purple mash

2Design and Make

2simple

Contents

1 Introduction

2Design and Make allows children to design nets and more on screen then print and make them in real life.

The software uses a variety of templates such as vehicles, houses and 3D shapes. 2Design and Make can be used to support Maths, topic work, design and more.

3D models created in 2Design and Make can also be printed using a 3D printer. If your school does not have a 3D printer, you can save your model in a format suitable for sending to external online services to upload your models and have them sent to you in 3D.

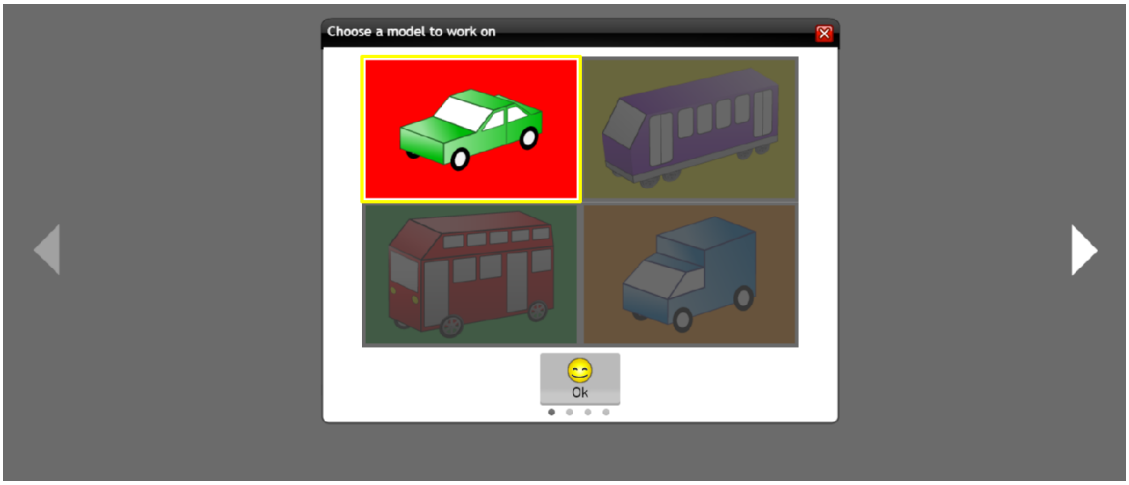

Help videos can be found with examples within 2Design & Make. Click the Video Guides button at the top right to open the videos.

1.1 Starting 2Design and Make

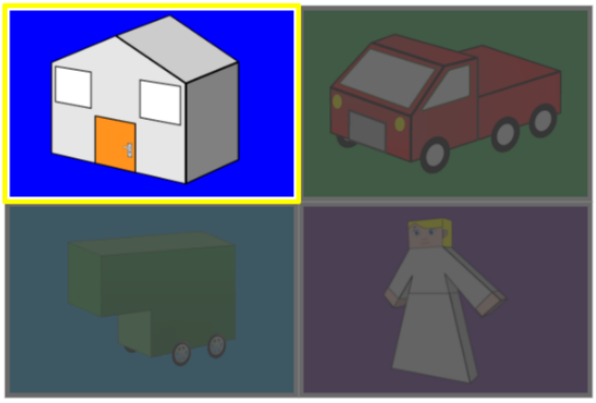
When you open 2Design and Make from Purple Mash you will be presented with a choice of models on four start screens. Select one of these models to edit and make your own.

Use the arrows to navigate through the choices.

