

3D Printer Badge: Bambu Lab A1

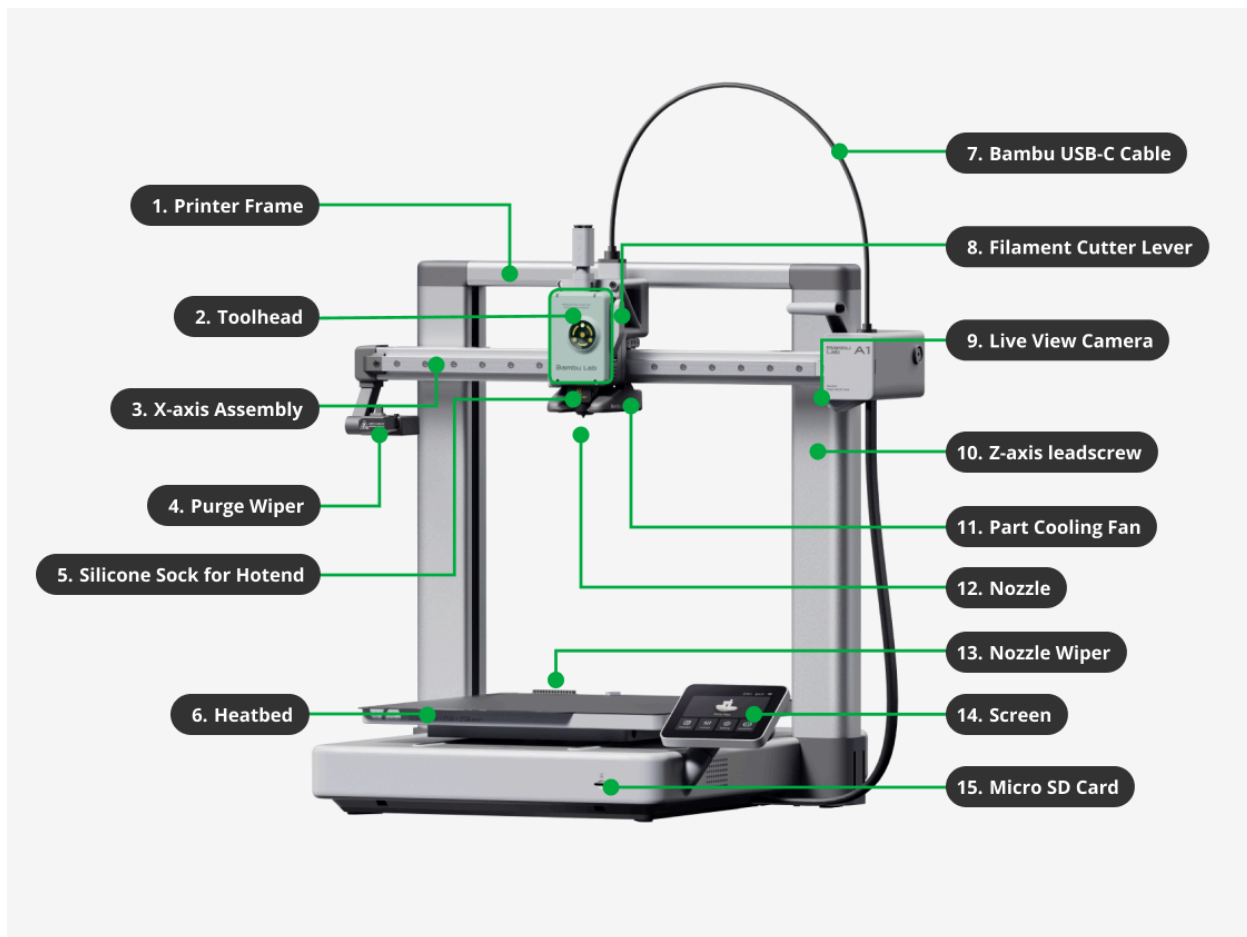
Age: Grade 6-Adult

LEVEL 1

Objectives:

- To learn the basic functions of the 3D printer.
- To print from the Bambu Studio slicer.
- To change the filament with supervision.

1. Identify parts of printer and their functions



1. **Frame**

2. **Toolhead:** Houses the hot end, the extruder, sensors, and cooling fan.

