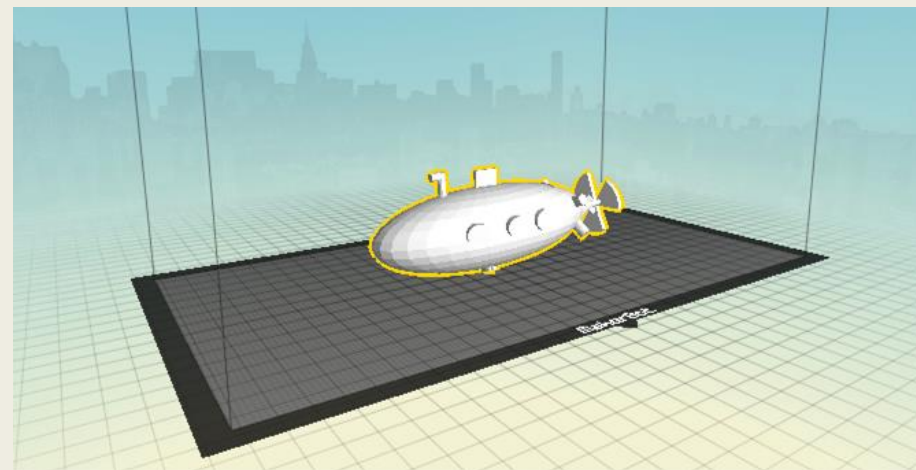
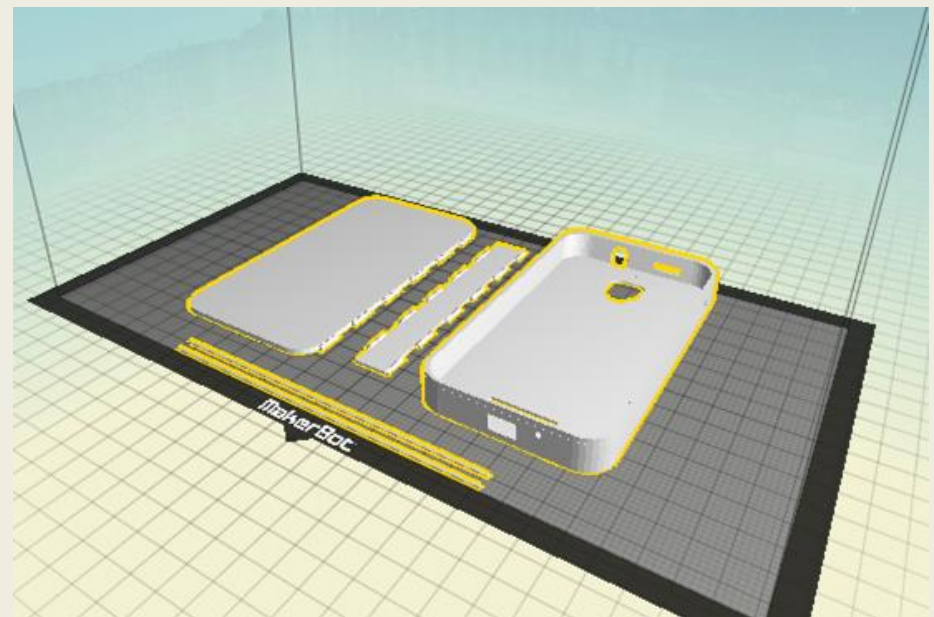
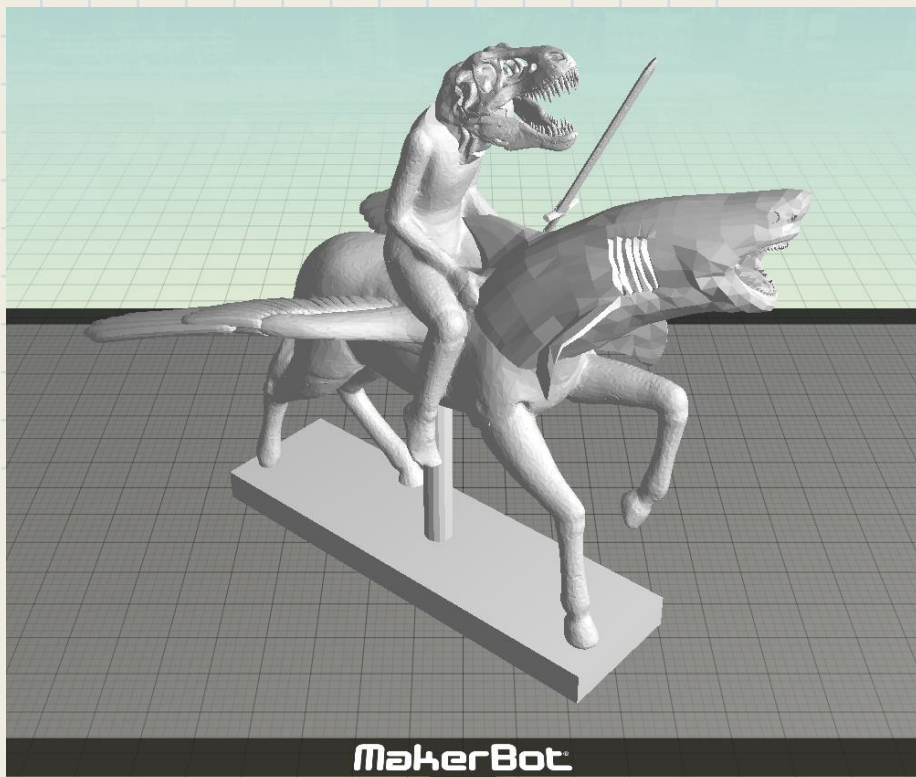
- Manage & Print 3D Designs
  - Scale
  - Orientation
  - Placement
- Default & Custom Profiles
  - Resolution
  - Fill
  - Speed
- Print Preview Management
  - Support Material
  - Rafts
  - Time
  - Material
- Print Status & Control