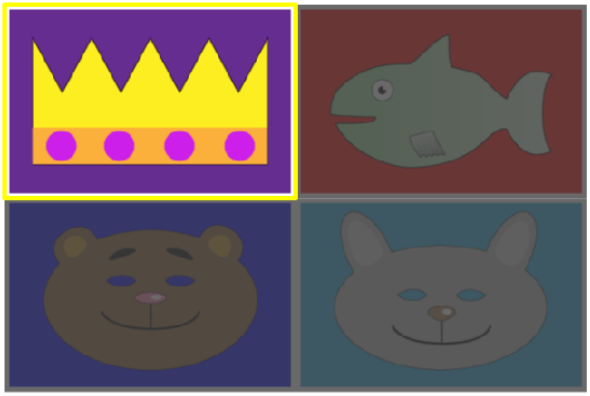
3D models of a car, train carriage, bus, van:



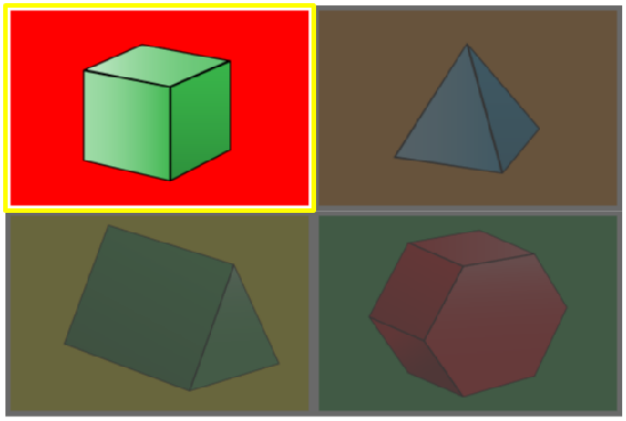
3D models of a house, truck cab, truck trailer, person:



2D models of a crown, fish, teddy, cat:



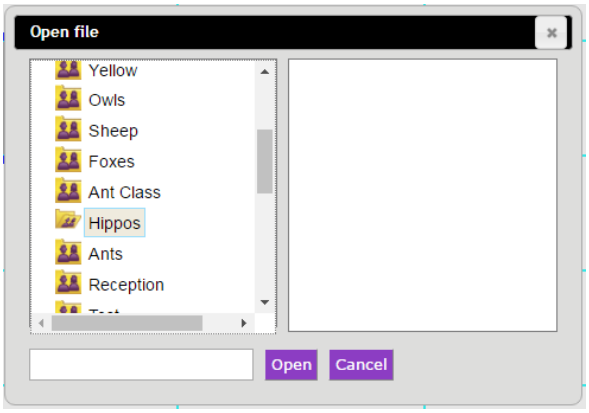
3D models of a cube, square-based pyramid, triangular prism, hexagonal prism:



1.2 Top menu bar

 New File button: this will take you back to the start screen.

 Open button: this will give you the options of opening 2Design and Make documents from your PC (or other device) or from your saved work. If you have folders set up on Purple Mash, you will also be able to open files from one of these.

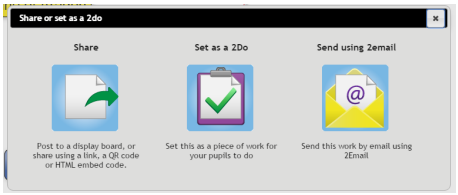


 Save button: this will give you the options of saving the file that you have created to your online documents (My Work), online folders or to your device.

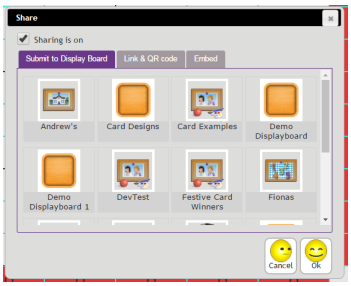
 Export as Image button: this allows you to export your 2Design and Make net as a **png** (picture format) file that can then be opened for viewing or printing from your device without using Purple Mash.

 Print button saves the net of your model as a **pdf** file for printing.

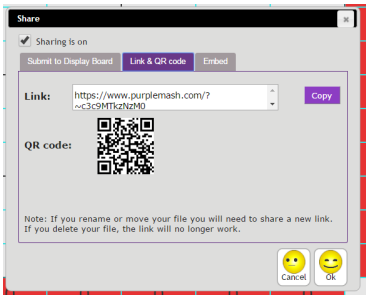
 Share button: clicking the share button will give you various options to share your file.

