

Preparing the printer

If the filament doesn't fit in the spool compartment, then use the screw in the wall above the machine.

To unload filament (if you want to switch colors):

On the printer's touch screen, select **Tools >> Filament >> Unload**. You'll then hold down the spring lever on the side of the extruder and pull out the filament.

To load new filament:

1. Thread the filament through the intake tube, but don't connect the tube yet.
2. On the printer's touch screen, select **Tools >> Filament >> Load**
3. Insert the filament into the intake hole until the little gears inside take over.
4. Look to see if hot filament starts to exit the nozzle, and *then* click **Done** on the touch screen.
5. Excess filament will leak out for a minute – that's OK. Just wait for it to finish.

ALWAYS protect the plate with masking tape – otherwise, if your printed design sticks, then it might need to be broken to remove it!

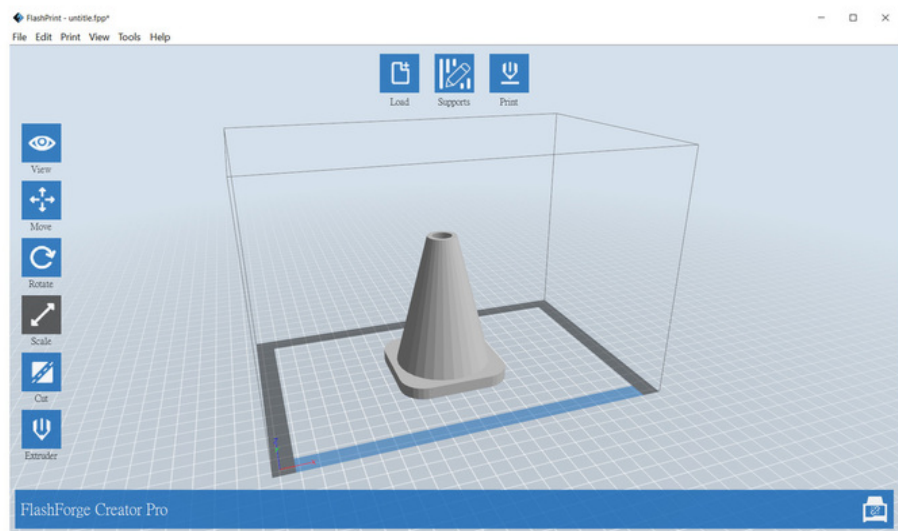
When the machine is heated, do NOT touch the nozzle, or freshly extruded filament. It will feel like touching a hot glue gun.

Preparing your 3D designs with FlashPrint

In Tinkercad, export/download as an **.stl** file

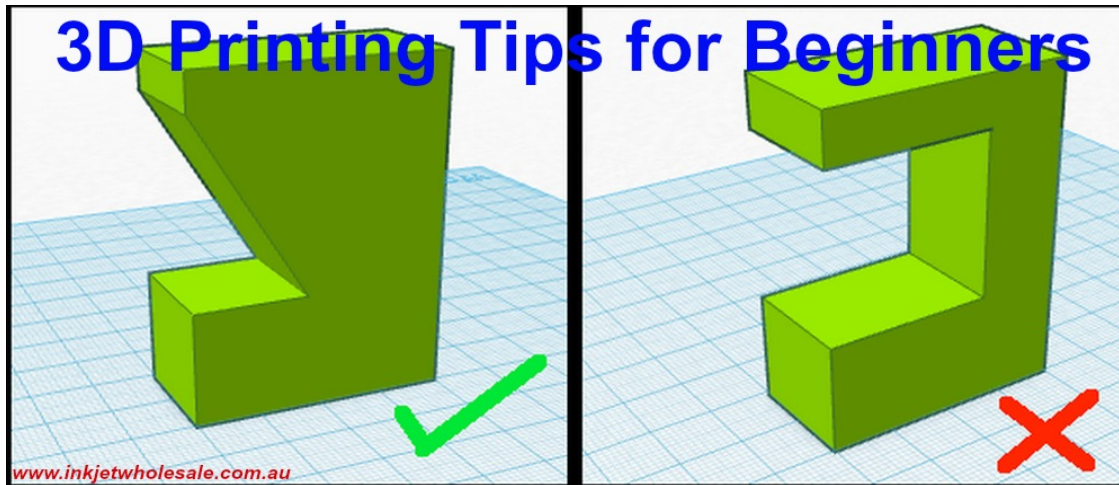
FlashPrint is the software on your computer where you will prepare your design for printing.

