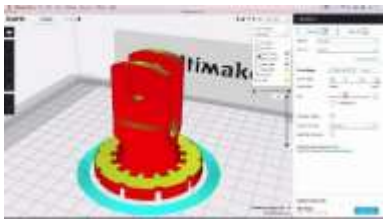
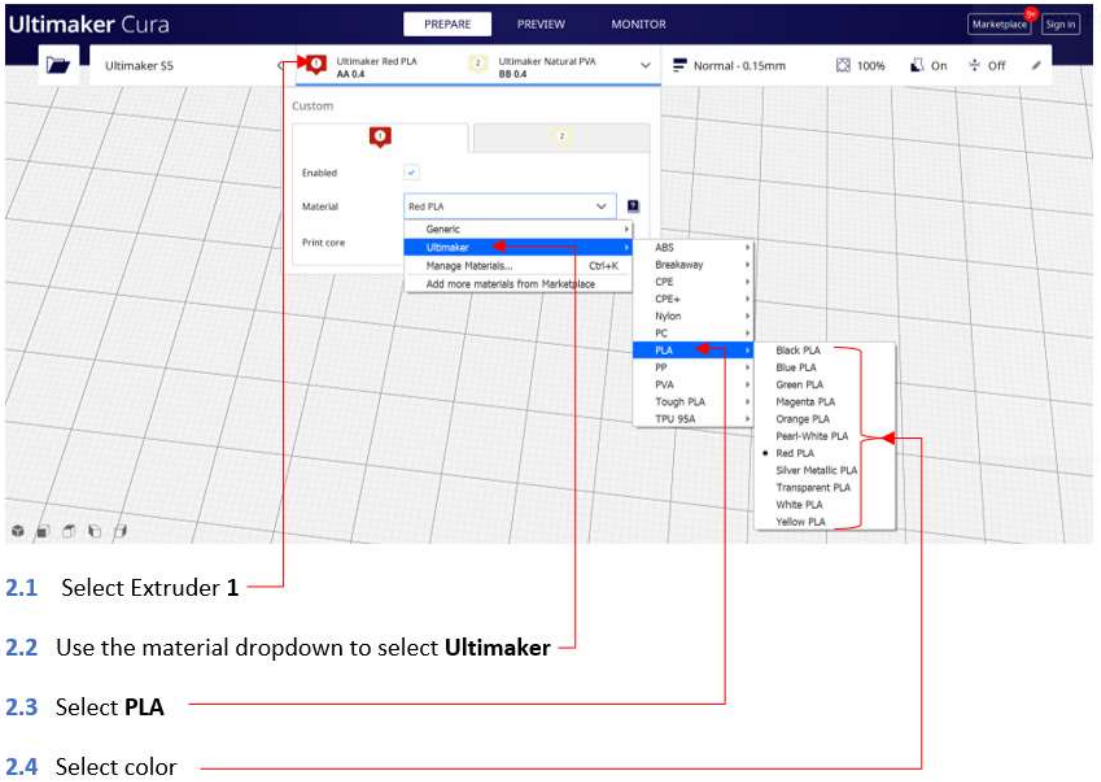
SEPTEMBER 16, 2025