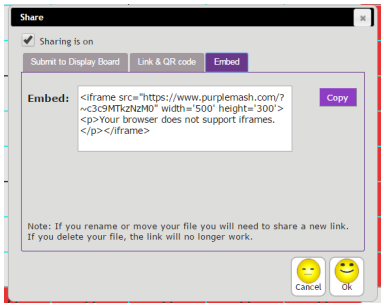


You can share your work to a **Display Board** so that everyone can see it. Display Boards can be configured in the Teacher's Section of Purple Mash.

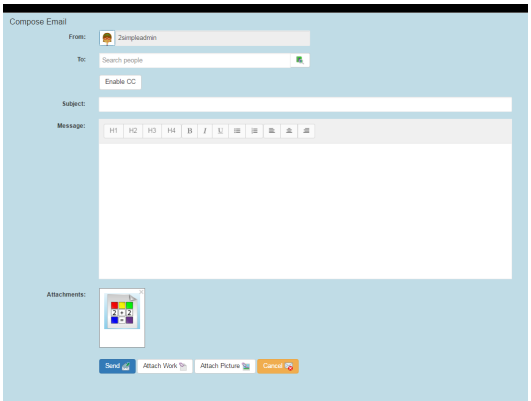


You can also get a unique l**ink** or **QR code** to your work or code to embed it on a website. The QR code can be saved by right-clicking on the image.





Clicking on the **Send Using 2Email button** will open a new mail window with your file as an attachment to add a message and send as an email.



 Download .stl file. This is used when printing a model using a 3D printer. See 3D Printing for details of how to print in 3D even if you do not have a 3D printer.

 Clear button; this button will clear any drawing that you have done on your model.

 The Undo and Redo buttons will appear once you have started drawing; they allow you to undo the last action or redo a previously undone action.

2 Making a model

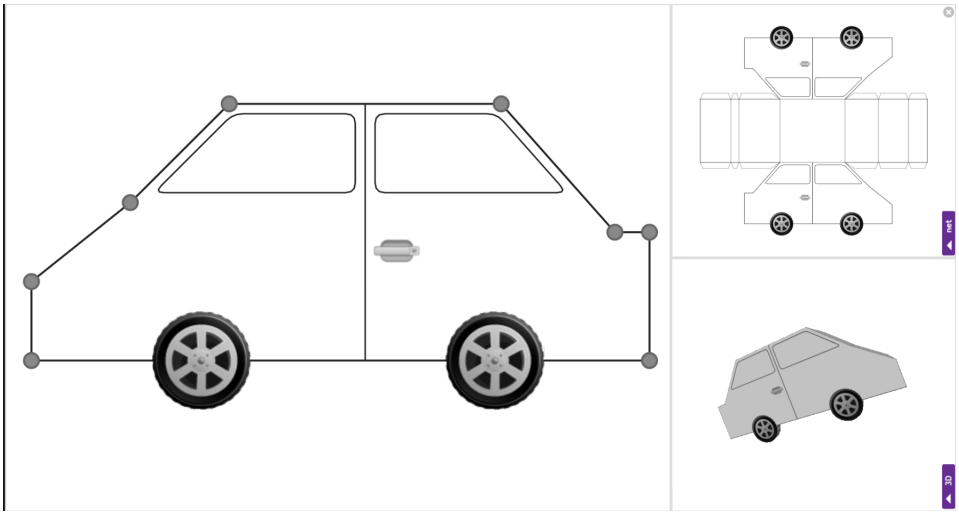
Firstly, select a model to edit from the front screen. The Editing screen varies depending upon the type of model that you have selected. The specifics of the types of model are discussed in the relevant sections:

2D models

3D models

Polygons

3D Model Editing screen:



2.1 Painting tools

Many of the painting tools will be familiar from other programs in Purple Mash. Some tools are available only for certain models.

It is recommended that you finalise your model shape before decorating it; if you alter the points after decorating, you will lose the decorations.

 Move Points: to change the model, move the points around to create different shapes. A pale blue dashed box will denote the amount of movement allowed to keep the model looking like the item it is meant to be. For polygons, there is no such restriction.

