

## Pacific Lutheran High School 3D Printing Club Guidelines / Activities

### **Preliminary Steps**

1. All 3D Printer Users must have a signed MakerSpace Form on file in the school office in order to use the 3D Printer.
2. Students should have the Printing Guidelines Form and review it for school use of the 3D Printer.
  - a. SD cards are in the school office and should be checked out with Mr. Fitzgerald.
  - b. When you get your SD Card in the school office, you should list what you are printing and give the date/time.
3. Students should join the Google Doc 3D Printing Group by giving their e-mail to Mr. Fitzgerald or Mr. Young.

### **3D Printing/Objectives**

Pacific Lutheran Jr./Sr. High School has an approved 3D Printing Advisor, Mr. Neal Young, who comes to campus twice a month to teach 3D Printing theory, answer questions, explain uses for the technology, etc. These club meetings occur every two weeks on Wednesday in the Maker Space Room. The meeting dates for the 2016-2017 school year are: March 8, March 22, April 5, April 19, May 3, May 17, May 31<sup>st</sup>

**There are several goals for the club and they are listed below.**

Step One – Students print an existing file provided by Mr. Young or Mr. Fitzgerald.

Step Two – Students find an existing 3D file online, convert it to a gcode file and print this object.

Step Three – Students design their own 3D Print, convert into a gcode file and print this.

Step Four – Students identify a problem that needs to be fixed on the campus of PLHS and solve it with a 3D Print they complete.

### **Printing Guidelines Step by Step**

1. Search and choose a piece – pick two or even more from which you will choose one.
  - a. Sources for pieces. Use the links in the 3D Printing Google Doc.
  - b. Make a reasonable choice – something small, small file size, single piece, etc.
  - c. Format of the piece file - .stl., .obj, .amr
2. Download – Caution! Make sure that your choice is for the file and not an AD.
3. Open Cura and open your downloaded file(s)
  - a. Evaluate each of your candidates – dimensions, time to print, material
    - i. Remember you can scale your print to be larger or smaller and this will affect print time and material requirements.
  - b. Process
    - i. Choose Fast, Medium or High Quality – note the change in print time and material requirements with each.
    - ii. Choose the material (we only have PLA)
  - c. Save
    - i. Naming Convention – Printer displays only 15 characters. First two or three letters should be your initials
  - d. Request the SD card (school office) and copy your file to it.
  - e. Insert the SD Card into the Printer and select and print your file!
    - i. Mr. Fitzgerald, Ryan Lyu or Mark Macrunnel should assist with the start of the print.
    - ii. It will take a few minutes to start printing.
    - iii. As the carriage moves toward the center, pull away the initial filament ejection (fuzz). Touch only the filament. **DO NOT TOUCH THE EXTRUDER.**
    - iv. Watch it print each layer for as long as you have the time.
  - f. Take your piece.
    - i. The piece is not to be removed from the printer until the extruder and the print table have cooled. This takes a few minutes.
  - g. Return the SD card to the office.