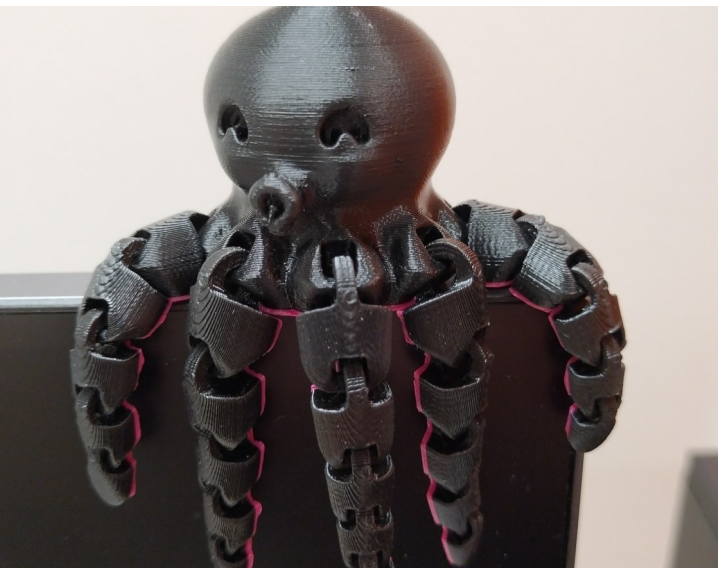

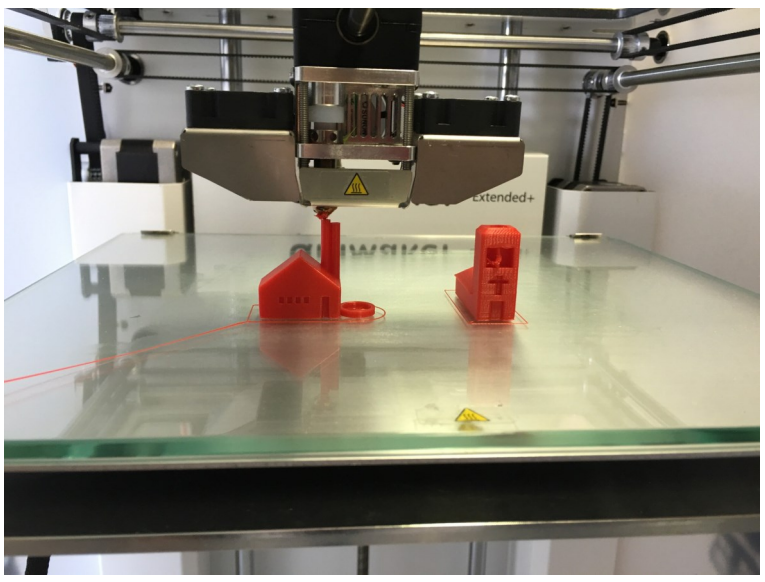

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3D printer

The 3D printer produces physical objects from digital model files.

A model file in STL format is required for printing.

With a 3D printer, you can produce objects that are no larger than 21.5 x 21.5 x 20 cm.

With the Ultimaker 3 printer, you can also produce models that require support structures or create two-color prints. Two-color prints require a model that is designed for two colors.

Ready-made models can be found, for example, at **www.thingiverse.com.**

The materials used by the library are non-toxic and biodegradable plastics. They can be recycled into bio-waste. However, no home composting is recommended because the material settles slowly.

Material fee:

1 € / print time (maximum 4 hours)

Please make sure the printout can be completed in the allotted time!

