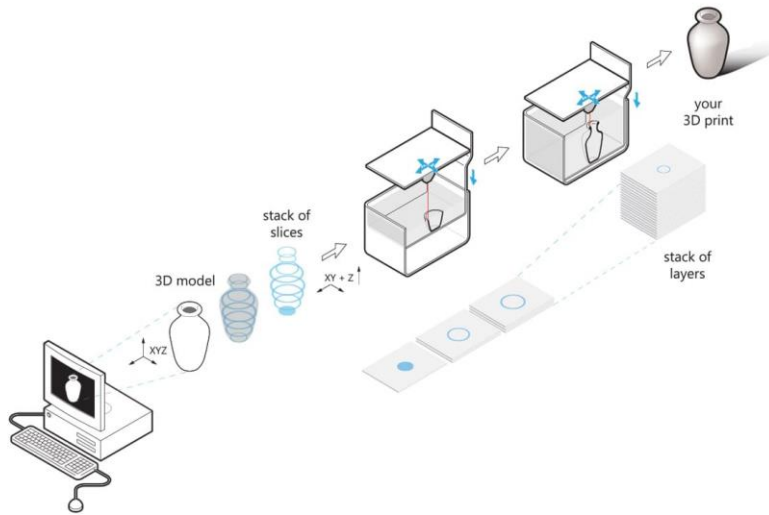




<https://prusaslicer.net>

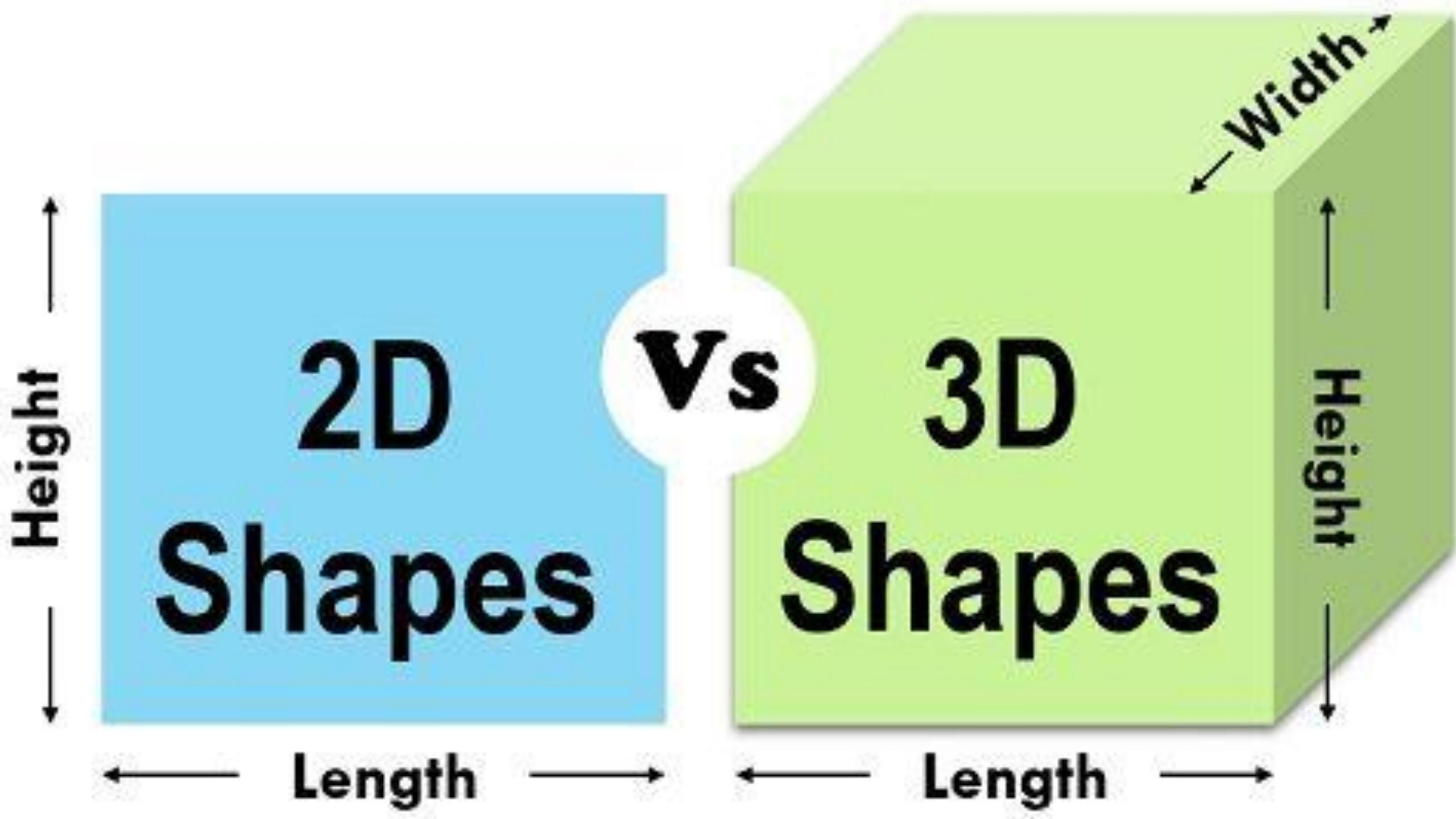
THE 3D PRINTING PROCESS

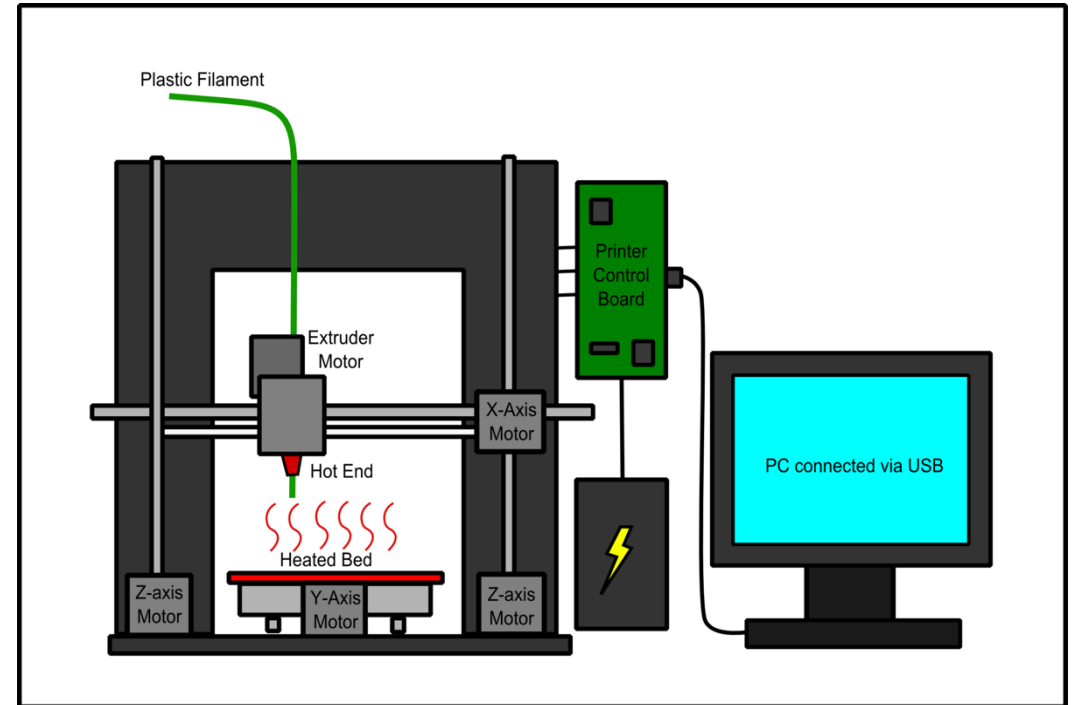


What is 3d Printing?

At its core 3D printing is about turning digital 3D models into physical ones with a few different methods.

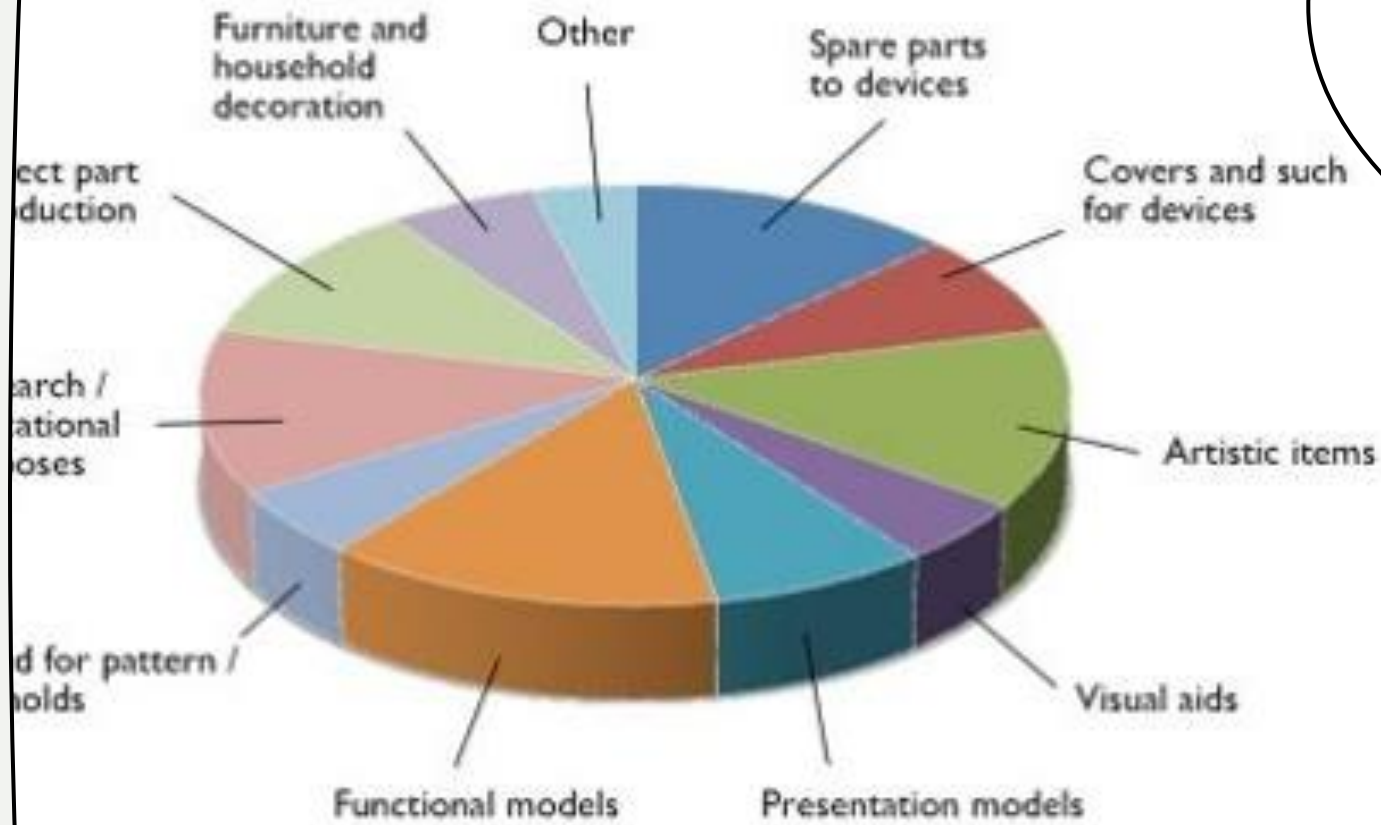
The most popular method being Fused-Deposition Modelling (FDM) which works by ejecting melted plastic along a predetermined path.





WHAT SOME 3D PRINTERS LOOK LIKE

For what usage do you use 3D printing?



WHY 3D PRINTING?

- It can save you money
- It's very handy when things break
 - Which can help create a more sustainable economy
- It can change how the world thinks and does manufacturing
- Extending modeling to non STEM fields for knowledge mobilization and new collaboration
- It's not going anywhere
- It has applications for nearly every job field