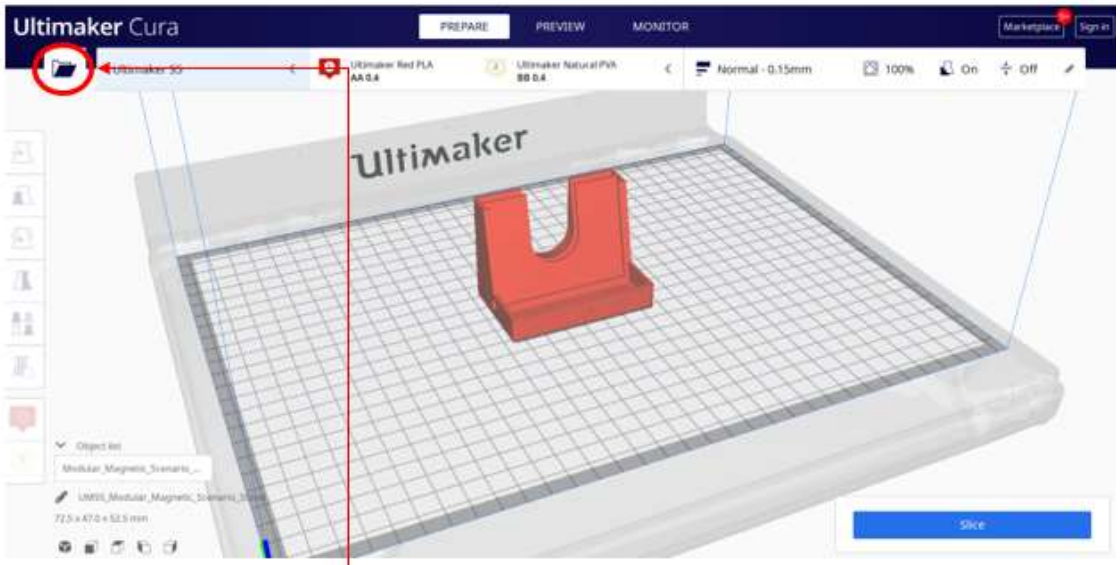
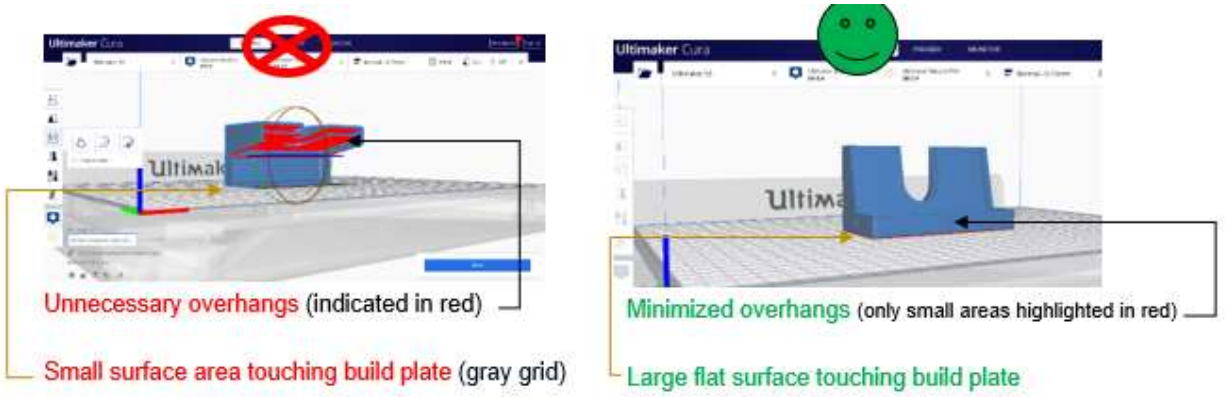


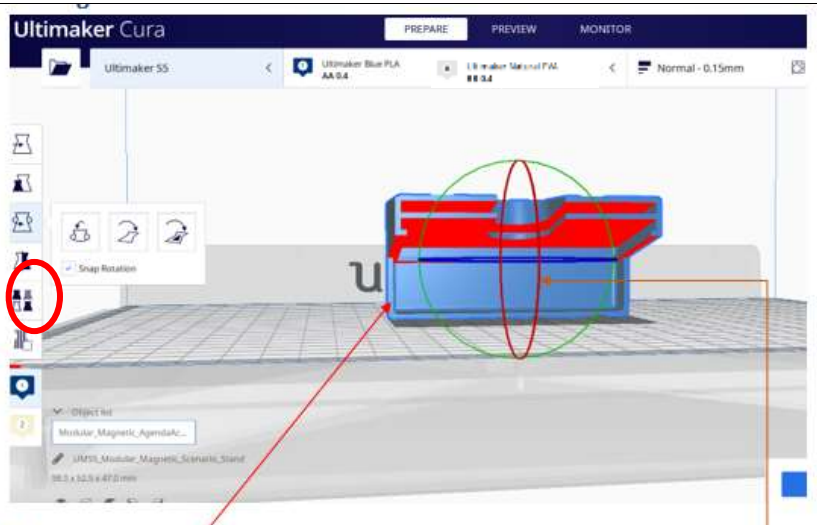
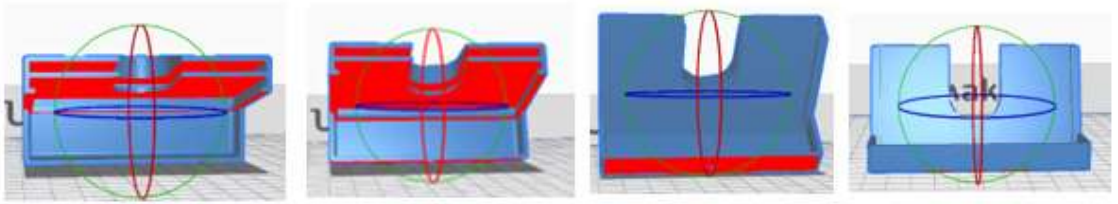
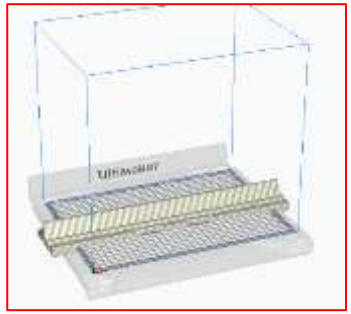
STEP 1: CURA SOFTWARE