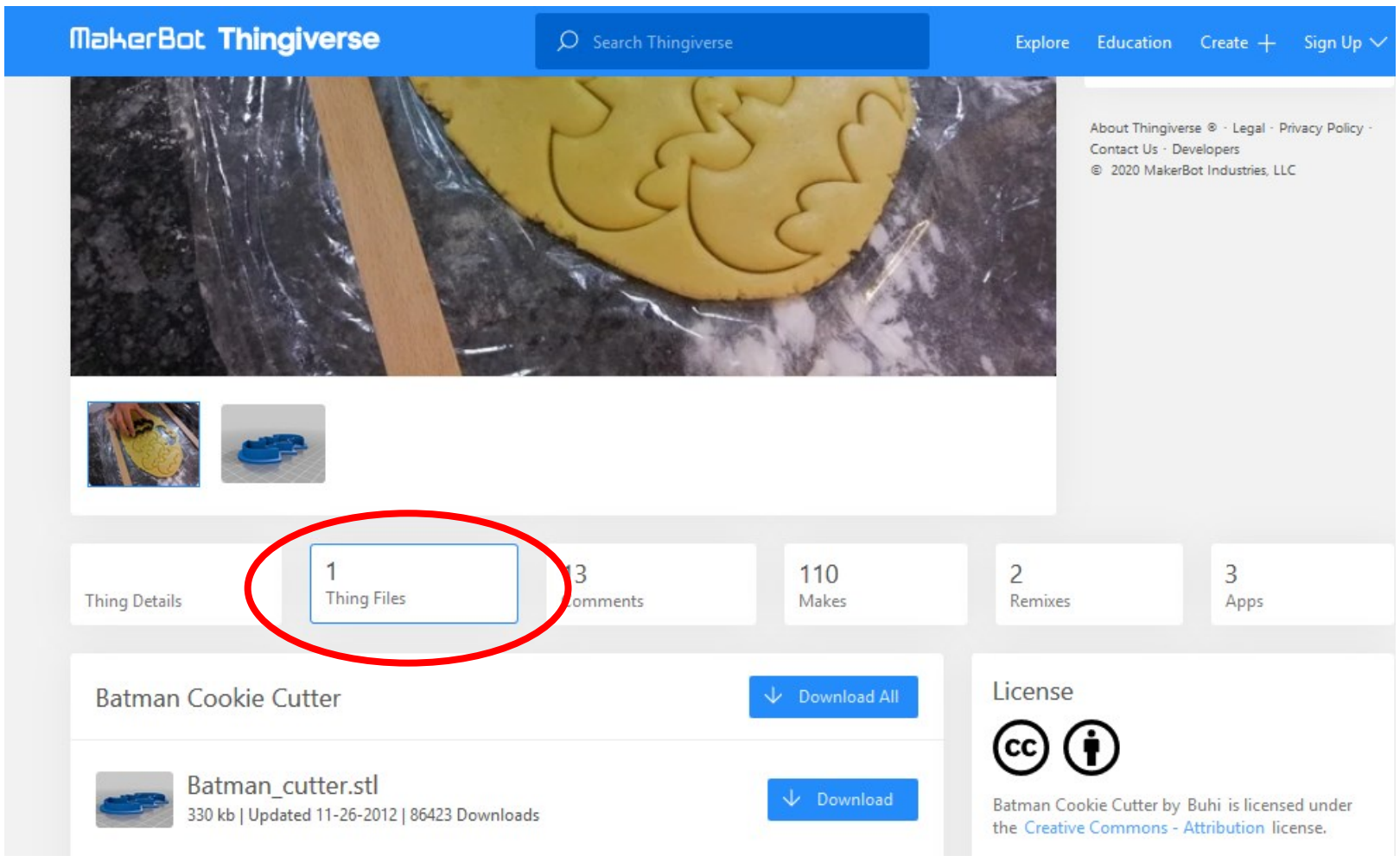
Ultimaker 3D Extended - printer and Cura program QUICKSTART

A 3D printer produces physical objects from digital model files.

A model file in STL format is required for printing. With the Ultimaker 3 Extended printer, you can also produce prints that require support structures or two-color prints. Two-color prints require a template designed for two colors.

Ready-made models can be found, for example, at **www.thingiverse.com**.
Free programs for making your own model are, for example, **Tinkercad** (**www.tinkercad.com**) and **SketchUp** (**www.sketchup.com**).

Download the STL file of your choice to your computer from the **Thing Files** section of the **Thingiverse** website.