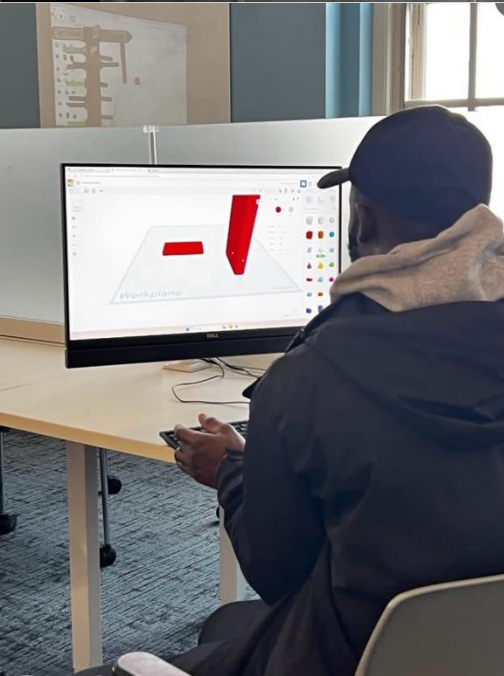
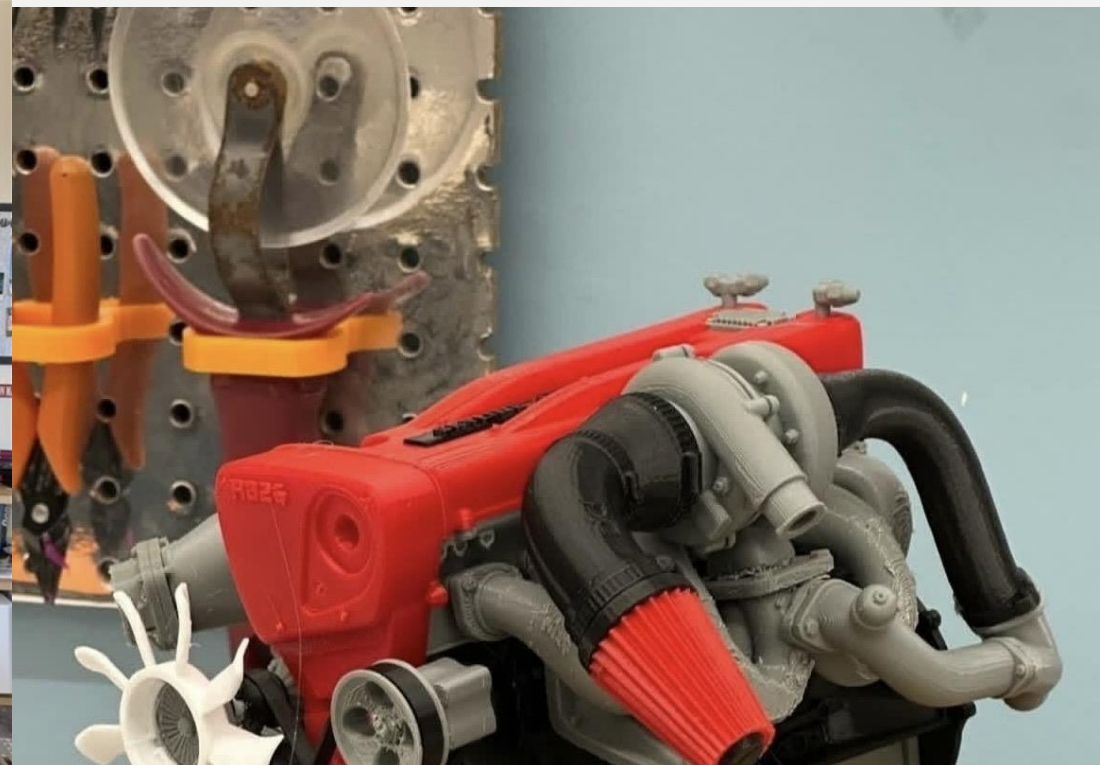
3D PRINTING IN EDUCATION: THE AGE OF CONSTRUCTIONISM

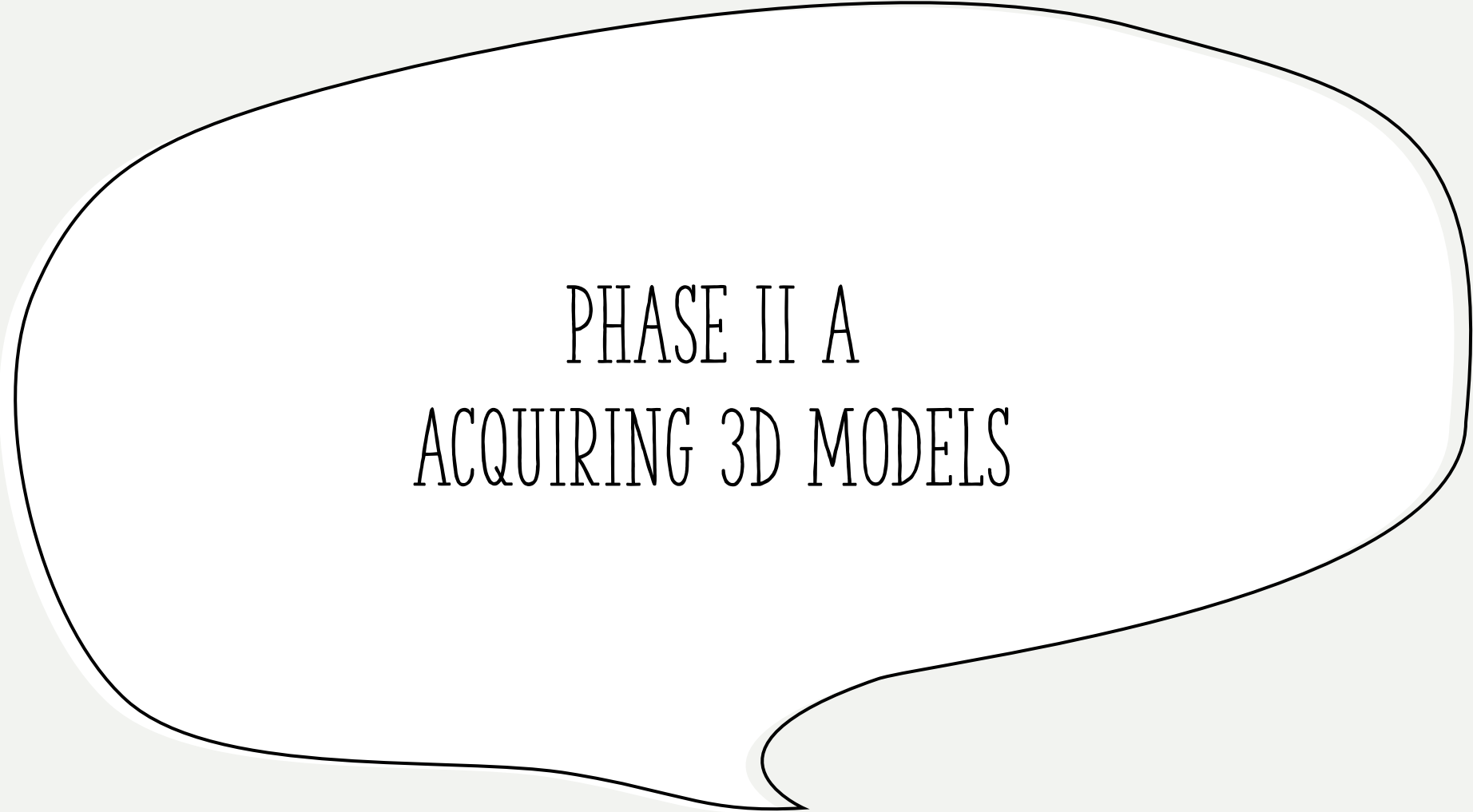
Seymour Papert's notion of constructionism (1991) extends Jean Piaget's (1954) constructivist learning model beyond evolving one's own knowledge through reflection and experience to physically manifesting this evolution through means methodical, intuitive, and social (Ackermann, 2001).