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3. **X-axis:** The toolhead moves left and right along this assembly.
4. **Purge Wiper:** When the printer changes filament or starts a job, it extrudes a tiny amount of filament. The wiper ejects the purged filament from the nozzle.
5. **Hotend sock:** Insulates the hotend so it does not drop below extrusion temperatures.
6. **Heatbed:** Where the prints are built. Moves back and forth along the Y-axis. Does not require any glue or other adhesive.
7. **USB-C Cable:** Connects the toolhead to the printer's mainboard.
8. **Filament cutter lever:** Automatically cuts the filament when changing it out.
9. **Live View Camera:** Capable of capturing real-time footage and time-lapse video of prints.
10. **Z-axis leadscrew:** The toolhead moves up along the Z-axis as the print proceeds.
11. **Part cooling fan:** Cools the filament after it is extruded.
12. **Nozzle:** Where the filament is extruded from.
13. **Nozzle wiper:** Cleans the nozzle automatically at the start of every print.
14. **Screen:** Where you can load and unload filament, adjust printing speed, and pause or stop the print job.
15. **Micro SD Card Slot:** Stores a micro SD card that captures past models as well as footage from the camera.

OTHER TERMS:

.STL File—Commonly used file format for 3D models.

Bowden Tube – Guides the filament from the spool into the toolhead.

Textured PEI - The material the removable heatbed is made of.

2. Safety Guidelines

- Do NOT touch any part of the printer other than the screen while the printer is in motion.
- Use only CRRL-supplied PLA plastic filament.
- The extruder is HOT (250 degrees Celsius or 482 degrees Fahrenheit). Don't ever touch it, even to remove strands of filament; the machine will autoclean the nozzle before the print begins.
- The heatbed will be very warm after a print completes. Ask a staff member to remove the print for you.

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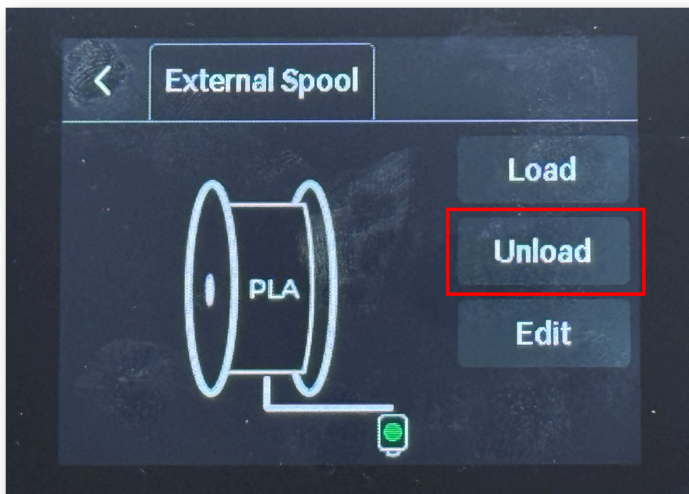
3. Unloading and Loading Filament

3a. Unloading

1. Tap **Filament** on the touchscreen.



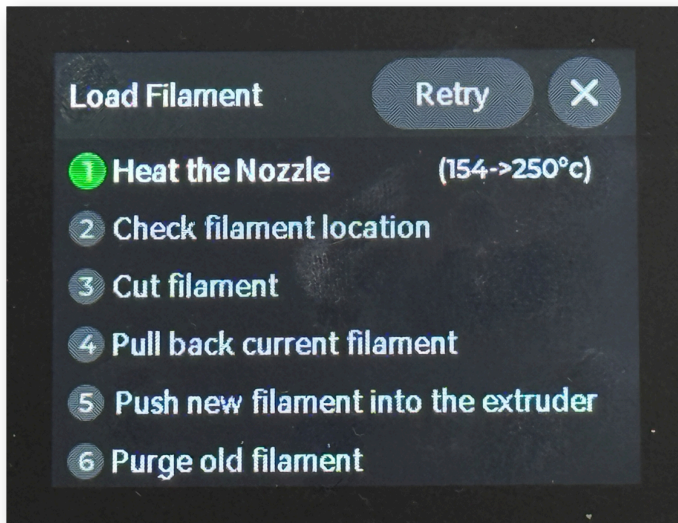
2. Tap **Unload**:



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3. The printer will heat the nozzle to 250 degrees C.



4. The toolhead will move from its home position to the right side of the X-axis and press against the filament cutter.



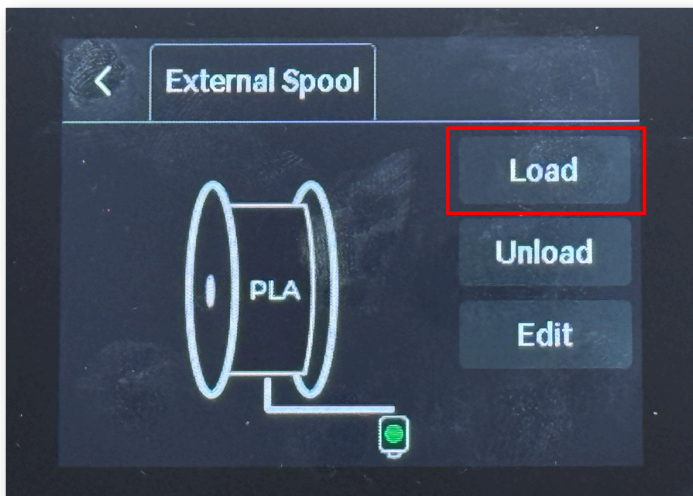
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5. When the toolhead returns to its home position on the heatbed, you may gently remove the filament by rotating the spool backwards until the filament has fully been removed from the bowden tube.