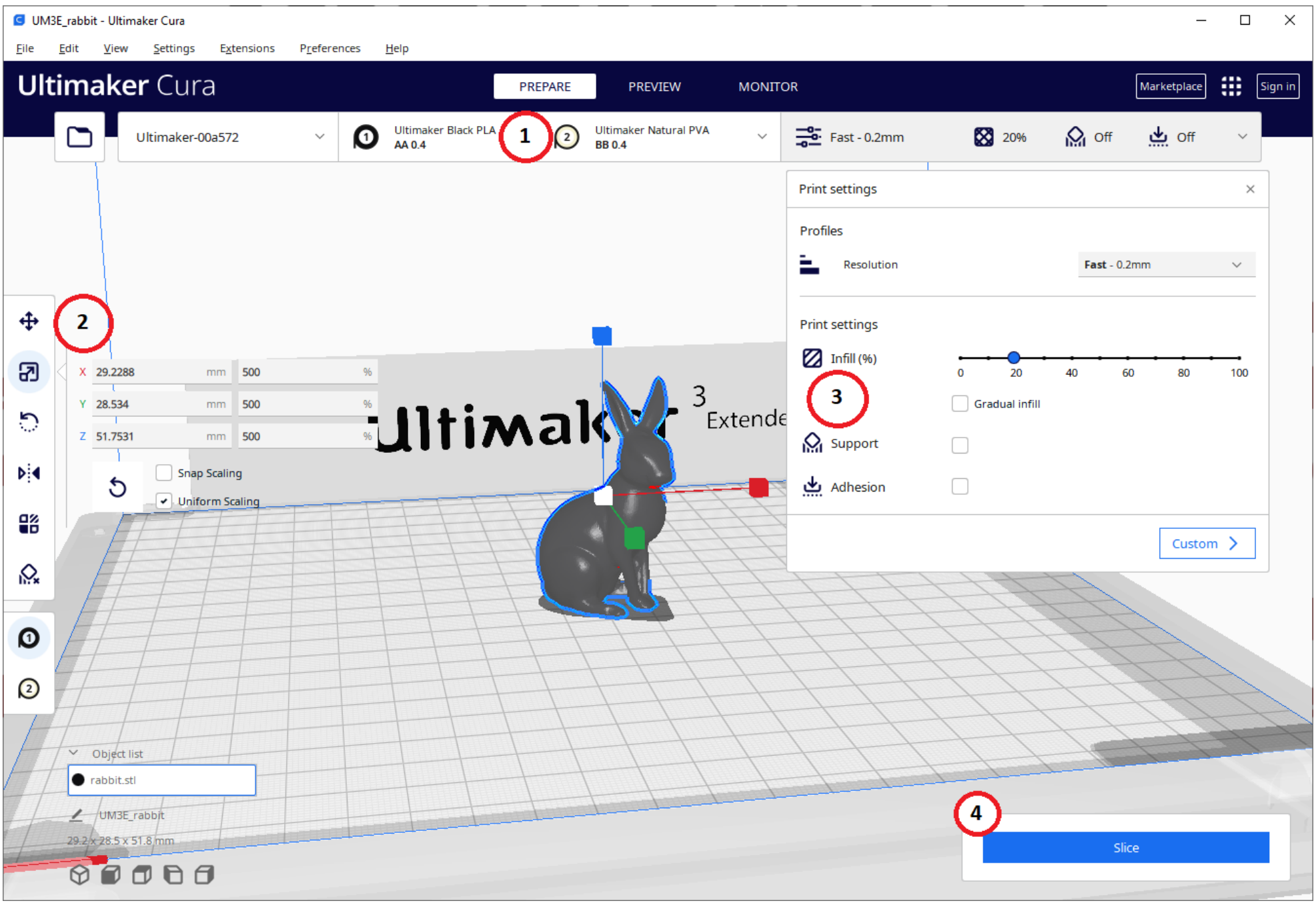
The printout for the library's 3D printer is prepared in the Cura program, which can be found on the computer connected to the 3D printer. Cura is a free, open-source software that you can also install from the web on your own computer. You can prepare the model at your leisure, save it on a stick and come to print the model at the library after making an appointment.

Instructions for preparing an STL file in Cura

Open the **Ultimaker Cura** program from the icon.

Import the STL file into the program by clicking on the folder image in the upper left corner. The file opens in the program. Activate the file by clicking it once. Now you can change the print settings if necessary.

You can also open the STL file in the resource manager.
STL files are automatically opened in Cura.
The figure below shows the numbered sections that are covered in this guide.