3D PRINTING IN EDUCATION: THE BENEFITS OF CONSTRUCTIONISM

- Creativity and innovation (problem solving)
- Digital literacy
- Spatial awareness, mechanical understanding
- Collaboration and communication
- Empowerment, resilience, and failing forward





PHASE II A
ACQUIRING 3D MODELS



MAKERBOT
THINGIVERSE

Design/Download/Modify

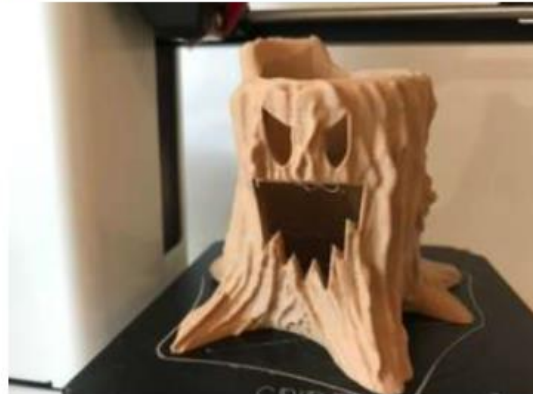


- Thingiverse
- Fusion 360
- Thangs 3D



Thingiverse

- Digital Design Platform - Open Source
- *Millions* of 3D models
- .STL downloadable
- <https://www.thingiverse.com/>





MAKIES COWBOY BOOTS



MAKIES_Short_CowBoy.

15 mb | Updated 11-11-2013 | 6915



Thing Details

1
Thing Files

2
Comments

3
Makes



MAKIES_Short_....STL



Makies Cowboy Boots

Download All

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under the C
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MAKIES_Short_CowBoy_Boots.S...

15 mb | Updated 11-11-2013 | 6915 Downloads

Download

search

Enter three or more characters

- Seasonal designs
- Sports & Outdoor
- Toys & Games
- World & Scans

File types

- All Types
- 3D Models
- G-code Print Files
- SLA Print Files

G-code filtration

- Prusa MK3/S/S+
- Prusa MINI / MINI+
- Prusa MK3S/S+ & MMU2S
- Prusa MK2.5/S
- Prusa MK2.5S & MMU2S
- More printers

 David Warboss



PRUSA

3D

FFF

Prusa Mini Base

801

4.6

5 435

 Frank Deschner



Designer Lithophane Moon Lamp

730

4.9

7 875

 Andrei



Bag Clip (PRINT IN PLACE CAM)

1035

4.9

19 090

 Ondřej Střiteský



Prusa Enclosure V2 - MMU2S

713

4.6

35 826

 DFV Tech



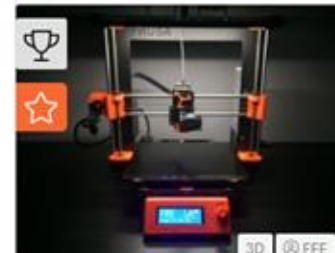
Charger Cable Organizer

949

4.8

12 035

 SethBon



LED Light Bar Prusa i3 MK2/MK3

671

4.9

3 566

Search Button

Prints Events Groups World Forum Blog Eshop

PRUSA PRINTERS

Phone/Tablet Stand - Flat fold - Print in place!

★★★★☆ 100 reviews (2)

You can now view this print job. Download it, print it and send for a notification.

Cherry Labs - Jonathan Add to collection

This phone/tablet stand is designed to be as universal as possible, print in place, and fold flat while being very...

100% 100% 100% 100% 100% Prusa MK3 & MK3.2

The print does not include a pre-sliced file, which is essential for displaying print times, etc. Share your own G-code in [User print files](#).

DOWNLOAD 5,326+

Like (100) Print a Make (1) Share (1)

updated 24. 4. 2019 | published 24. 4. 2019 | 10k views

Details **Files** Makes & Comments User print files Author Remixes Collections Related prints

Description

This phone/tablet stand is designed to be as universal as possible, print in place, and fold flat

STL/File location

Files 3 **Makes & Comments** 127 **User print files** 2 **Author** **Remixes** 2 **Collections** 307

Model files

↓ ALL MODEL FILES (7 MB)

stand_s.stl 3 MB uploaded 24. 4. 2019

stand_m.stl 3 MB uploaded 24. 4. 2019

stand_l.stl 3 MB uploaded 24. 4. 2019

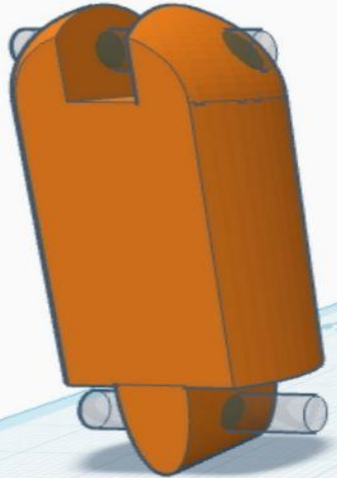
Download button

PHASE II B
TINKERCAD FOR CUSTOM
DESIGNS AND MODIFICATIONS

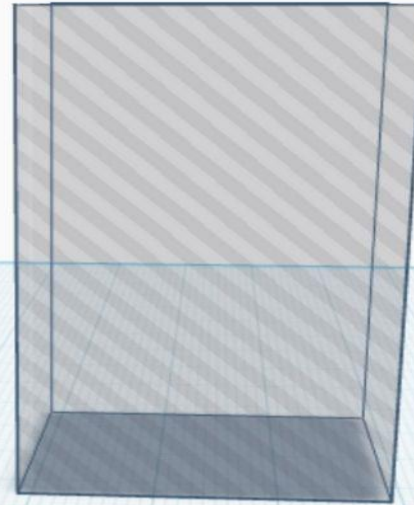
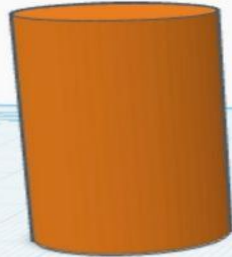
Building an articulated finger in Tinkercad

Dimensions in Length x Width x Height

Two:

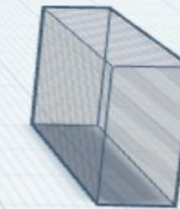


20x20x30



Two:

30x30x50

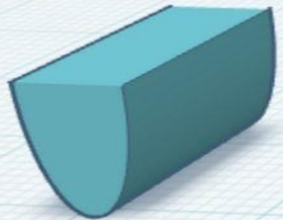


30x6x15



Two:

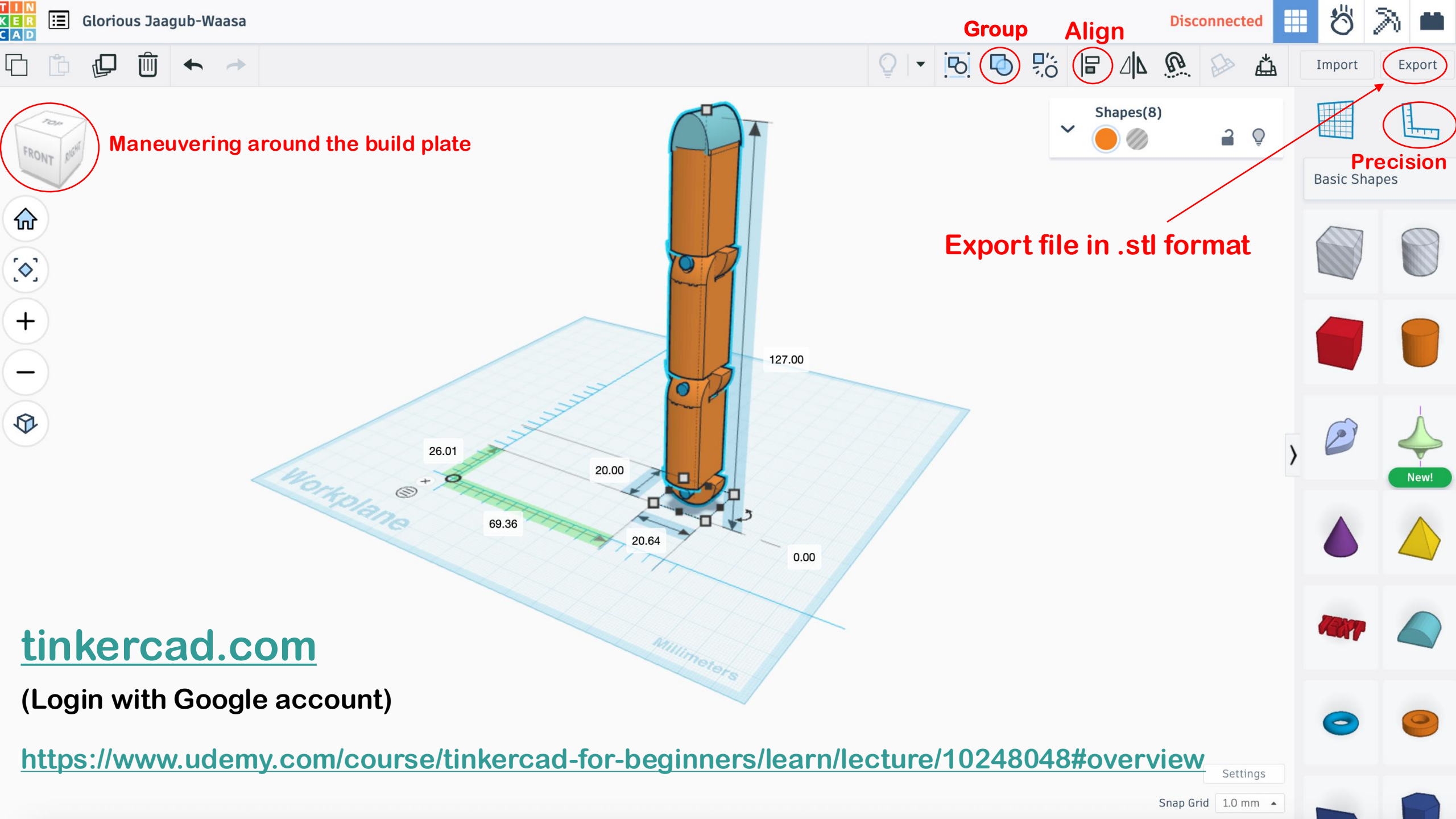
4x4x30



14x6x10



20x20x10



Maneuvering around the build plate

Export file in .stl format

Precision

Basic Shapes

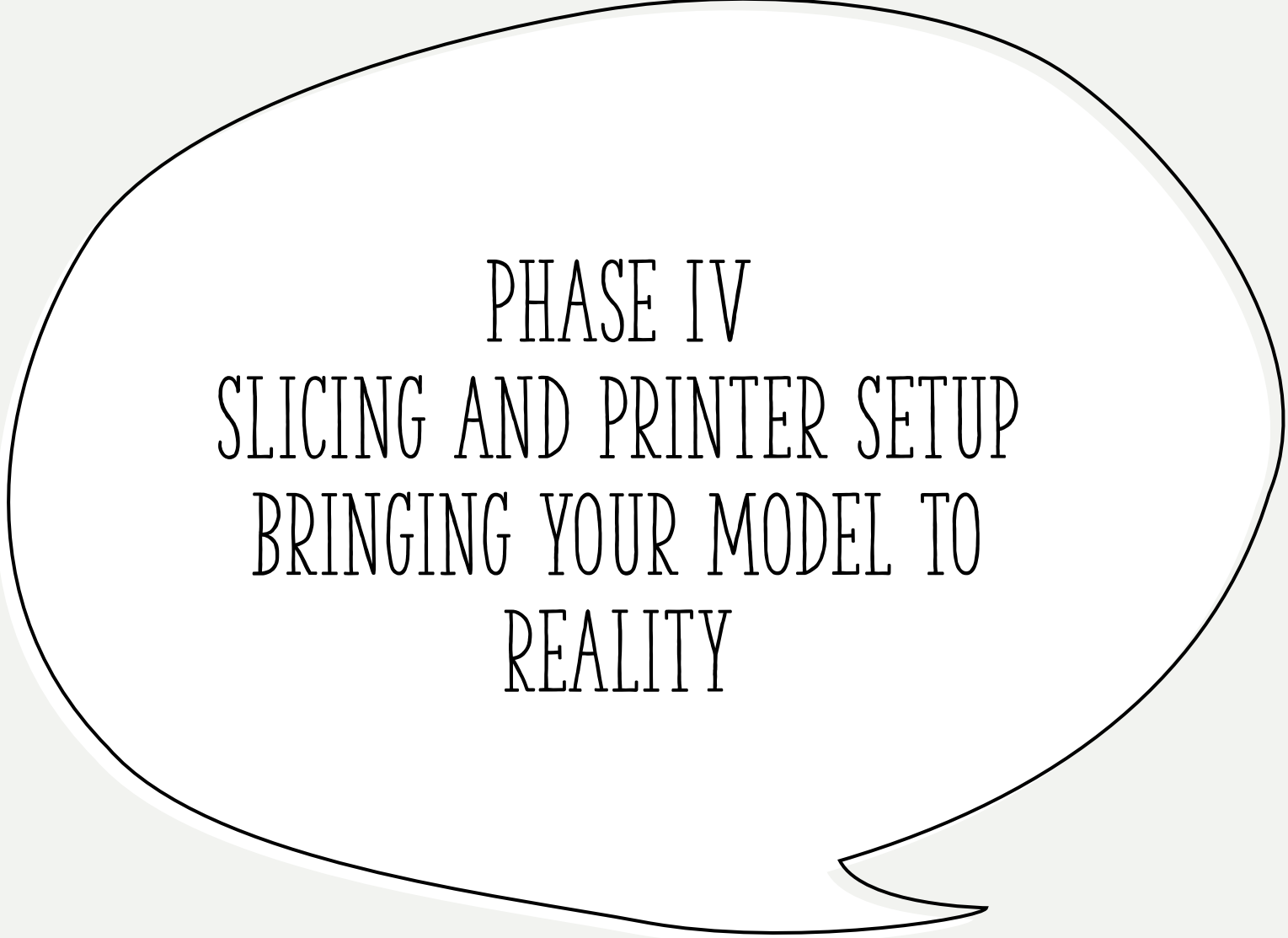
[tinkercad.com](https://www.tinkercad.com)