STEP BY STEP: PREPARING 3D MODELS FOR PRINTING

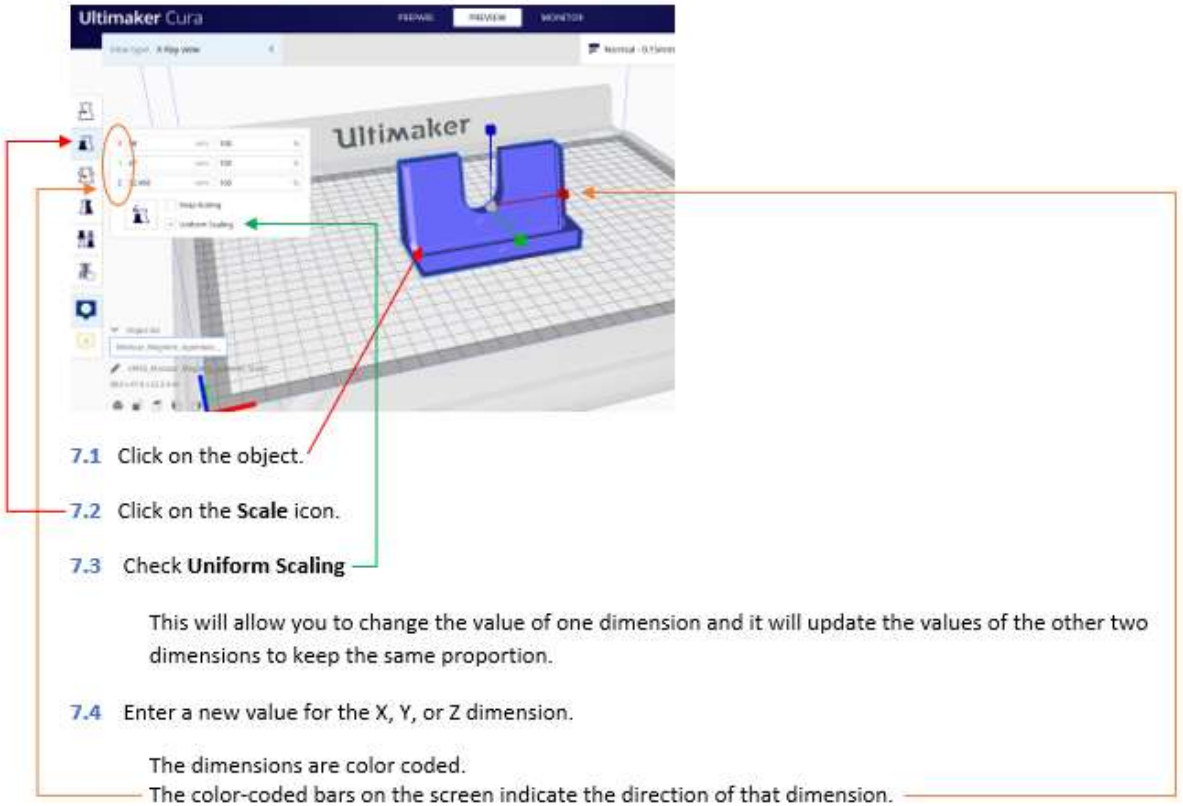
ADAM LAMPRECHT
FRISCO PUBLIC LIBRARY

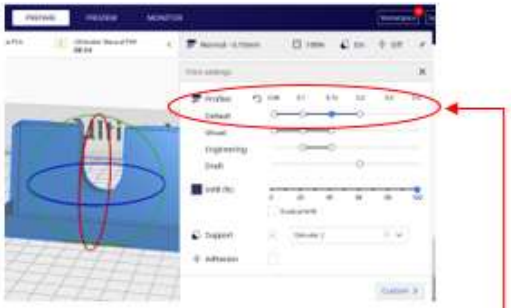
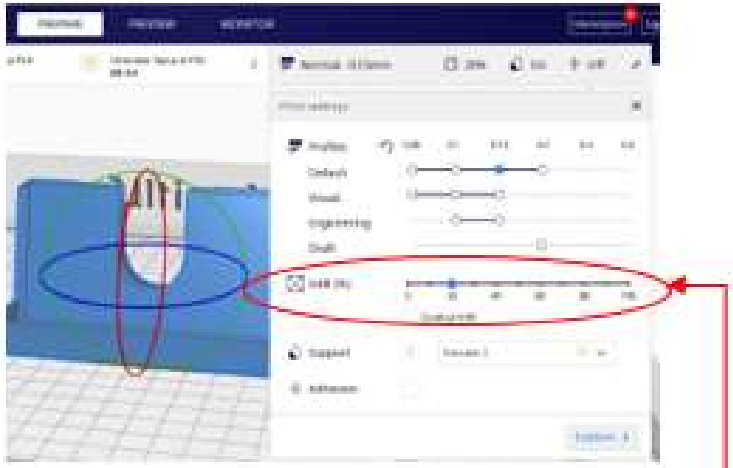
#	Steps	Key Points	Details	Pictures
1	Open Cura and Select Printer	Select add a **local** and then **non-network** printer. Select **Ultimaker S5**.	Ensures that the physical dimensions for the build plate are correct.	
2	Select Filament Color **Color availability:** • Red • White • Silver Metallic • Black • Blue	Select **Extruder 1** 2. Use Material dropdown to select **Ultimaker**. 3. Select **PLA** 4**.** Select color 5. **Extruder 2 Disable Extruder 2.**	Ensure the correct color for print job. All of our 3D printers default to using PLA in extruder 1 and do not use extruder 2. You will not be able to change this configuration. We do not support 2 color printing.	