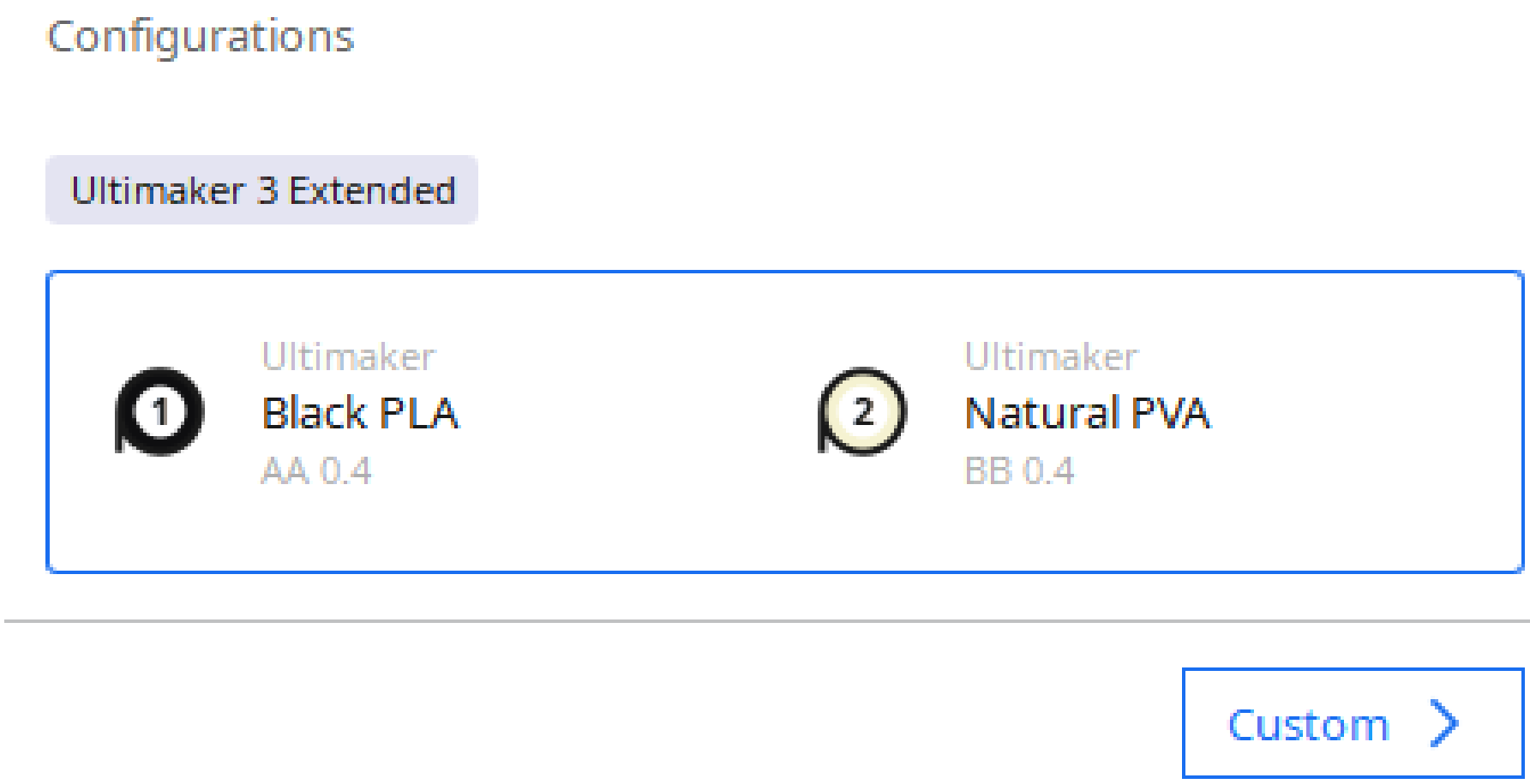


1. Material Settings

By default, the material settings can be imported directly from the printer by pressing the material section and then configuration. This requires that the 3D printer is turned on and recognized by Cura.

First, click on the section below.

After this, the view below opens.



This shows the printer's current media settings. The materials must match, i.e. the material on the device must be the same color as the material shown in the Cura program. If the materials do not match, a message about an incorrect setting appears on the printer screen during the printing phase.

When printing with a memory stick, the materials may be "wrong", because in this case the Cura program does not control the printing.

2. Moving the pieces on the platform and scaling

From the icons on the left, you can change the settings of the piece to be printed. You can access the selections by pressing and activating the piece Changing the size and position of the piece in the print area can significantly affect the print time.

Moves a piece in the print area.

Reduces or enlarges the output.

The position of the paragraph in the print area.

Mirroring a piece.

If the piece is too big, it will appear striped. The same view is also available when the piece is placed outside the glass in the Cura program.

3. Print Settings

Layer Height (Resolution) (thickness of an individual plastic layer):

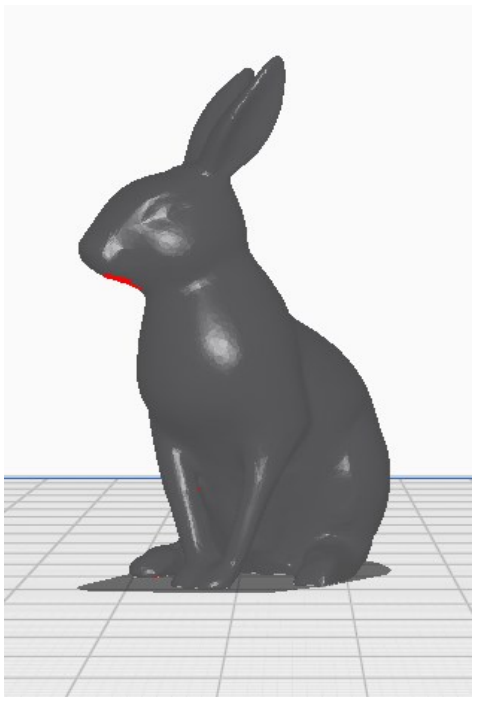
The smaller the number, the longer it takes to print. With low layers, you get a smoother result. In most cases, 0.2 mm is a sufficient height.