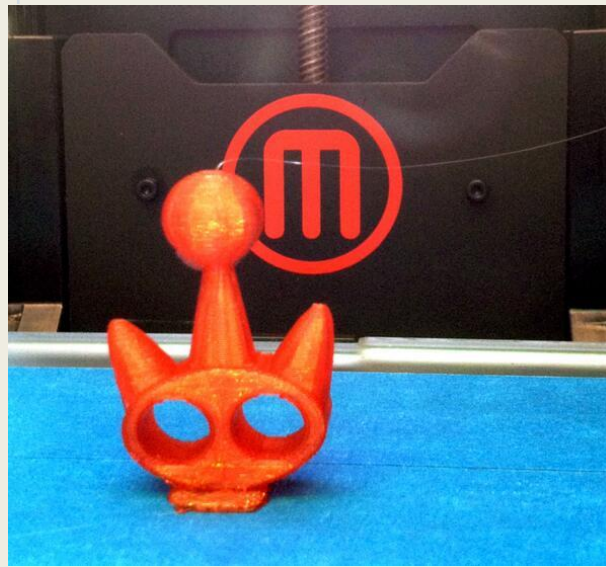
Making





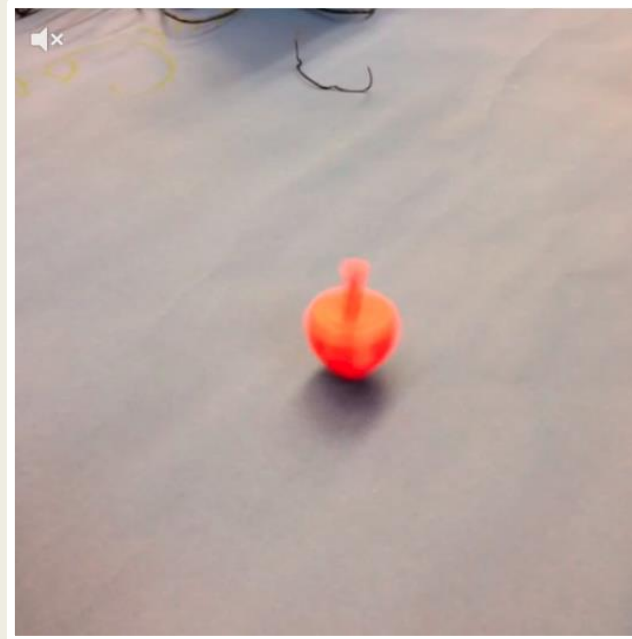
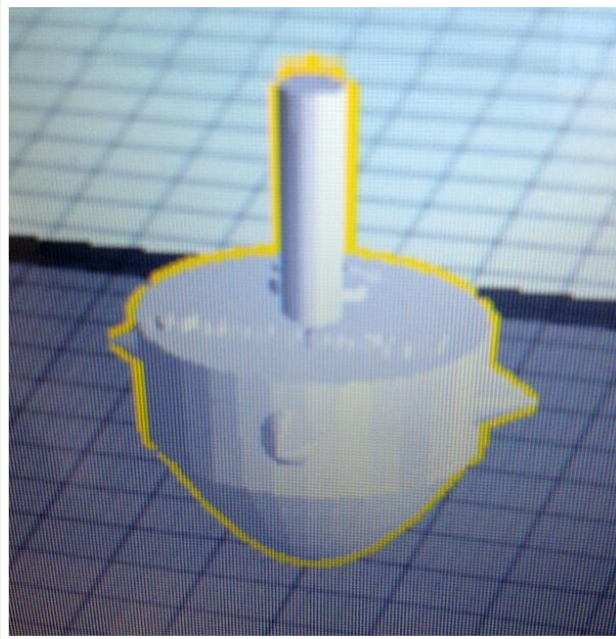
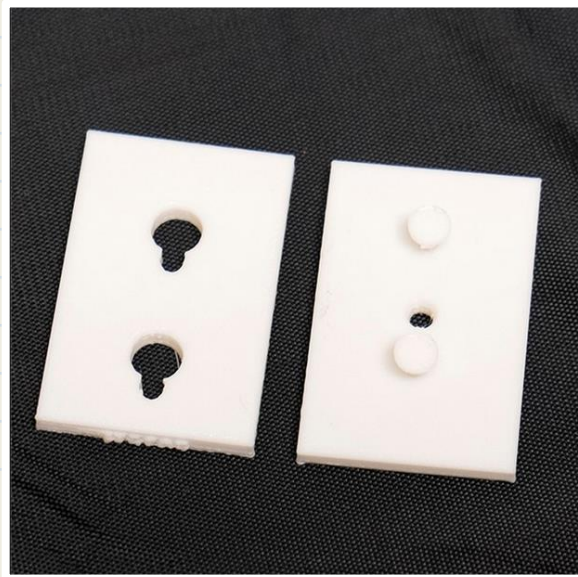
**Making: 3D Design**