 Add Text to a Model: select a colour, then click on the button and then on the model where you would like the text to appear. Enter the text and, if you are happy with the placement of the text, click 'OK'.

On vehicles, if the text is entered onto the points view (see 3D Models), the text will be repeated on both sides and mirrored. Enter text on the net view to prevent this from happening.

 Pen Selector: use this tool in combination with the colour and thickness selectors to draw freehand. On vehicles, anything drawn on one side of the vehicle will be automatically repeated on the other side.

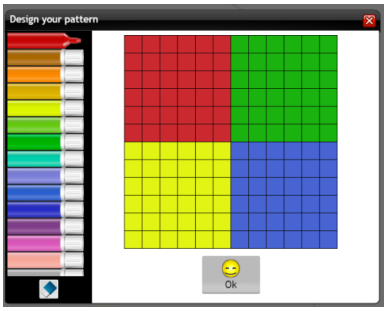
 Circle tools: use these to draw circles in outline or filled. Use the thickness and colour selectors to alter these aspects.

 Square tools: use these to draw squares in outline or filled. Use the thickness and colour selectors to alter these aspects.

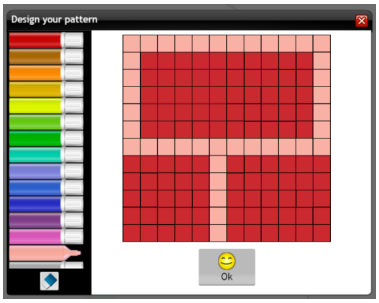
 Flood fill: use this to fill enclosed areas with colour.

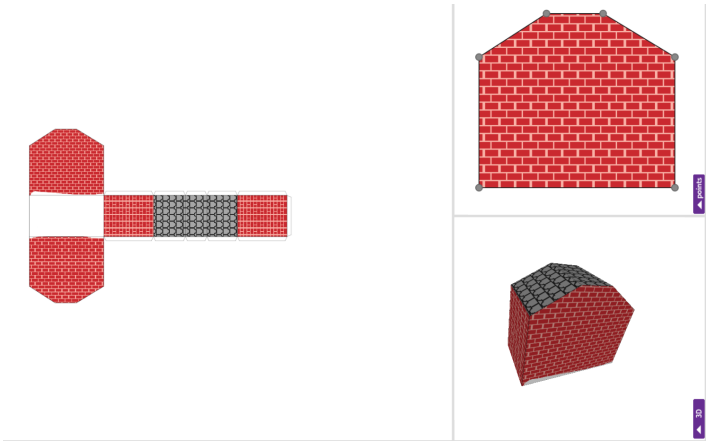
 Pattern Fill: use this to make a pattern that will be tessellated over the selected area.

Clicking on this button will open the following screen:



Edit the default pattern, then click OK and click the areas that you want to fill with the pattern. Hold the mouse button down and drag to reveal more colours. The following example makes a brick pattern:



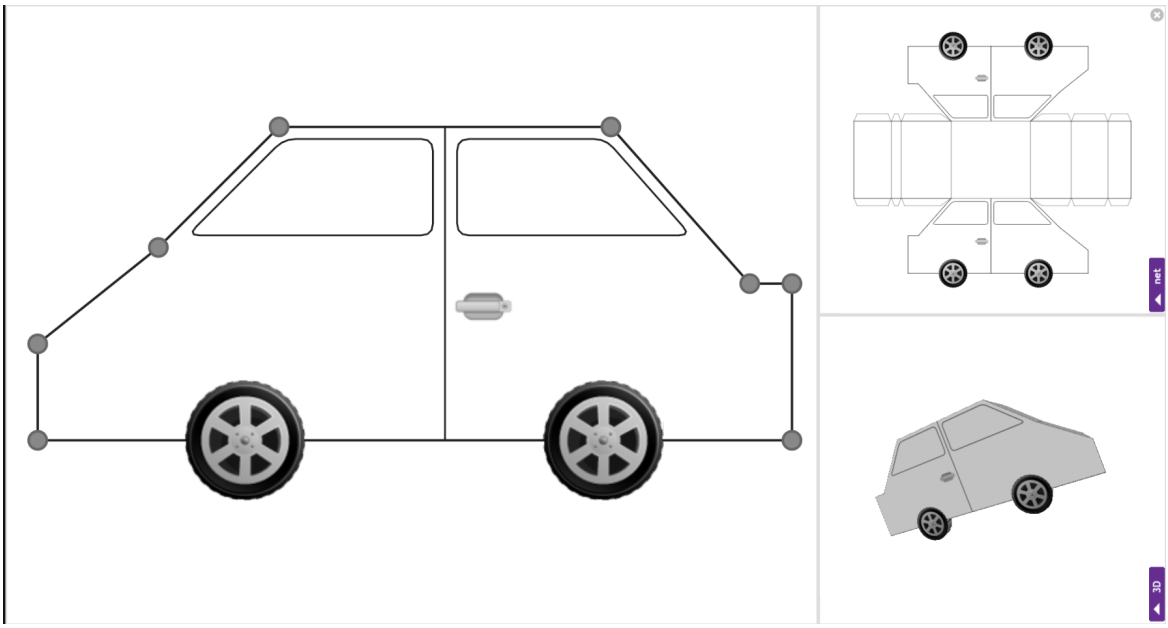


 Clear; this button will clear any drawing/text from the model.

 Add/Remove Points: these buttons are only available for the polygon models. See Polygons for more details.

2.2 3D models

The screen layout for 3D models looks like this:



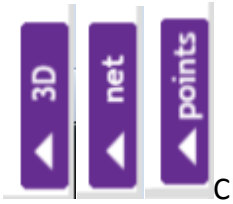
There are three screen areas: the Points view, the 3D view and the Net view.

Click on the Move tool in the toolbox  and drag the points in the Points view to change the shape of the model. A pale blue dashed box will denote the amount of movement allowed to keep the model looking like the item it is meant to be. For polygons, there is no such restriction.

When the points are moved, the 3D view will automatically update.

Use the Zoom In/Out tool to look more closely at parts of your model.

 Drag the scroll bars to locate the part of the model that you want to zoom in on.



Click on the little tabs to get different views in the main screen for editing or viewing.

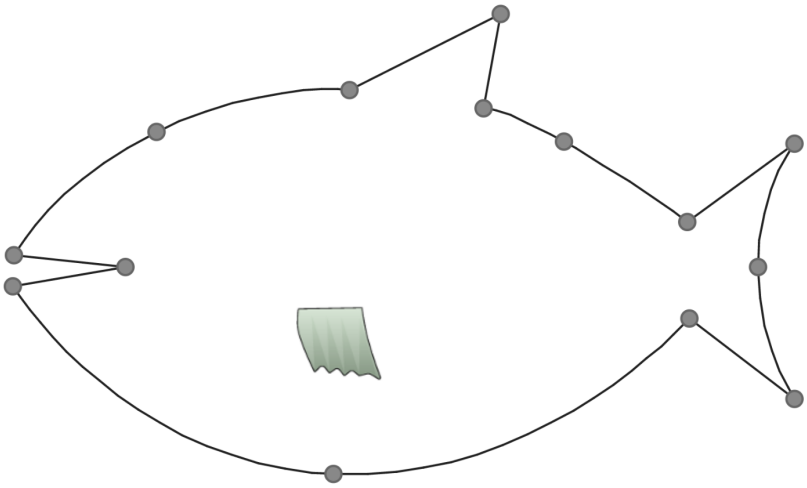
You can drag the 3D view to rotate it and see all aspects of your model.

You can also alter the thickness of the model by sliding the slider at the top of the 3D view. 

You can decorate the model in Points view or Net view using the Zoom tool as necessary to view things in more detail.

2.3 2D models

The screen layout for 2D models looks like this:



Click on the Move tool in the toolbox  and drag the points in the Points view to change the shape of the model. A pale blue dashed box will denote the amount of movement allowed to keep the model looking like the item it is meant to be.

