

Lesson Plan: 3D Printing on Mesh

Ages: 14-18

Primary equipment needed: 3D Printer

Originally taught at: Pratt Institute STEP Program, Future of Fashion course

Total hours of class time: 2

Supplies

3d printer

PLA filament

Mesh - 6" square per student

Prep

- Open Blender and PrusaSlicer on all computers
 - In Blender, delete cube
 - In Prusa, set to inches
- Have flash drives in all computers
- Cut one 6" mesh square per student
- Turn on and preheat printers

Presentation + Demo (20 min)

Project time (90 min)

- Everyone picks a filament color
 - Make groups based on color choice
 - Can swap out colors if needed based on class preferences
- Set each group up with a computer
 - One person at a time makes their model, others watch and help
- People go one by one to print
 - While people are waiting, they can collaboratively use the 3d pens on dress forms

How To: 3D Printing Textiles

In Blender:

- Create shape
 - (top left corner of screen) *Add > Mesh > Cylinder*
 - Click *Add Cylinder* dropdown menu (bottom left corner of screen)
 - Edit *vertices* to customize your shape
 - 3 = triangle, 4 = square, 6 = hexagon, 30 = circle
- Select shape
 - Click *Modifiers* icon (wrench towards bottom right of screen)
 - *Add Modifier > Generate > Array*
 - Change *Count* to 6
 - Change *Factor X* to 1.2
- Select the newly created row of shapes
 - Click *Add Modifier > Generate > Array*
 - Change *Count* to 6
 - Change *Factor X* to 0
 - Change *Factor X* to 1.2
 - You should now have a grid of 36 shapes
- (top left corner of screen) *File > Export > .STL*
 - Select Desktop as export location
 - (at the bottom of the menu) change file name to *YourName.stl*

In PrusaSlicer:

- (top left corner of screen) *File > Import .STL/3MF... > Select your file*
- (right side of screen) check *Inches* box
 - Change *Size* of X to 3 inches (Y and Z should also change when you do this)
 - Click the little lock to unlock the scale
 - Change *Size* of Z to 0.04 inches
 - Use the following settings, except set *Printer* to either MK4, MK3, or Mini depending on which you will be using
 - (top left corner of screen) *File > Export .Gcode to SD...*

- change file name to YourName and Save
- Eject flash drive / SD card

On the Printer:

- Plug in flash drive / SD card
- *Print* > your file
- Watch and wait for 2 layers to print, then click Pause
 - Once you can see the start of each of the 36 shapes from your design, this means 1 layer has been printed. Note approximately how much time it took, and once the time elapsed is double that, 2 layers have printed and you are ready to pause it.
- Once the print head has moved out of the way, place the mesh on the print bed, centered on top of your print
- secure the corners with magnets so mesh lies flat
- Resume print