**Making: 3D Printing**

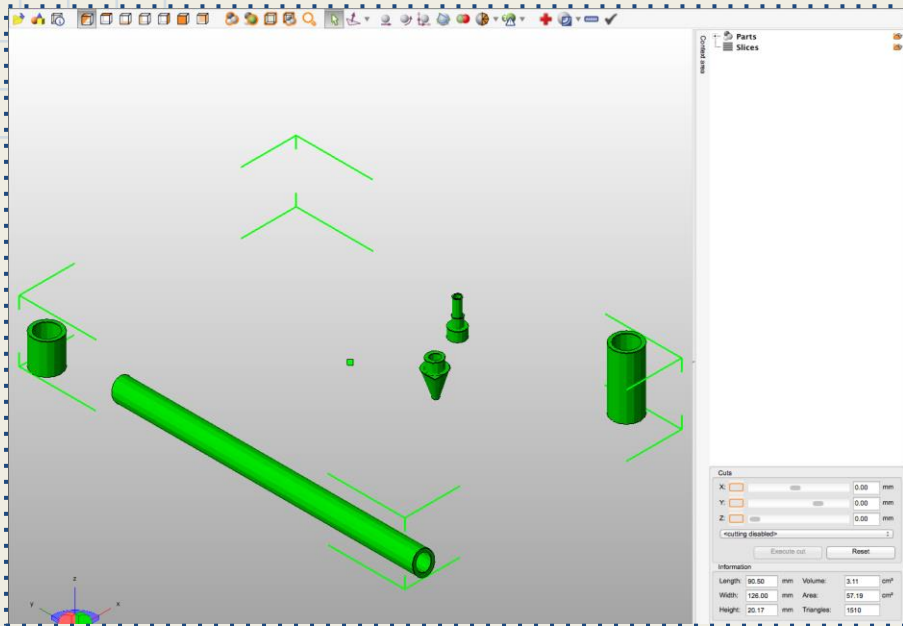




**Making: 3D Printing**



# Making: netfabb Basic & MeshMixer



## netfabb Basic

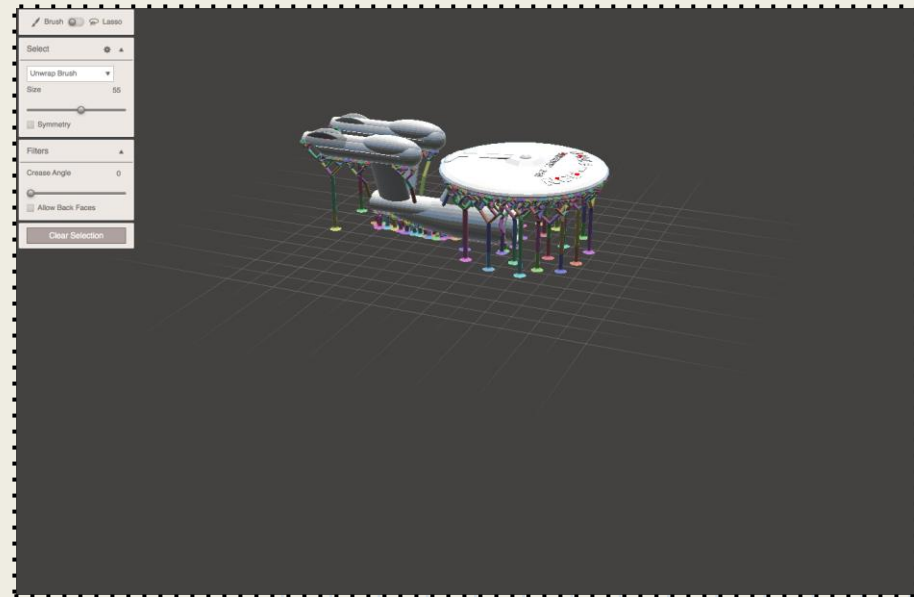
*Free, limited functionality*

Used to cut 3D Models into individual pieces for printing (x, y, z - axis)