Infill (degree of filling):

20% for decorative items, 50–100% for pieces requiring durability.
Note! This significantly affects the printing time.

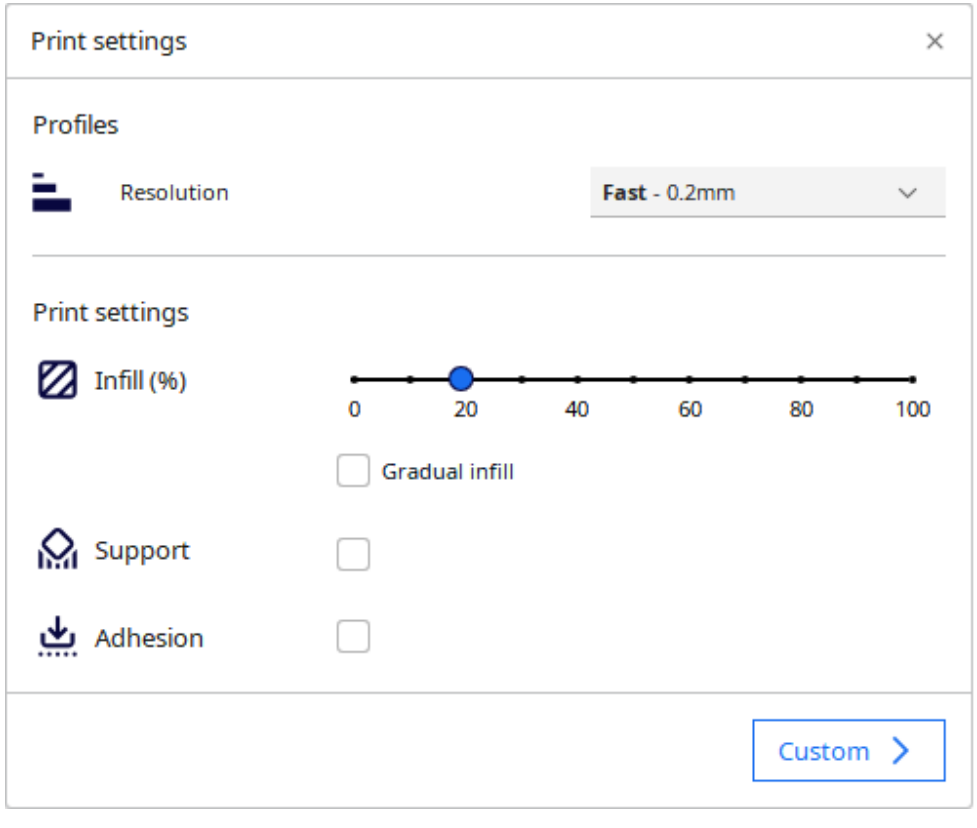
Support (support material):

For pieces that require support structures the need for a support structure is shown in the model as a red area. View the piece from different angles by turning it with the mouse to see if support material is needed. PLA plastic or water-soluble PVA plastic can be used as a support material.



Adhesion: helps better adhere the piece to the glass plate.
The border can be removed from the finished piece.