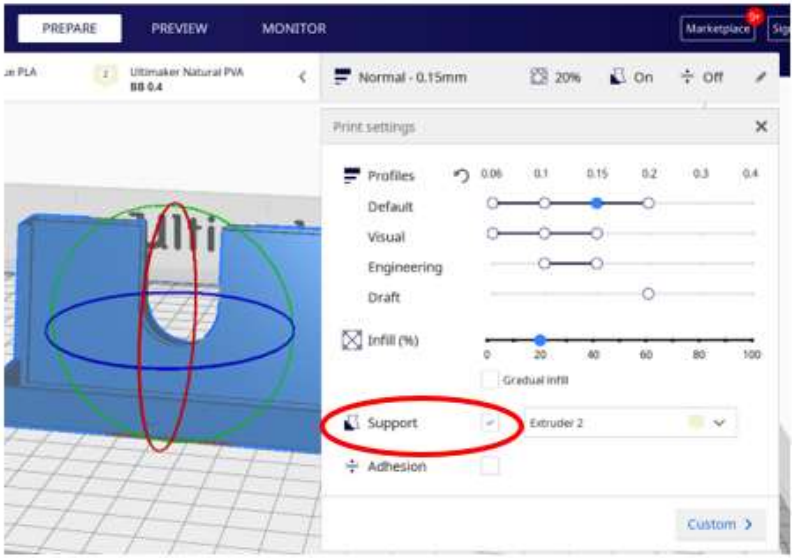
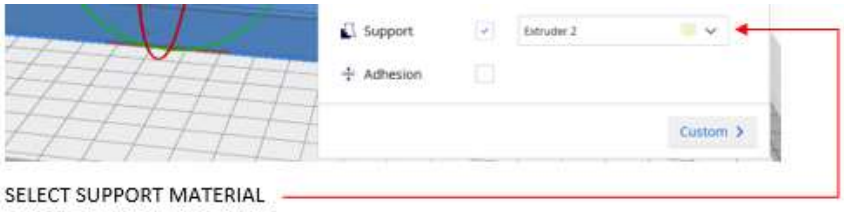
3	Open 3D files	File needs to be a 3D model file. 3D Model File Formats: • .OBJ • .STL MANIFOLD ERROR MESSAGE? This object cannot be successfully printed.	Brings model into Cura software to be prepared with print instructions for the printer. Checks that model is manifold (also known as mesh errors or water-tight check).	
4	Optimize Orientation of Object	Determine best orientation to minimize any overhangs. Best practice is to put a large surface on the build plate of the printer (gray grid).	Print job could have major printing errors and be significantly more expensive if not done properly.	