(Login with Google account)

<https://www.udemy.com/course/tinkercad-for-beginners/learn/lecture/10248048#overview>

PHASE III C
3D IMAGING





PHASE IV
SLICING AND PRINTER SETUP
BRINGING YOUR MODEL TO
REALITY



TIME TO SLICE! (WITH PRUSASLICER)



PrusaSlicer Icon

1

Locate & open *PrusaSlicer* on your computer. (Typically, the software should be found on the desktop of your computer)

2

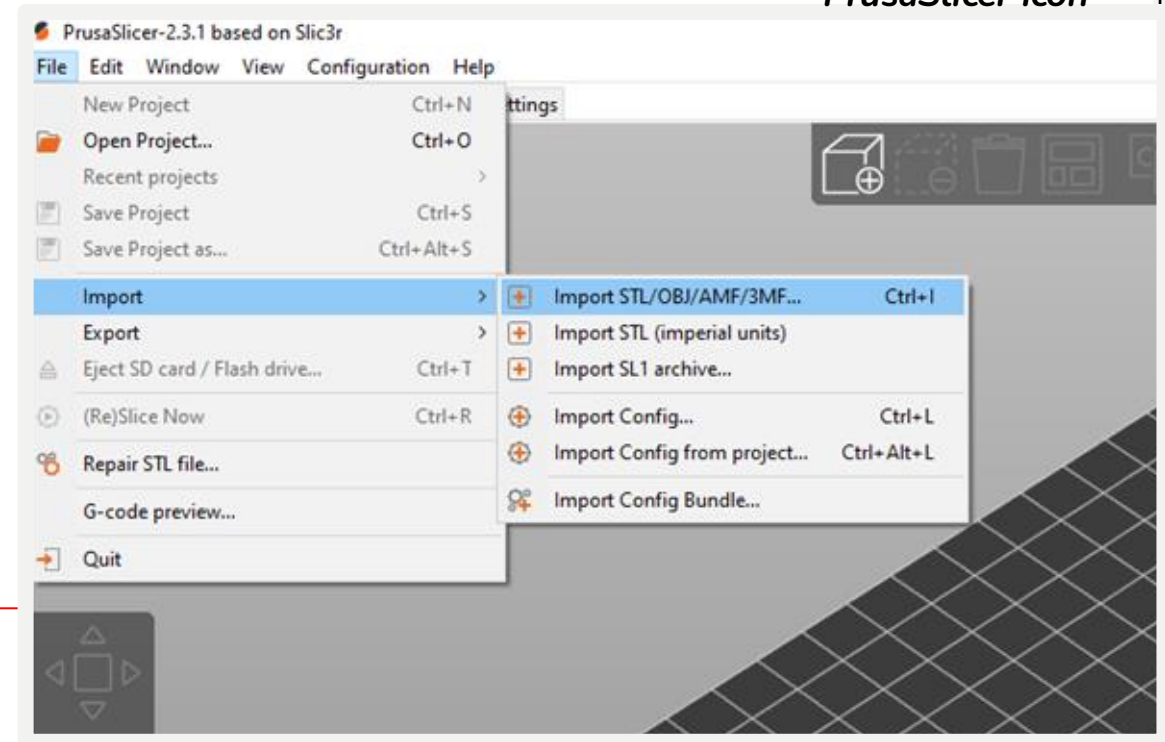
Locate 'File' in the top left corner of your screen

3

Hover your mouse above 'import' and select 'Import STL/OBJ/AMF/3MF...' This will open File Explorer.

4

Open your desired STL file



Visual example for 'Import' location in PrusaSlicer

The background of the image features a large, fanned-out stack of papers or documents. The papers are arranged in a semi-circular arc, with their edges creating a dense, overlapping pattern of various colors. The color palette includes shades of red, orange, yellow, green, blue, purple, and brown, giving it a vibrant, multi-colored appearance. In the lower-left foreground, there is a white, speech-bubble-shaped callout with a thin black outline. Inside this bubble, the text "THE PRUSASLICER INTERFACE" is written in a black, all-caps, serif typeface.

THE PRUSASLICER INTERFACE

PrusaSlicer File Edit Window View Configuration Help

Plater Print Settings Filaments **Printers**

Original Prusa i3 MK3S & MK3S+

System presets

- Original Prusa i3 MK3S & MK3S+
- Original Prusa MINI & MINI+
- Original Prusa MK4 Input Shaper 0.4 nozzle
- Original Prusa MK4S 0.4 nozzle

Add/Remove printers

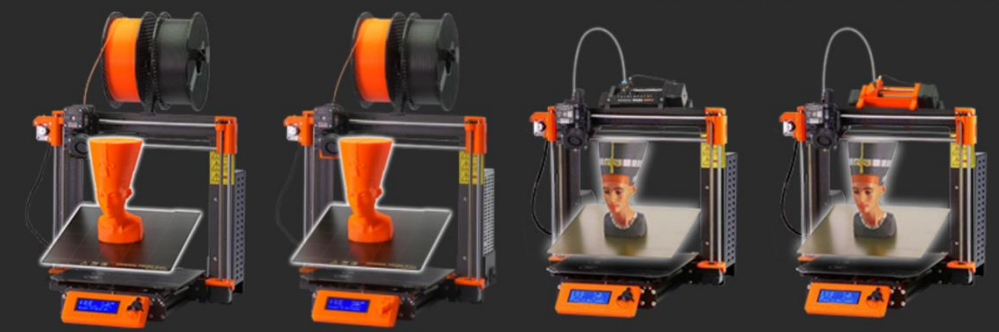
Dependencies

Capabilities

- Extruders:
- Single Extruder Multi Material:

