



PROJECT:
JABER

3D Printed Nasopharyngeal Swab

A guided tutorial

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Materials Required

- **3D Printer:**

The 3D printer that is used needs to be an FDM (Fused Deposition Modelling) capable of printing with PLA filament. This form of printer is the most common in the market and is very affordable compared to 3D printers that use other types of technologies. Prices for 3D printers start below \$200 USD and are readily available online. Before choosing a 3D printer, be sure to read online reviews about its reliability as you will be running it continuously, this is to avoid downtimes due to maintenance.

i *Our Set Up*

While we used many different printers donated by volunteers, the most common type used has been a PRUSA MK3S.



These printers can be found at:

<https://shop.prusa3d.com/en/3d-printers/181-original-prusa-i3-mk3-3d-printer.html>

- **PLA Filament:**

Polylactic Acid Filament is one of the most used bioplastics in the field of 3D printing, also known as additive manufacturing, today. PLA is a thermoplastic aliphatic polyester derived from renewable resources, such as corn starch. It is approved by US Food and Drug Administration (FDA) for human use, and has been applied clinically in areas such as drug delivery systems, sutures, tissue engineering, bone implants and screws, vaccine antigens, temporary and long-term implantable devices, and is constantly expanding to new fields. This is owed greatly to the polymer's favorable biocompatibility and its safe degradation products.

The PLA filament you need would come in rolls ranging in weight between 500-1000g. Be sure to get the filament that matches the thickness requirement of your 3d printer. Also try to get a filament that has no unnecessary additives. Before purchasing your filament, try to find reviews about the quality and the consistency in the filament thickness. Good quality filaments fail much less which should definitely reduce your down time

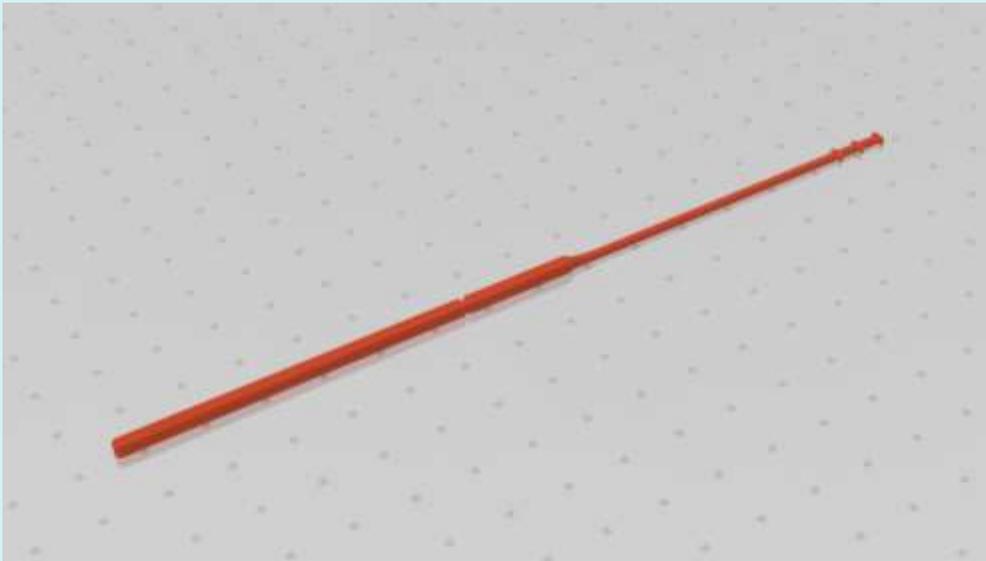
Step 1 – Download

- Start by downloading your 3D models which are in an “.STL” format from the following link:

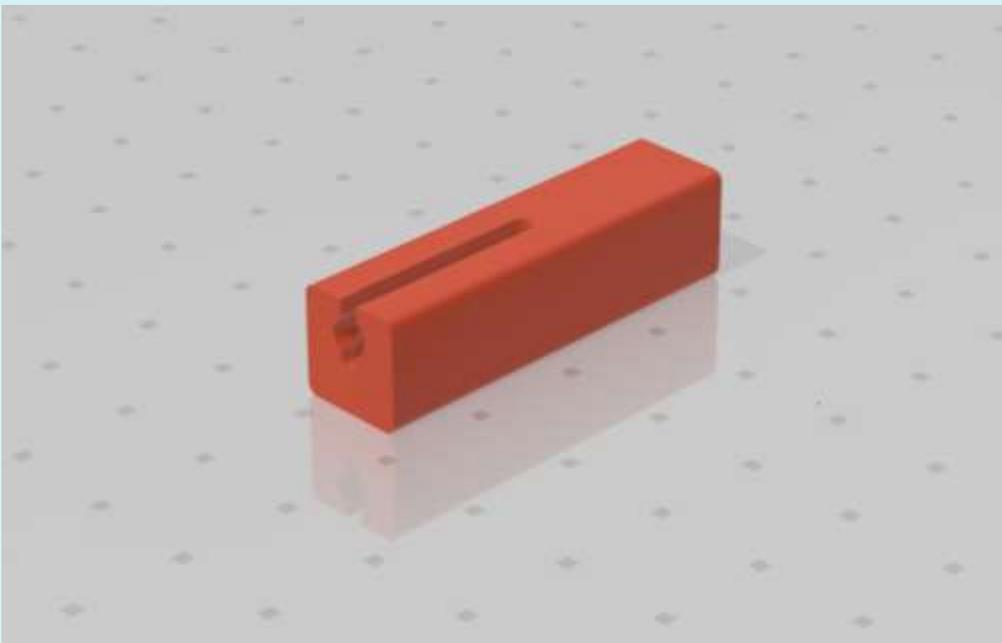
<https://projectjaber.com/adult-swabs/>

Here you will find 2 files, one for the Nasopharyngeal Swab, the other for Swab polyester roller aid.

i Visualization of the .STL file of the Nasopharyngeal swab.



i Visualization of the .STL file of the nasopharyngeal swab polyester rolling aid.

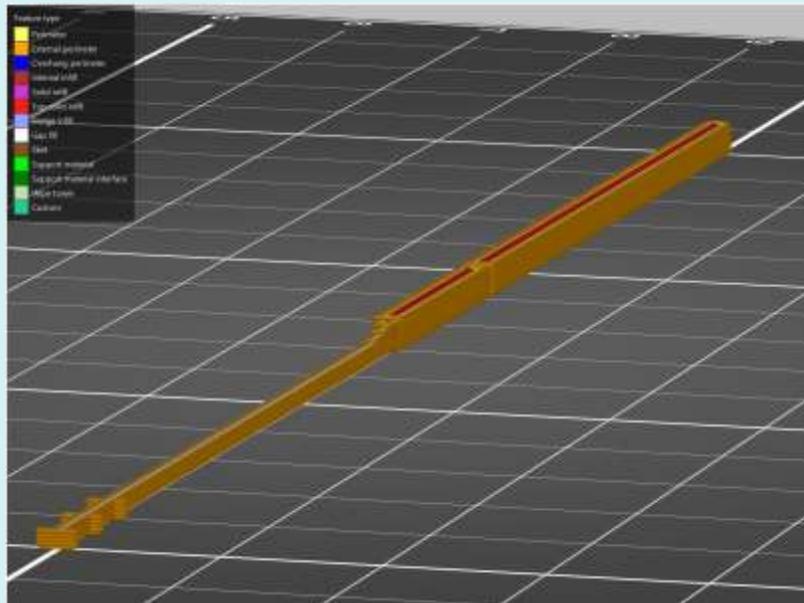


Step 2 – Slice

- Now you need to import your “.STL” files into a slicing software. The job of this software is to turn the 3D models into “gcode”, a language 3D printers can understand. It does this by ‘slicing’ the 3D model into thin layers that will give the printer exact instructions on how to build it. The slicer must be fed a specific list of parameters that will determine things such as the speed and resolution you will print with. These are the parameters we recommend to maximize your output:

Print Settings	
Layer Height	0.25mm
Infill	100%
Filament Material	PLA
Rafts	No
Supports	No
Orientation	Laid flat on back

i This image shows how the swab should be oriented on the print bed. It also shows how the model has been ‘sliced’.