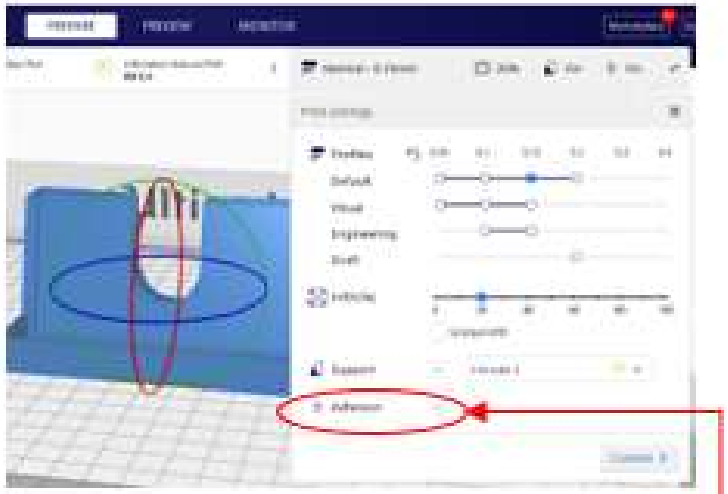
5	How to Change Orientation See Step 7 to resize object.	Click on the object to move and rotate the object. Click on "Rotate" button on left hand menu. You can also manually rotate using the green, red, or blue orbits to reposition. Click and hold mouse on the desired orbit to rotate object.		 4.1 Click on the object. 4.2 Green, Red, Blue orbits will appear. You will use these orbits to reposition the object. 4.3 LEFT click on an orbit and hold the click down. 4.4 Move the mouse to move the object. In this example we left clicked on the red orbit and while holding the left click down, moved the mouse towards the top of the screen:   A striped appearance indicates the object is too large to print. Options include to: • Resize the object so that it fits in the printable area. • Re-orient the object so that it fits in the printable area. Redesign the object into smaller components that can be assembled after printing.

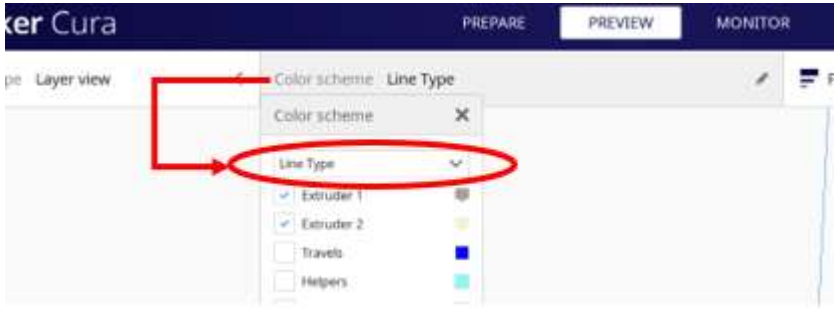
6	Review Object Orientation	Right click and hold the right click down in an empty space away from the object. While holding the right click down, move the mouse slowly from left to right to spin the view of the object to see the other sides.	Check for overhangs.	