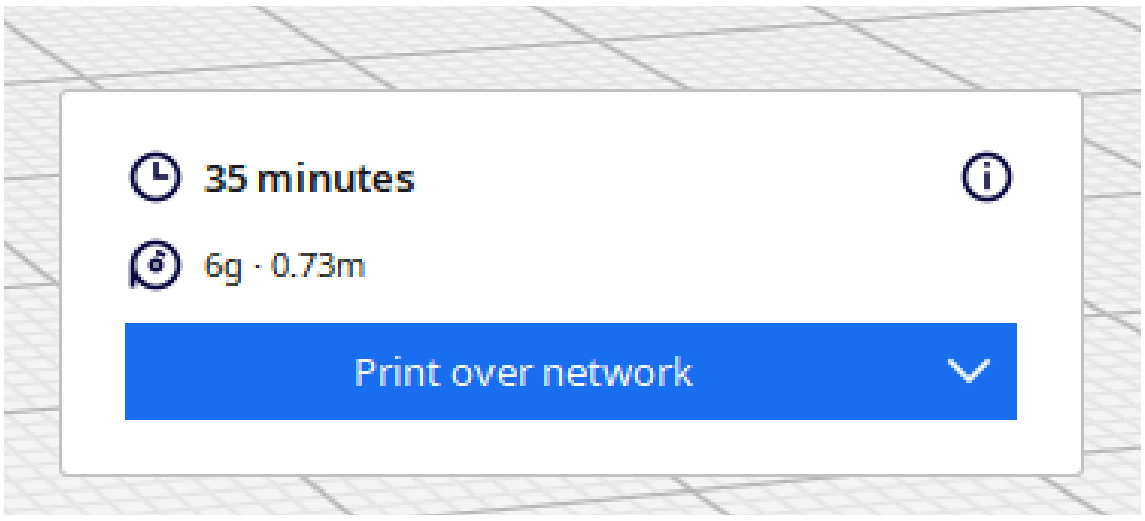
More settings can be found behind the Custom menu in the lower right corner. You can ask the library staff for more information about custom settings.



4. Print Time

5. Select **Slice** and the program will create a slice for the printer floor plan.

At the same time, you will also receive a print time estimate. **15 minutes should be added to the time estimate**. This goes to the printer's initialization and completion to cool down the output and clean the printer.