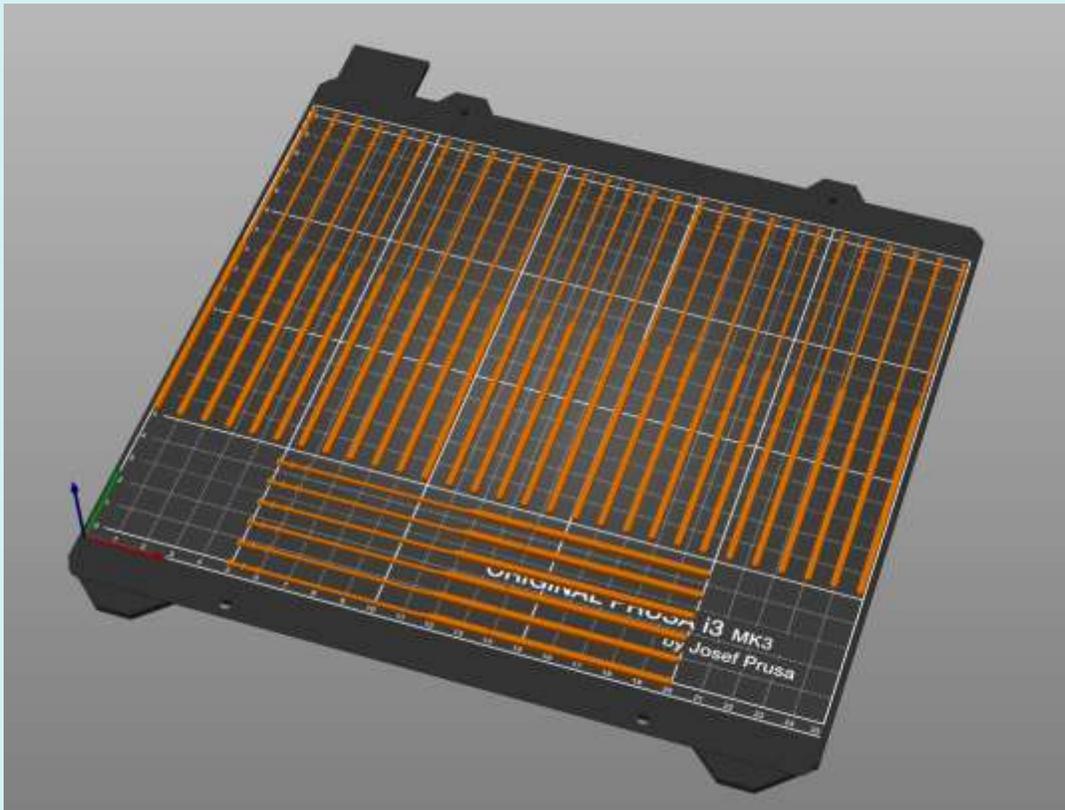


- When it comes to the nasopharyngeal swab polyester rolling aid, the amount produced will be a function of how many people you have to do the rolling at a time. Since you will be printing much less of these, you may choose to use different print settings, but this is not important.

Step 3 – Print

- To produce the swabs efficiently, it is better to produce them in large batches as shown below. Different printers have different sized beds, which will determine how many swabs you may print. This in turn will determine the print time.

i In our case we fit 60 swabs on the Prusa MK3S build plate. With these settings, you should be able to produce around a swab every 3-4 minutes or more than 400 swabs per day per printer.



- After the print is done, scrape all the swabs from the print them in a dry place so that they do not become brittle due to the humidity.

For any questions or concerns, please do not hesitate to contact us at info@projectjaber.com