Once you are happy with the model, it can be decorated using the Paint tools.

2.4 Polygons

Polygons are similar to the other 3D models but with some additional functions.

 The Add and Remove Points tools will be available for polygons. These can be used to change polygons into all sorts of shapes. You can click on the Add Points tool then click on any of the lines in the Points view to add an additional point to drag around. You could remove one of the points of the square-based pyramid to make a triangle-based pyramid, for example.

In 3D view, you can change the shape of the pyramid by sliding the slider at the top to alter the height of the point:

3 Printing

The Print button in 2Design and Make  saves the net of your model as a **pdf** file for printing.

You can print your model, then cut and fold to create an actual 3D model.

If you have access to a colour printer, you can print your model to create an actual 3D model. See the following section for further details.

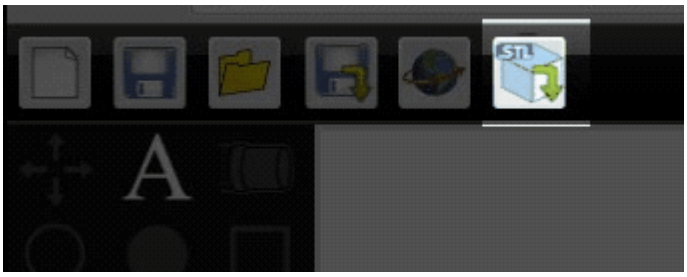
If you do not have a 3D printer, you might be able to make contact with a local secondary school with a printer and send them the files in the correct format for printing.

There are also commercial 3D printers in many areas who will be able to quote a price to print. Children might be interested in doing this themselves if they have spent time perfecting a Design Technology project using 2Design and Make.

3.1 Printing in 3D

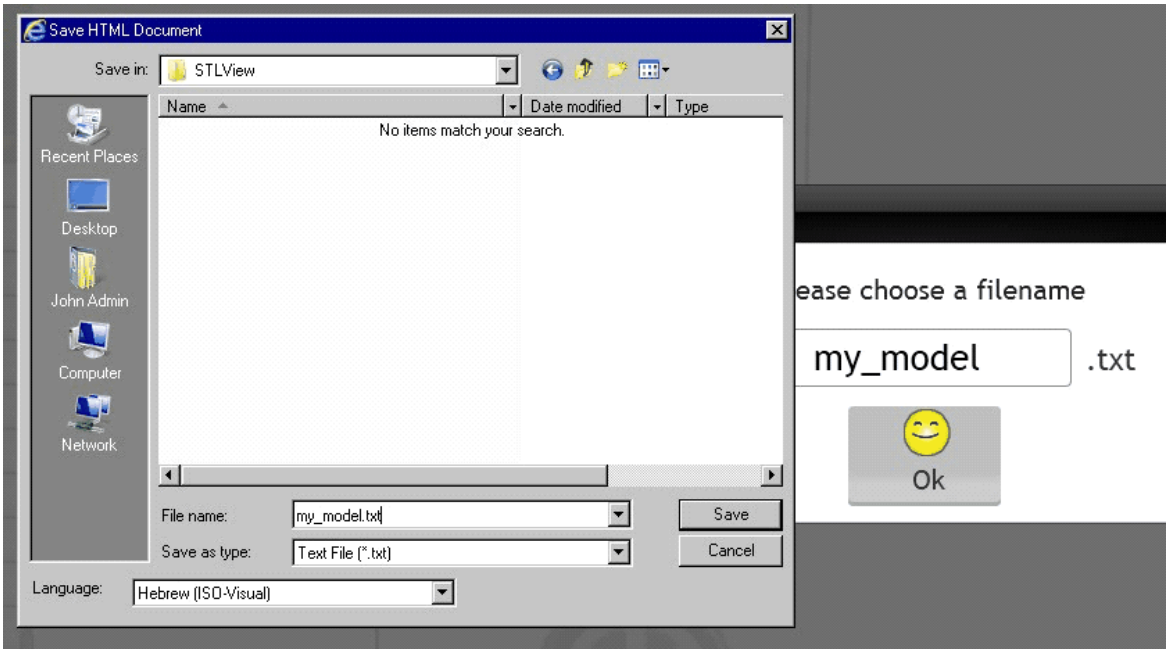
2Design and Make uses the common STL format for 3D printing.