## MeshMixer

*Free; full functionality*

Used to repair gaps in prints, create custom supports, and preview overhangs



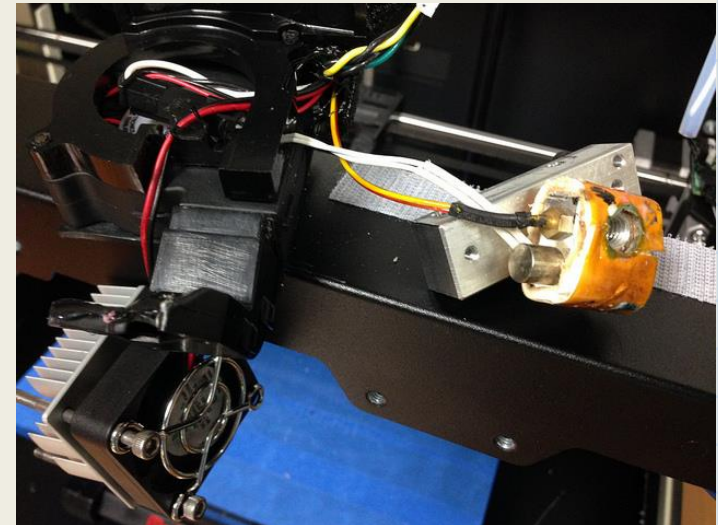
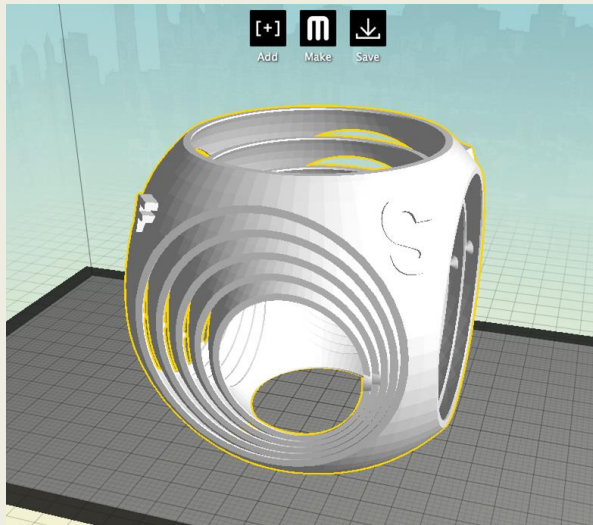
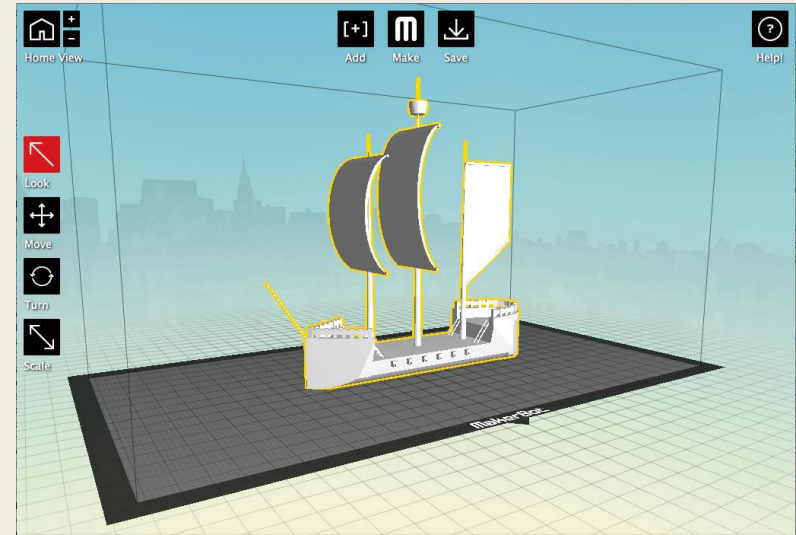
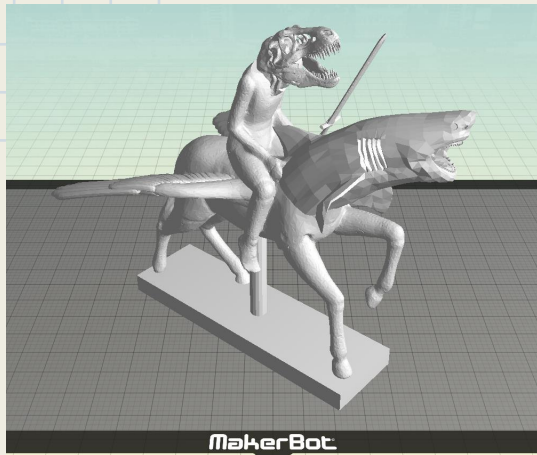
# Making:

## Making Other Stuff





# Making: Also...Learning





# MAKERCAMP RECEPTION





# Looking Outward...



## Chicago Public Library's Maker Lab

<http://www.chipublib.org/#/filter/make/make-at-cpl>

## Piscataway Public Library's Make it Yourself: MakerSpace

<http://piscatawaylibrary.org/MiY>



# Looking Forward...

- Expanded Access:
  - Technology for Teens
  - Early Education Tools
  - Retirement Center STEM Outreach
  - STEM - Focused Resources & Programs
  - Guided Creation through Production
  - Community Partnerships
  - Publically Accessible 3D Printing