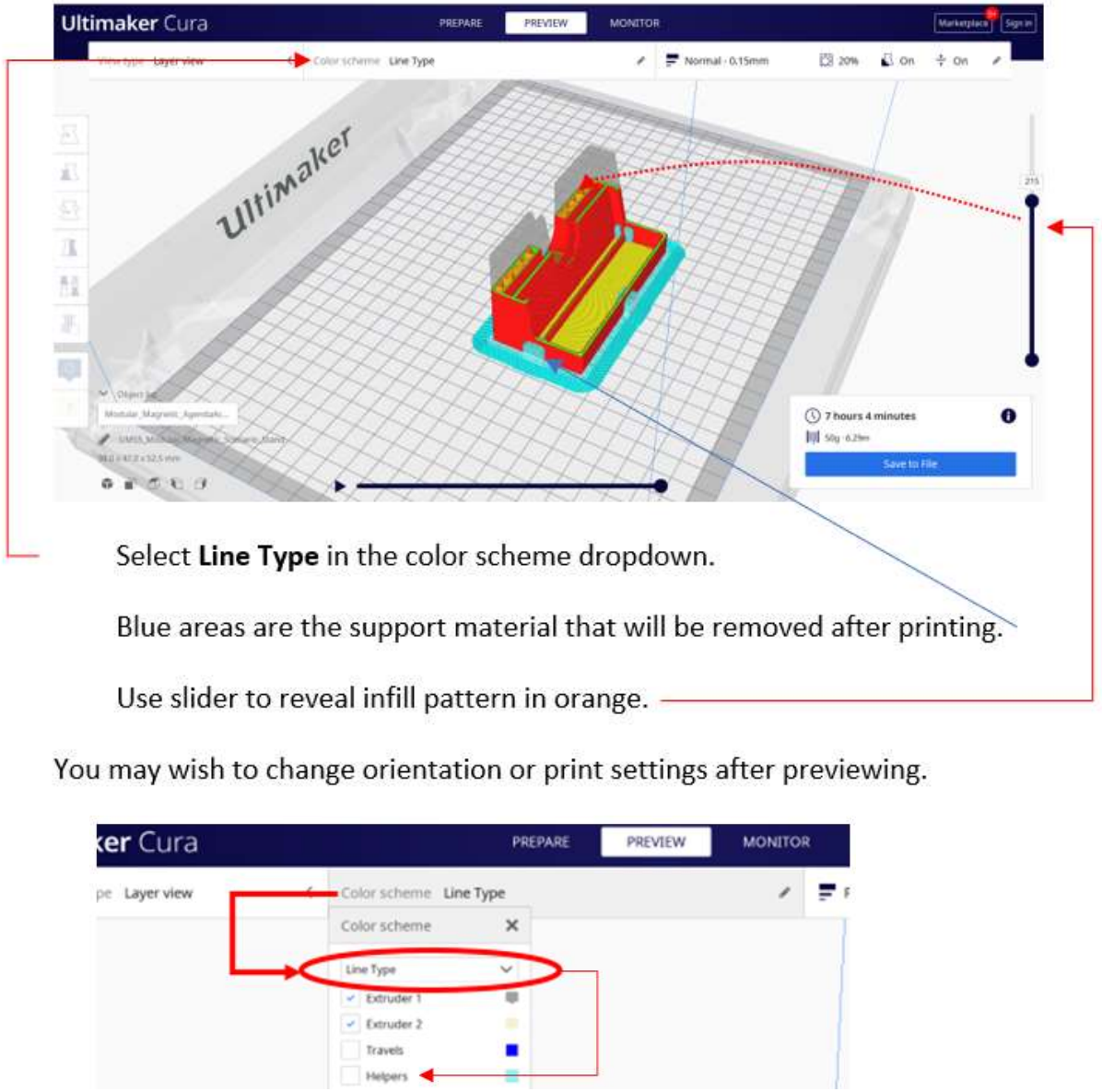
7	Re-size Object (If needed)	Click on object. Click on “Scale” button in left hand menu. Check “Uniform Scaling”. Enter a new value for the X, Y, or Z dimension. With uniform scaling the software will update the other dimensions to keep the object true to original proportions.	This is to scale the print job and make sure the print job is the correct size. It is recommended to making sizing changes in the design software when possible and not in Cura. Using a scaled increase or reduction can result walls and other design elements becoming thinner/thicker than desired as well as other unintended modifications that come with altering the overall size.	