Once you have created your model in 2Design and Make, click on the download button at the top right.



Note: To do this, you need to open your file on a laptop or desktop; this feature is not supported on tablets.

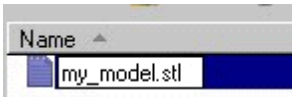
Choose a file name and save the file to your computer.



Notice that the file will have been downloaded as a plain text file (.txt).

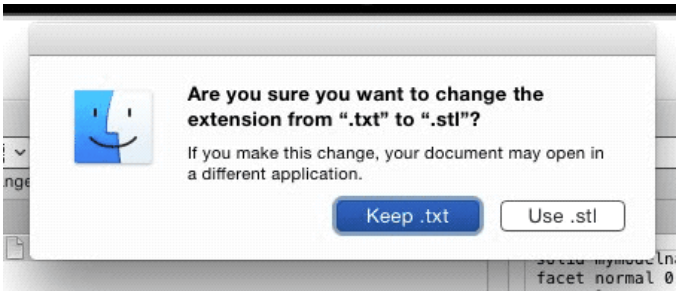
This is because some Windows computers do not recognise the STL format correctly and the download may fail.

The next step is to rename the file extension as ".stl".

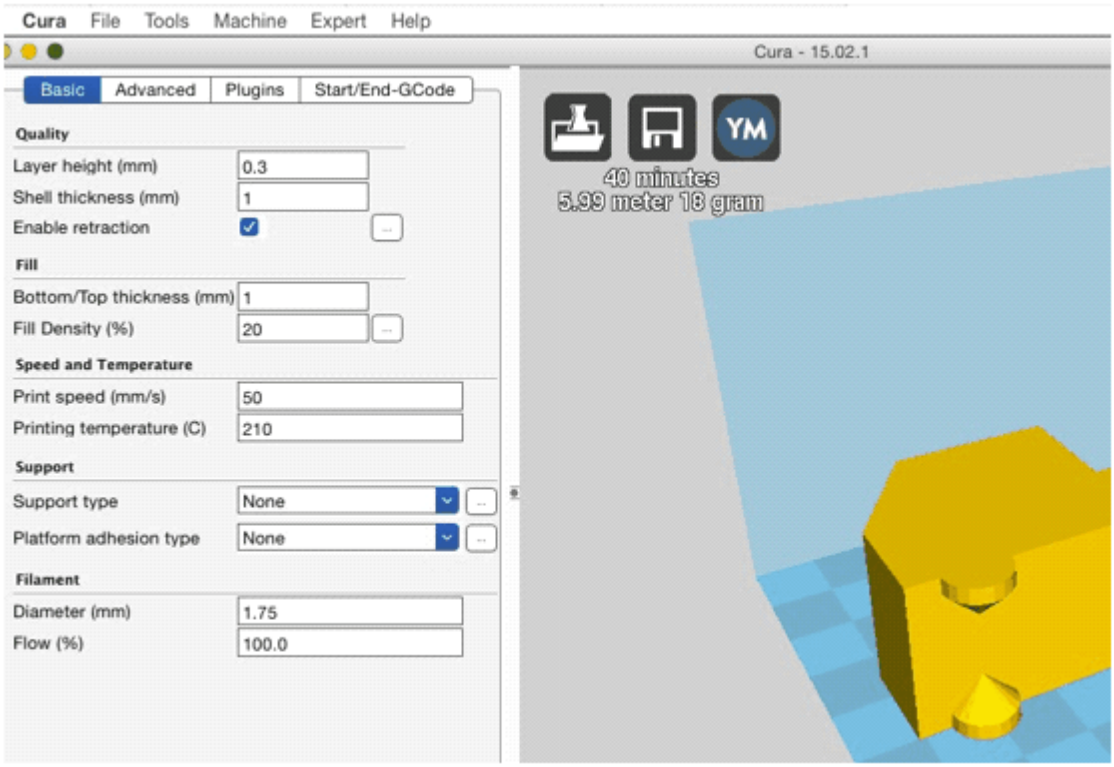


On Windows computers you might need to show the file extension if it is hidden (see https://support.microsoft.com/en-gb/kb/865219) then confirm that you want to change it.