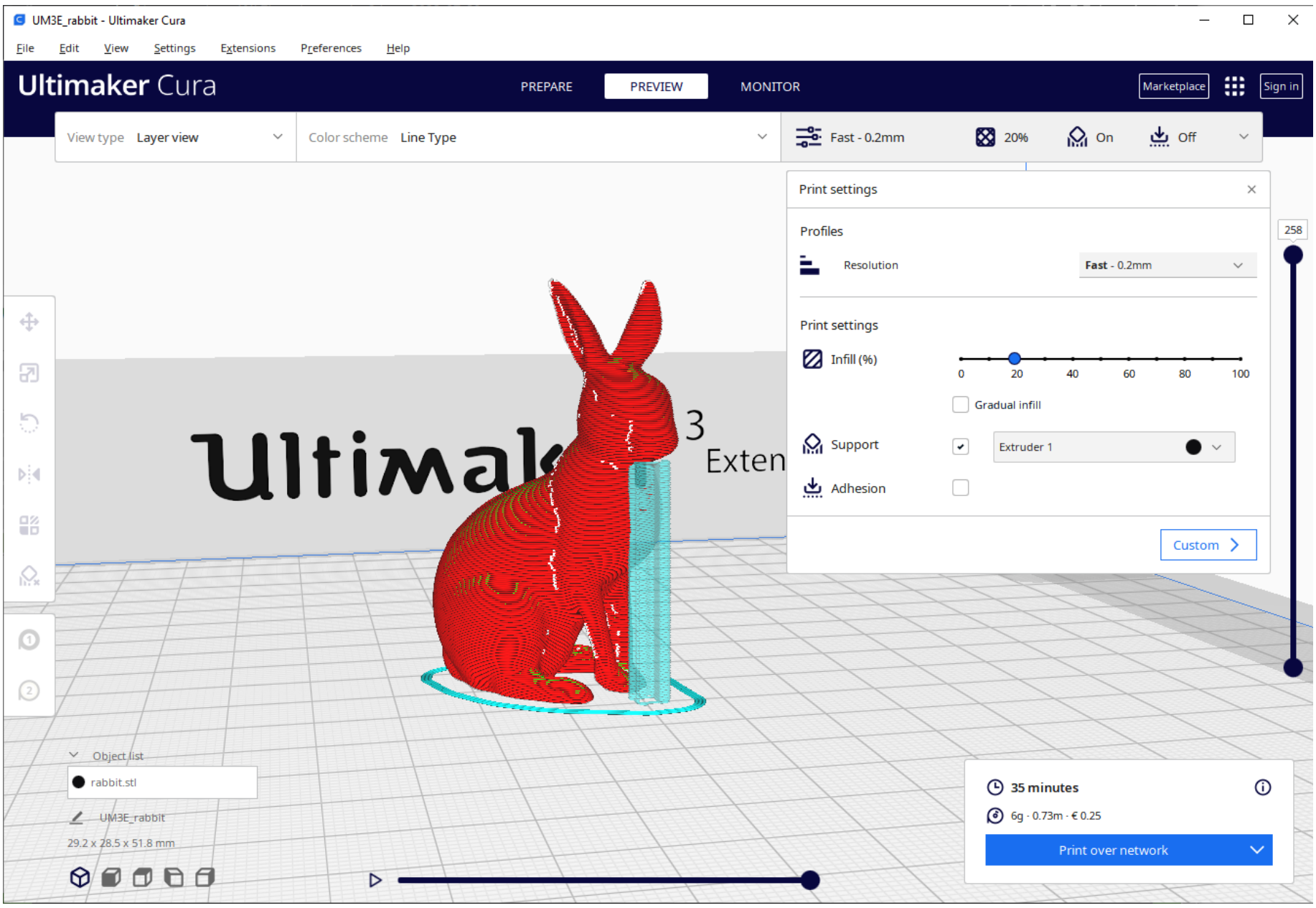


The printing time is affected by the object's size, Infill and Layer Height. The printing time can be quickly changed, for example, by changing the **layer height** and evaluating the need for support material.

Changing the support material to PLA plastic eliminates the need to change the nozzle during printing, which speeds up printing significantly.

Please note that the printout must be completed in the time you booked. You can get more tips on print settings from the staff.

In the Preview window you can view e.g. what kind of support structures the printer builds around the piece. In addition, with the help of the scroll bar on the left side, you can see how the piece is finished layer by layer.



There are two ways to start printing.

Select **Slice**, and the program will prepare the file in a format suitable for the printer (.gcode). After that, select **Print over network**, and Cura will transfer the file to the 3D printer and start printing. This method is recommended as it makes the printer easier to use.

Another way is to save the file to a memory stick by selecting **Save to Removable Drive.** You can transfer the stick to the printer and start printing. Instructions for printing with a memory stick can be found on the next page.

Connect the memory stick to the 3D printer and select **Print.**

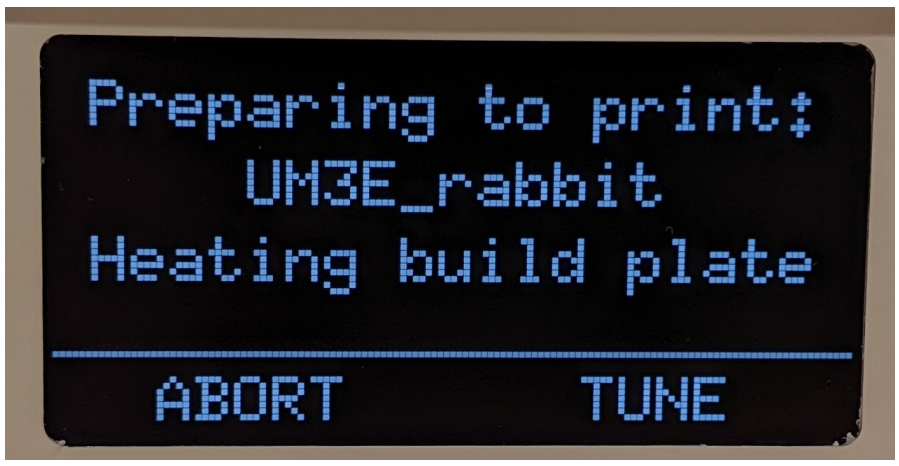
Select the file to be printed (the device suggests the most recently saved one at the top).

When printing with a memory stick, the printer uses the materials that are in place.

Only remove the memory stick when the printout is complete.

Print tracking

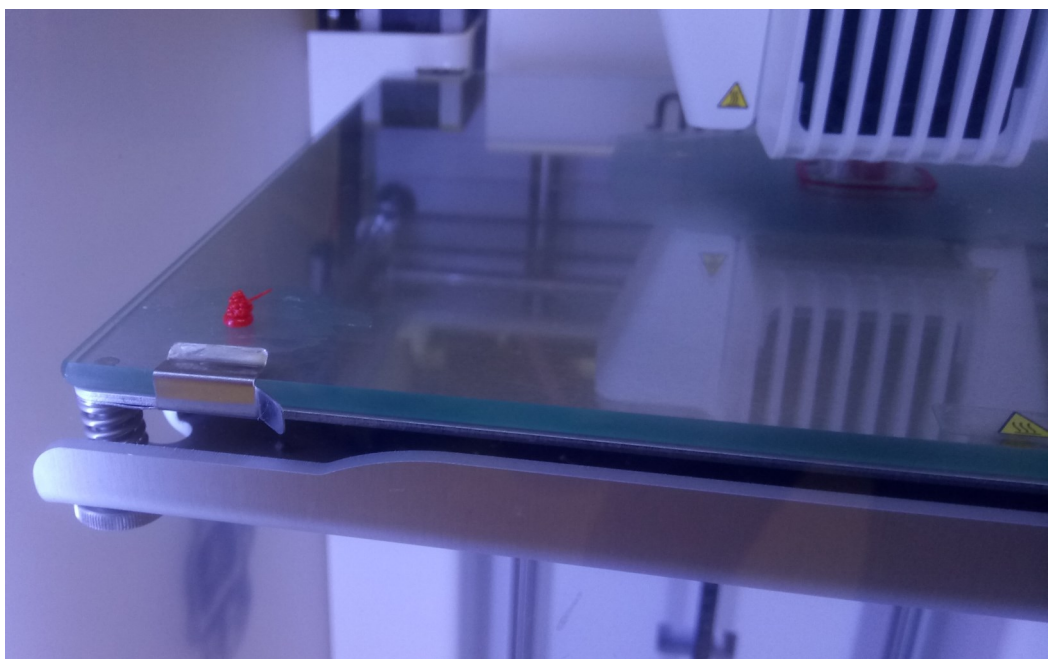
The glass plate acting as a printing platform must be clean enough so that the material sticks to it well. For example, fingerprints and most of dust particles should be wiped off the glass before starting to print.