MK3 Family

All standard All None



Original Prusa i3 MK3S & MK3S+

- ☒ 0.4 mm nozzle
- Alternate nozzles:
 - ☐ 0.25 mm nozzle
 - ☐ 0.6 mm nozzle
 - ☐ 0.8 mm nozzle

Original Prusa i3 MK3

- ☐ 0.4 mm nozzle
- Alternate nozzles:
 - ☐ 0.25 mm nozzle
 - ☐ 0.6 mm nozzle
 - ☐ 0.8 mm nozzle

Original Prusa i3 MK3S & MK3S+ MMU3

- ☐ 0.4 mm nozzle
- Alternate nozzles:
 - ☐ 0.25 mm nozzle
 - ☐ 0.6 mm nozzle
 - ☐ 0.8 mm nozzle

Original Prusa i3 MK3S & MK3S+ MMU2S

- ☐ 0.4 mm nozzle
- Alternate nozzles:
 - ☐ 0.25 mm nozzle
 - ☐ 0.6 mm nozzle
 - ☐ 0.8 mm nozzle

Prusa Research FFF Technology Printers

MK4 Family

All standard All None



Input Shaper

Original Prusa MK4S

- ☐ HF0.4 mm nozzle
- Alternate nozzles:
 - ☐ HF0.5 mm nozzle
 - ☐ HF0.6 mm nozzle
 - ☐ HF0.8 mm nozzle
 - ☐ 0.25 mm nozzle
 - ☐ 0.3 mm nozzle
 - ☒ 0.4 mm nozzle

Original Prusa MK4S MMU3

- ☐ 0.4 mm nozzle
- Alternate nozzles:
 - ☐ HF0.4 mm nozzle

Original Prusa MK4 Input Shaper

- ☒ 0.4 mm nozzle
- Alternate nozzles:
 - ☐ 0.25 mm nozzle
 - ☐ 0.3 mm nozzle
 - ☐ 0.5 mm nozzle
 - ☐ 0.6 mm nozzle
 - ☐ 0.8 mm nozzle
 - ☐ HF0.4 mm nozzle

Original Prusa MK4 MMU3

- ☐ 0.4 mm nozzle
- Alternate nozzles:
 - ☐ HF0.4 mm nozzle

< Back Next Finish Cancel

Plater

Print Settings

Filaments

Printers

Printables

0.20mm SPEED @MK4S 0.4 (modified)



Layers and perimeters

Infill

Skirt and brim

Support material

Speed

Multiple Extruders

Advanced

Output options

Notes

Dependencies

Support material

Generate support material:



Auto generated supports:



Overhang threshold:



40



°

Enforce support for the first:



0



layers

First layer density:



80

%

First layer expansion:



3.5

mm

Raft

Raft layers:



0



layers

Raft contact Z distance:



0.15

mm

Raft expansion:



1.5

mm

Options for support material and raft

Style:



Organic



Top contact Z distance:



Grid

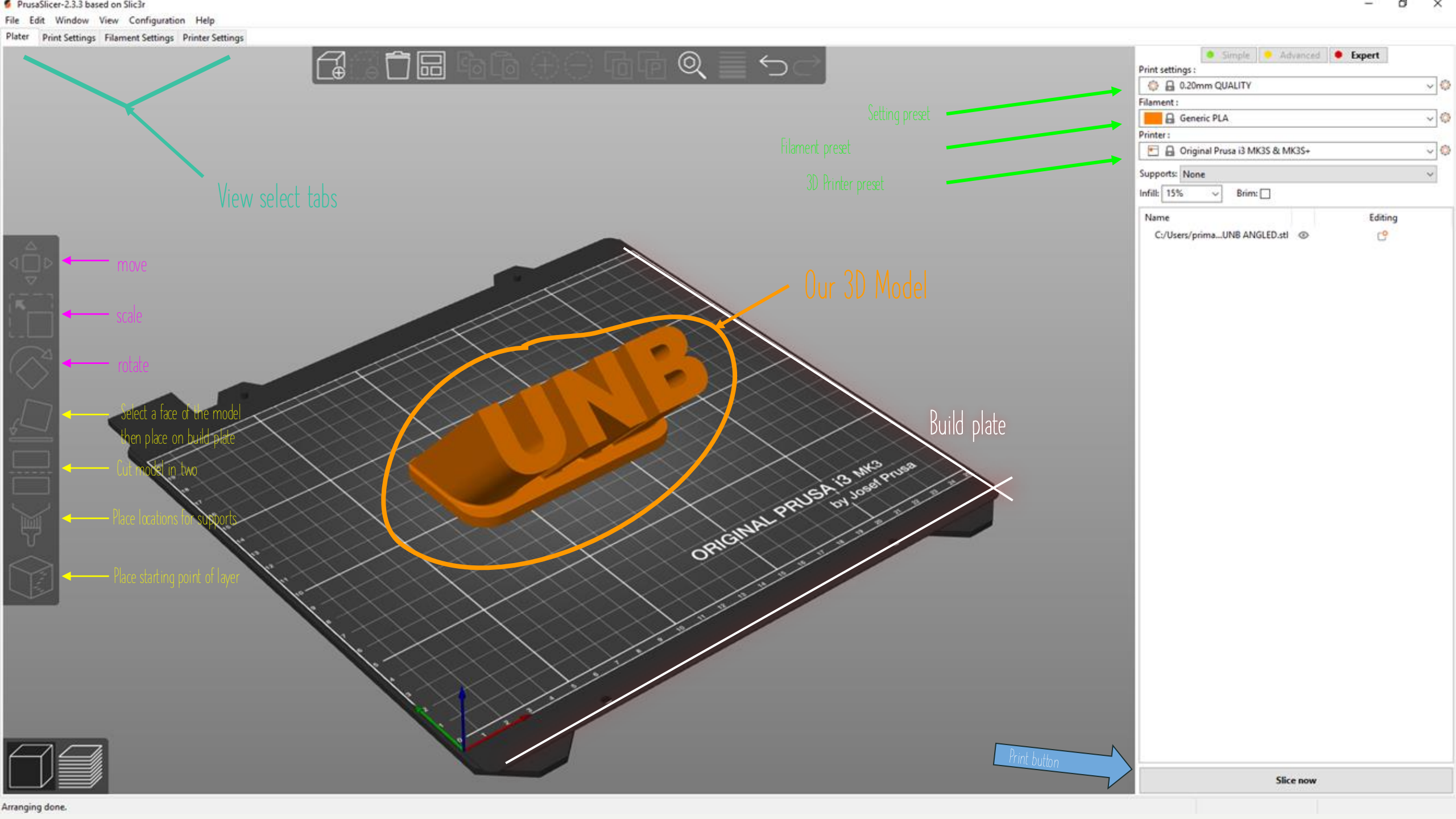
mm

Bottom contact Z distance:



Snug

mm



View select tabs

Setting preset

Filament preset

3D Printer preset

Our 3D Model

Build plate

Print button

Slice now



WHAT SETTINGS ARE GOOD?