Size limit: 5.5" x 5.5" – it's best not to make it too large, as it will drastically increase printing time.



You change right-click+hold to manipulate the 3D view.

Your design will print layer-by-thin-layer, from the bottom. The bottom plane in FlashPrint is referred to as the “platform”.



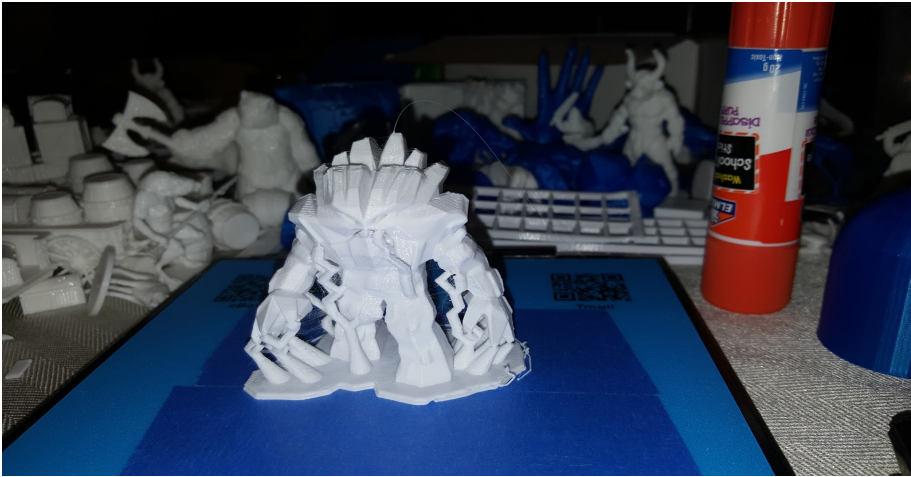
Overhanging parts will cause the filament to fall to the bottom of the printing bed.



The solution is to create supports. Flashprint will do this automatically.

Supports >> Supports Options: this will allow you to select between **linear** and **tree** supports.

Tree supports:



Linear supports:

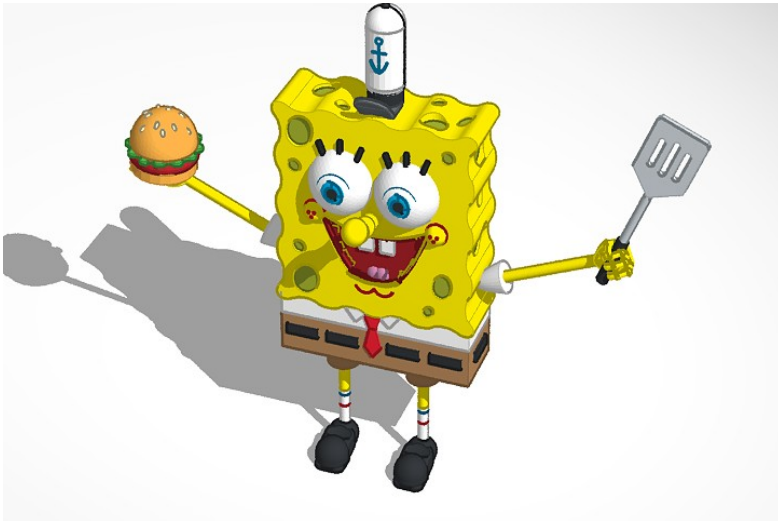


Tree supports have less contact with the design and are easier to break away. Use these for *leaning* forms.