- GCPL's MakerBot Guide
  - [lib.gwinnettpl.org/makerbot](http://lib.gwinnettpl.org/makerbot)
- TinkerCad
  - [www.tinkercad.com](http://www.tinkercad.com)
- MakerBot Thingiverse
  - [www.thingiverse.com](http://www.thingiverse.com)
- Buffy's MakerCamp Post
  - *Partnering for Possibilities*  
<http://bit.ly/WGFgQa>
- GCPL's MakerCamp Storify
  - <https://storify.com/stevelibrarian/gcpl-makercamp-1>

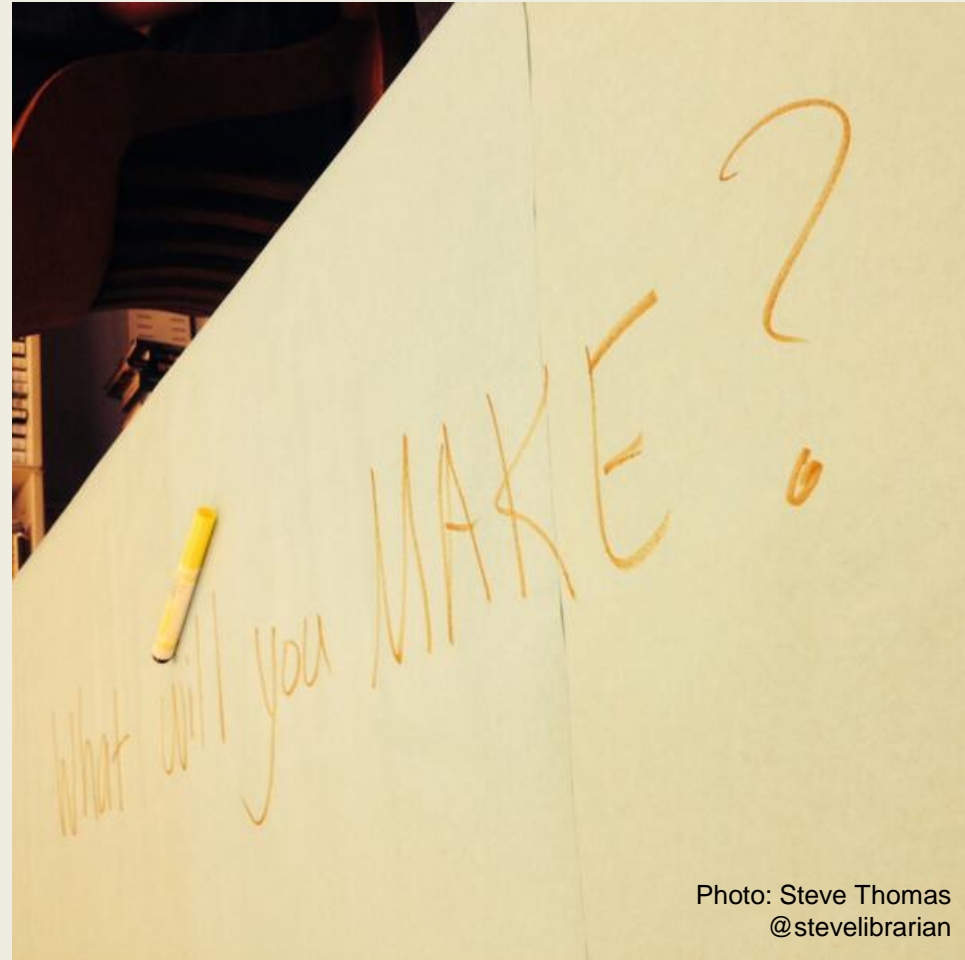


Photo: Steve Thomas  
@stevelibrarian

# Thank You!

# Questions

Presentation Link  
<http://goo.gl/JnypDZ>

Michael Casey - IT Director  
[mcasey@gwinnettpl.org](mailto:mcasey@gwinnettpl.org)

Christopher Baker - Training Manager  
[cbaker@gwinnettpl.org](mailto:cbaker@gwinnettpl.org)  
Gwinnett County Public Library