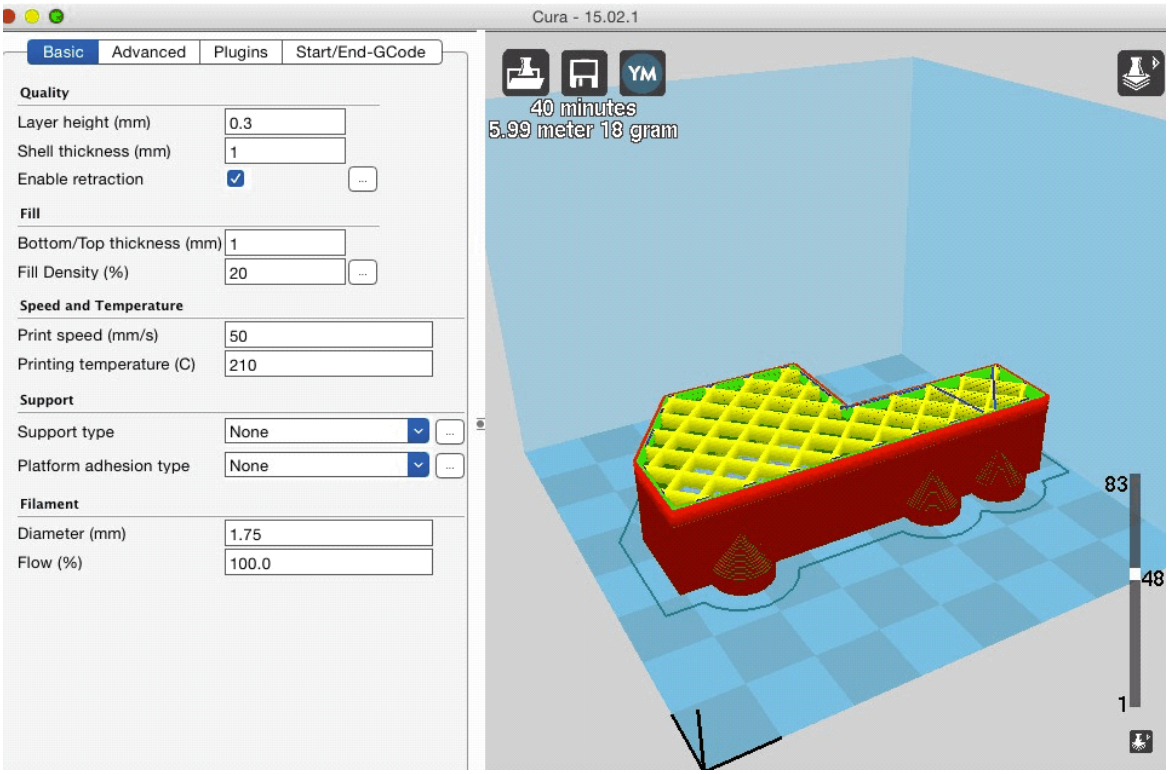
On Mac computers you just need to confirm.



Next, open your .stl file inside the software you use with your 3D printer. The screenshots below are from the popular Cura software.



Adjust the settings for printing. We suggest using the cheapest PLA plastic, a layer thickness of 0.3mm, a shell thickness of 1mm, a bottom/top thickness of 1mm and an in-fill of 20%. You may need to change these settings for your particular printer.



Check that the layers of your model look OK and the amount of plastic and time taken are acceptable. This truck is going to take about 40 minutes to print, and will take 6m of 1.75mm diameter plastic (about 20g).

Print using your 3D printer!