Linear supports are useful for flat, overhanging forms – they simply provide better support.

Once you have selected between the two, you can click **Auto Supports**, and Flashprint will design the supports for you.

Not all designs can print as one piece!



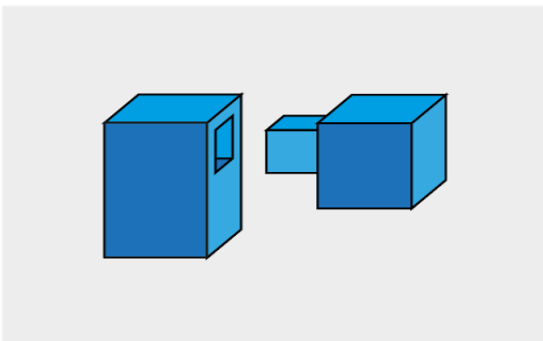
This Spongebob design presents a number of printing problems:

1. The extreme overhang of the shorts – this would require a ridiculous amount of supports which would risk malforming the design.
2. The thin legs and arms would be weak and vulnerable to warping
3. The extreme angle of the arms would make the layer-by-layer printing difficult.

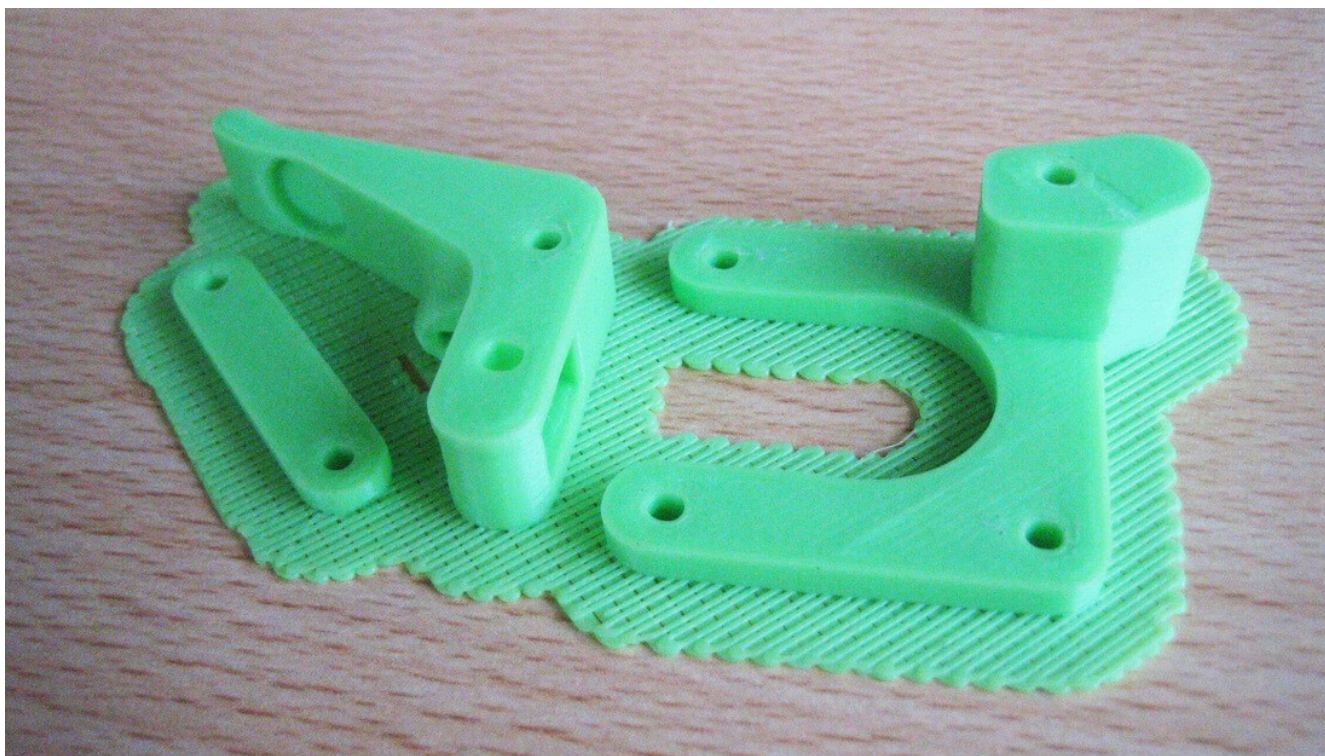
Solutions:

1. Ungroup the body from the arms and legs in Tinkercad
2. Print the body as one piece
3. Print each leg and arm separately, and have them oriented flat (or nearly flat) against the platform.
4. Glue the parts back together (superglue, or even hot glue)

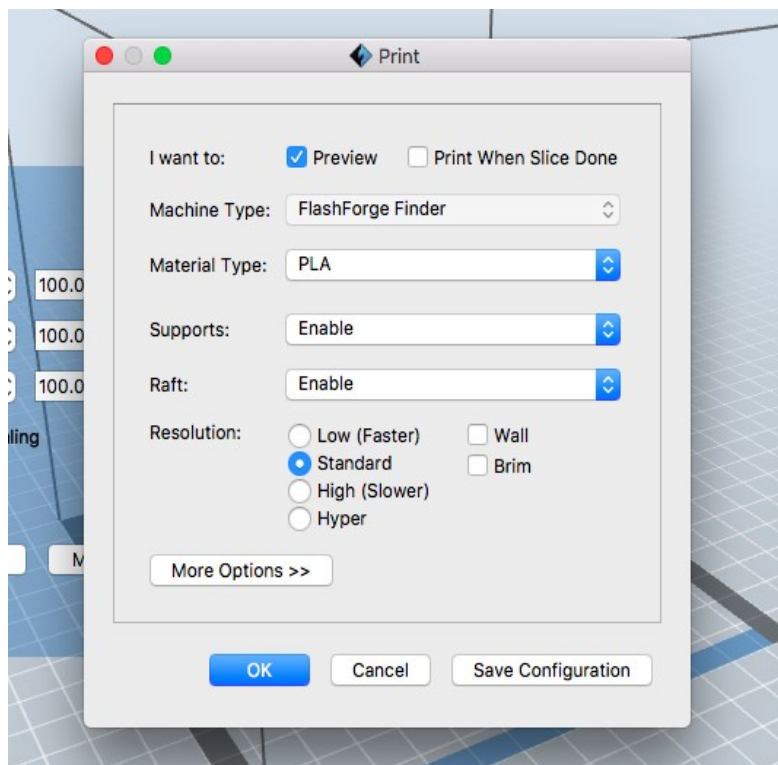
You can consider making peg+socket joints in Tinkercad, or making puzzle-style fittings.



It's a good idea to create a **raft** for your design:



This helps steady the design against the bed, to assist with filament adhesion and prevent warping issues. When you select the **Print** option, the raft can be **enabled**.



Material type: we use PLA filament

Resolution: Standard is recommended. High resolution will give you finer details, but printing time could be doubled.

To save your settings in FlashPrint, save as an **.fpp** file.

When you're finally ready to start printing

You should load your design into the printer with a **USB stick**.

You will need to save your design as a **.gx** file, which can be read by the printer.

When you **Print** your design, FlashPrint will do the following:

1. Ask you if you want a raft (it's a good idea)
2. Save a **.gx** file
3. Give you an estimated time for printing

If the estimated print time is ridiculously long, then you can rescale the design in FlashPrint to make it smaller. Also, if you selected **high** resolution in the Print console, then select **standard** resolution instead.

When you attach the USB stick, select **Build** in the touch screen.

Warning! If you stare and watch your design being printed, it will increase your printing time 3x.