At the beginning of printing, the machine needs time to warm up the printing platform and nozzles.

By default, the device forms a small test blob in the front left corner of the glass. If it does not form, it may mean problems with the material feed.

In case of problems, stop printing. See the more detailed instructions for stopping printing from the next page.



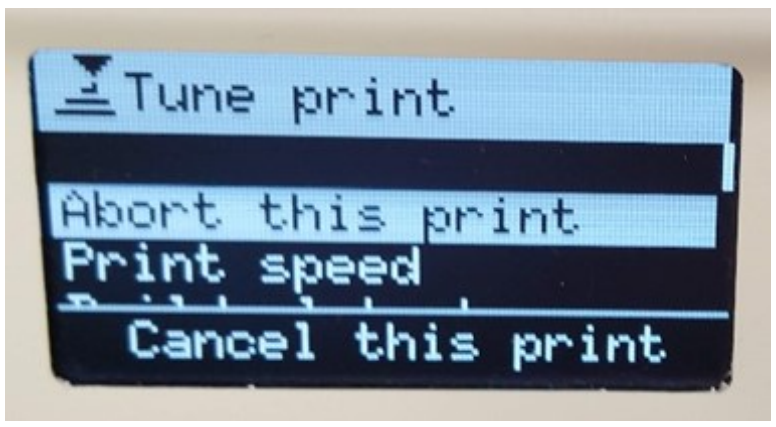
The printing process itself is automatic, and the device generally does not require monitoring after the first layer. The remaining time for printing is shown on the printer screen and in the **Monitor** tab of the Cura program on the computer.

Wait until the print cores and the print bed have cooled down to at least 40 degrees. If there is too much heat, the print may warp or break. Remove the printout and clean up the resulting debris.

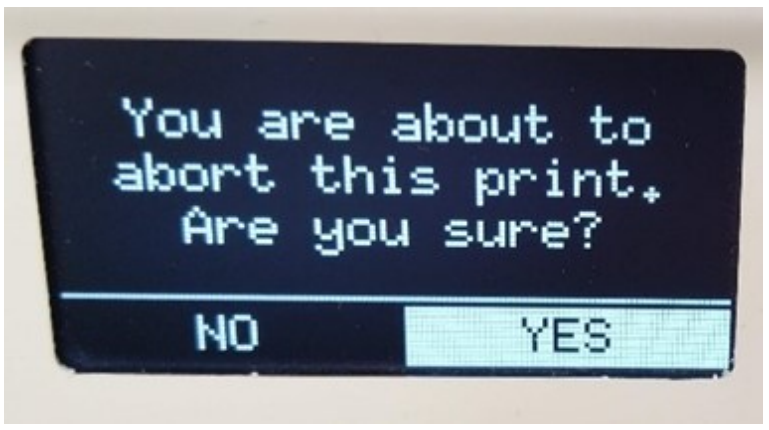
Stopping printing

Select **TUNE** from the printer menu.
Turn the printer dial, execute selection by pressing the selection wheel.

Choose **Abort this print**
from the drop-down menu.



Confirm the stopping again by selecting **YES**.



Wait until the print cores and the print bed have cooled down.

Clean up the generated debris and start the printing from scratch.
By selecting **YES** printing starts from the beginning.
The device remembers the previous printout.

If you want to make changes to the settings, select **NO**. Make the changes in the Cura program and proceed according to the previous instructions.