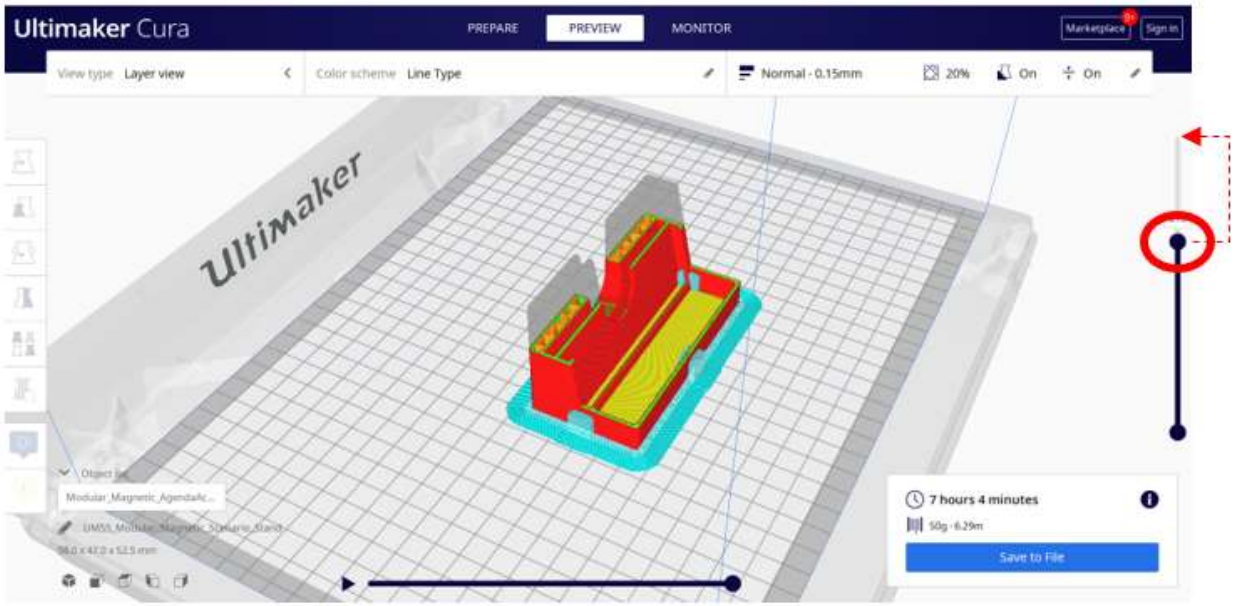
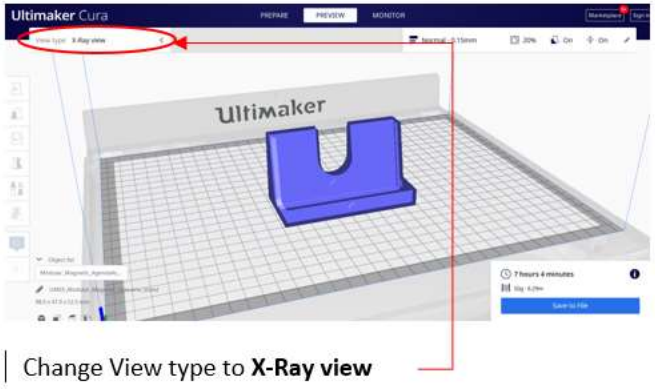
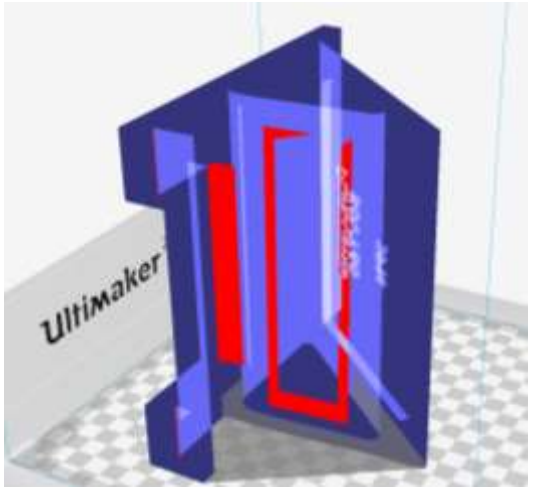
8	Update Print Settings: Profile	Click on Profile and change the settings to: **.15mm** profile Best Quality **0.2** profile Reduces print time but also makes each layer more visible	Alters the layer height of each print level. Other profile options are not supported at the Frisco Public Library.	 8.1 Click on the print settings menu bar.  8.2 Select **Profile**
9	Update Print Settings: Infill	0 – 10% **Not recommended** most likely to give poor end results. **20 – 30%** recommended for most items **40 – 60 %** very strong, slow print time, good for parts under stress **100% solid** slowest print time, highest cost	Used to decide how dense the project will print.	 9. Select **Infill**

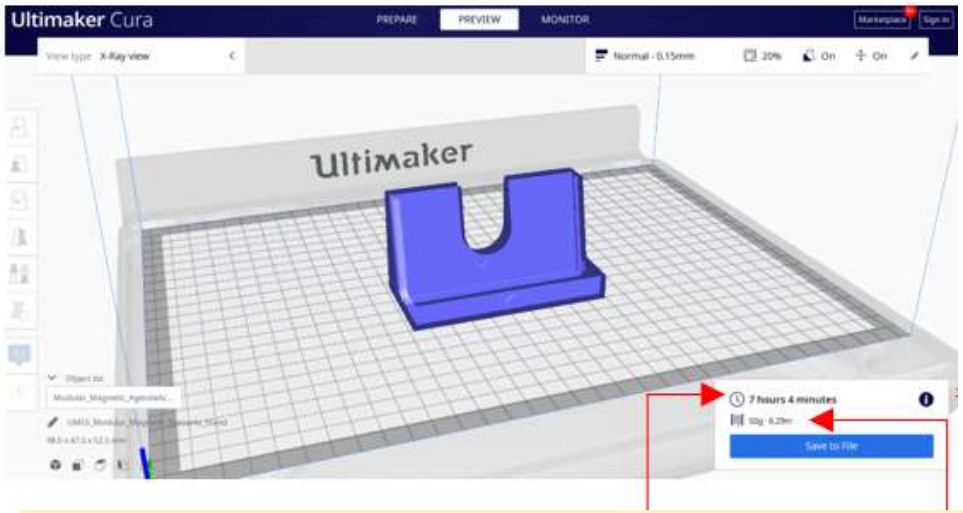
10	Update Print Settings: **Check** Support Supports will only be applied where it is necessary.	Choose **Extruder 1** for PLA supports that you will break away after printing Double check that you have disabled Extruder 2. **See Step # 2**	Supports used to help provide scaffolding needed for overhangs. NOT CHECKING SUPPORTS IS THE MOST COMMON CAUSE FOR FAILED PRINTS.	 