Layer Height

- 0.2 mm is great for 90% of prints
- The lower the setting the longer the print (eg, 0.1 takes ~3X longer to print than 0.3)
- Time can be saved by printing .3 geometrically simple shapes like a box or container

Perimeters

- How many solid layers are on the outside of the print. Changes durability.
- 2 perimeters is good for most things that are for display or light use
- 3+ perimeters are often not needed except for specific mechanical parts like gears and connectors

Infill

- How much filler material is inside the model
- Stay between 8-20% unless your model is going to undergo *a lot* of mechanical stress

Brim

- Brims are good for very large parts with sharp point (box)
- And very small things that might need more to help hold them down to the build plate

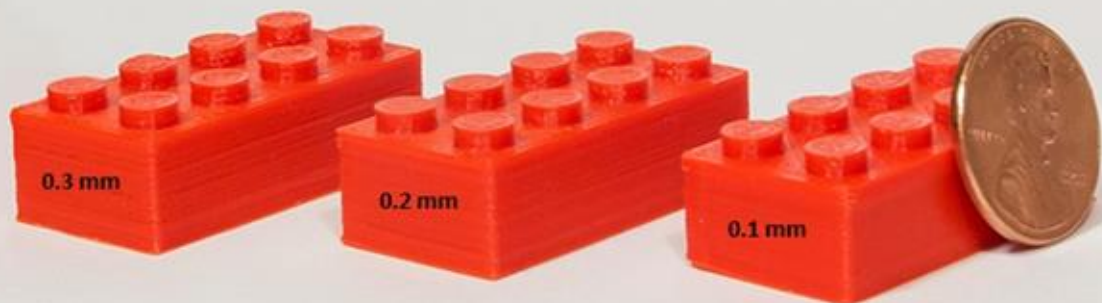
Supports

- Some geometries will require supports- in other words an additional part printed that can be removed afterwards. These are printed for *overhangs*, areas that don't have enough material underneath them to be printed on and require additional support
- Angles under 60 degrees can be printed reliably
- So a "T" would require supports, however an "X" or "O" would not

IMPORTANT 3D PRINTING SETTINGS



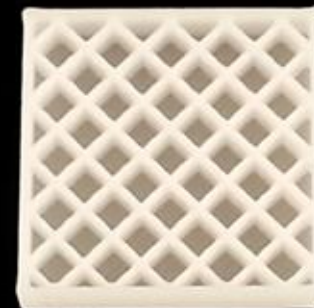
SOME VISUALS



Fill Density



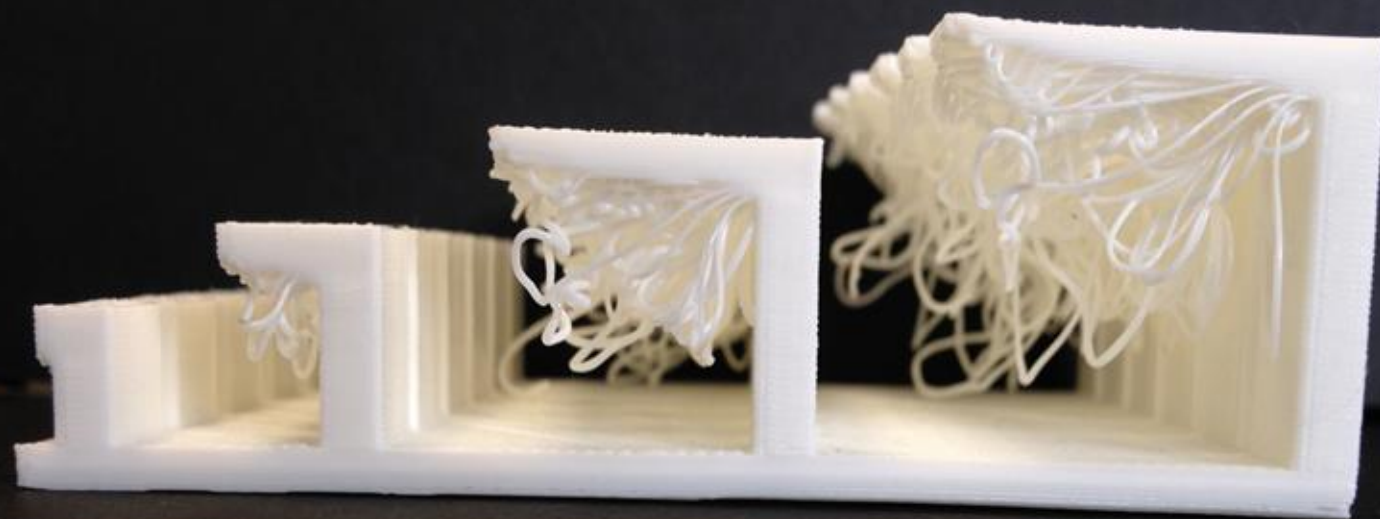
10%



20%



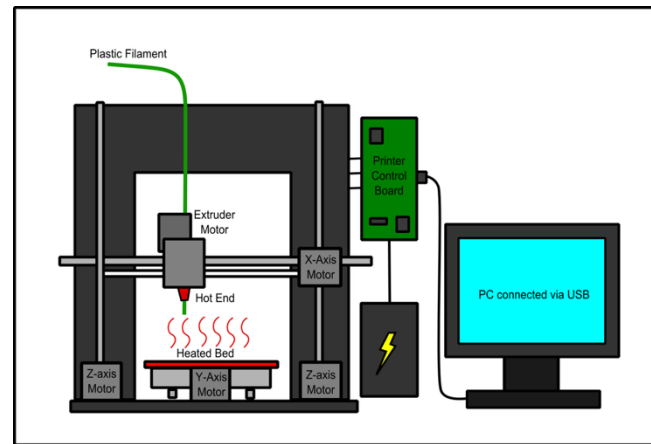
30%



Failed Horizontal Overhangs

TRANSFER MODEL

After you have adjusted your settings and sliced your model you can save the "gcode" file (print file) onto the one of the provided SD cards and bring it to a printer



PHASE IV
PRINTING



RUN THE PRINTER

- Insert SD into the printer
 - Printer will read automatically
 - Scroll to choose file
 - Press button to print
 - Sit back & relax!