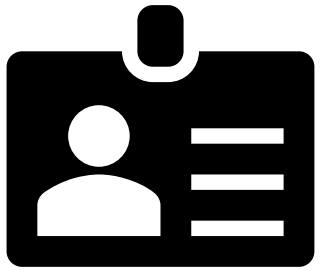
11	Update Print Settings: **Check** Adhesion	Place a check in the Adhesion checkbox.	Adhesion will add a removable brim to keep object in place during printing process. If object moves during printing, job will not successfully be completed.	
12	Slice	Click “Slice” button on bottom right.	This will transform the file from .stl or .obj into G-code that includes layer by layer specific instructions for the printer type chosen. The printer uses these instructions saved as a .**UFP** file to recreate the object.	

13	Preview	Click “Preview” button. Change the **Color scheme** field to **Line Type.** The line type preview is a color-coded preview that allows you to see exactly how the printer will create the 3D model.	This creates a layer by layer view of what the printer will be able to print. This allows you to check for issues (unprintable elements) and see how much temporary supports are required during the printing process. A careful review of the Line Type preview allows you to identify problems before you print.	 

14	Preview Review Supports	Blue sections are the supports. To see a preview that does not include the blue supports (this will allow you to view elements of the model hidden by the temporary supports), click on the Color Scheme Line Type and uncheck **Helpers**. It is important to review the preview that does not show the temporary supports in Step 15.	This will allow you to see how much clean-up work is required after the object is printed. **IMPORTANT**: Supports in small or difficult to reach places will be difficult to remove later.	

15	Preview Review for unprintable areas	Make sure slider is up to the top position. Any areas in gray are elements of the object the printer cannot recreate.	Some elements may be too narrow or thin for the printer to recreate. The printer extruder nozzle is 0.4mm wide. Elements smaller than this cannot be printed.	
16	X-Ray Preview	Check for problem areas that are flagged in red.	Areas highlighted in red are issue areas that likely will prevent this model from successfully printing. It is not recommended to try printing a model with errors shown in the X-Ray view.	 

17	Note the total number of grams and total print time.	On the bottom right after Slicing, there will be a total amount of time to print and number of grams of plastic used to complete the print job. You will need these details to reserve a 3D printer at the library.	You will want to make a reservation for a printer that is longer than the estimated print time (at least an additional 30 minutes). Cost of 3D printing is based on the number of grams of filament you use.	 **Cost to 3D Print** 25 cents per gram
18	Save file to USB drive.	Insert USB drive into computer. The save button will update with a new label. Click "**Save to Removable Drive**" This process saves a **.UFP** file to your USB drive.	You will plug this USB drive with your saved file into the 3D Printer to print your object. Flash drive must be formatted using FAT32 and have a total storage between 1 and 32 GB.	 FAT32 formatting required 1 – 32 GB Total Capacity 

19	Reserve a 3D printer online	See the library website to book one of the Ultimaker S5 3D printers at the library. We recommend adding **<u>at least</u>** 30 minutes to your reservation for: • Check-in • Safety Review • Machine boot up • Machine cool down • Clean-up	It is not possible start a 3D print, pause and then resume 3D printing that same object at a later time. You will need a reservation that is long enough to include additional time to check-in, review the safety precautions, and clean up time.	friscolibrary.com/3d-printing
20	Bring to the library: Library Card Photo ID	You will need your photo ID at check in. Be sure you are using your own library card account. All fees are billed to the library card account used to make the reservation.	Because fees are billed to the library card account making the reservation, we are unable to allow guests to another individual's card to book time on a 3D printer.	

TOOL INVENTORY

Drawer 1

- Cleaning Filament Container
- Cleaning Instructions

Drawer 2

- Removing Spatulas (3)
- Glue Sticks (3)
- USB Cover Key (1)

Drawer 3

- Cura Preparing Instructions
- 3D Printer Operating Instructions

Drawer 4

- Cutters
- Bolt Driver
- Screw Lubricant
- Oil

Drawer 5

Staff Only - Filament and Filters