3b. Loading

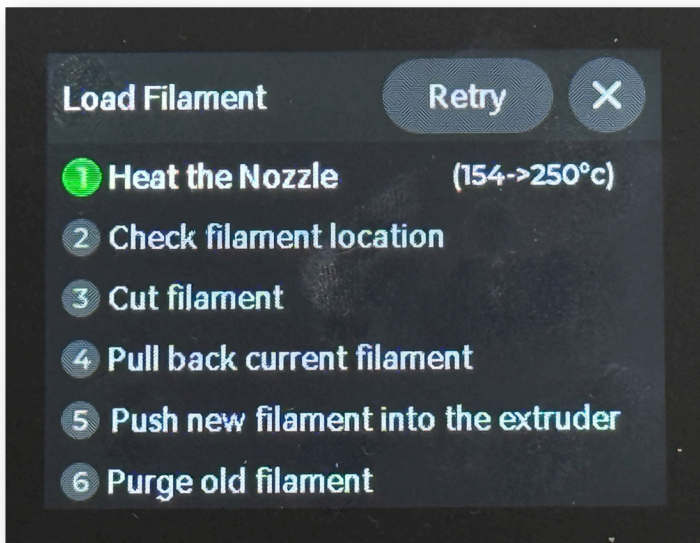
1. From the filament screen, tap **Load**:



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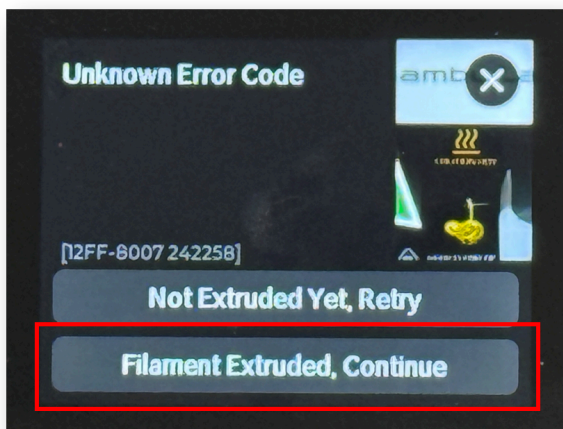
2. Wait for the nozzle to heat to 250 degrees C.



3. When the touchscreen reads **Push new filament into the extruder**, load a spool of filament onto the filament holder so that the filament is coming off the top. Gently push it into the bowden tube until you feel resistance.

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4. On the touch screen, ignore any error codes and tap **Filament Extruded, Continue**.

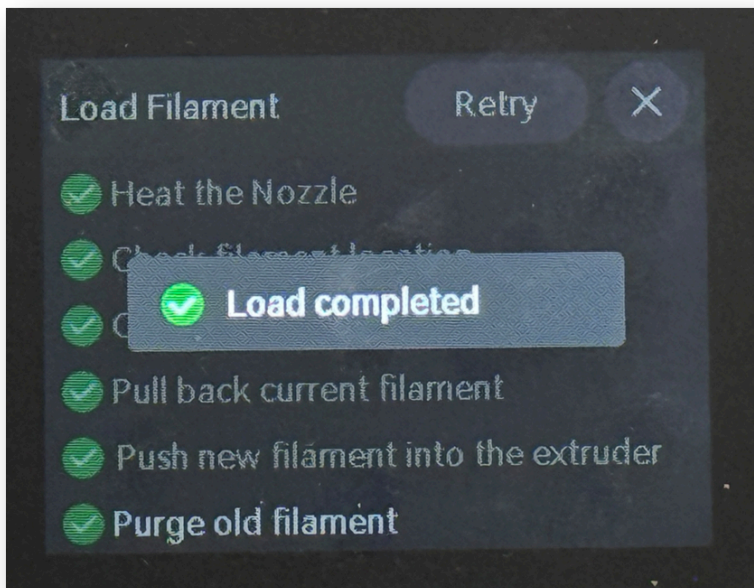
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5. Watch the nozzle to make sure the old filament is coming out.



6. When the old filament has been completely extruded, the screen will read **Load Completed**. Tap the screen to dismiss this message.

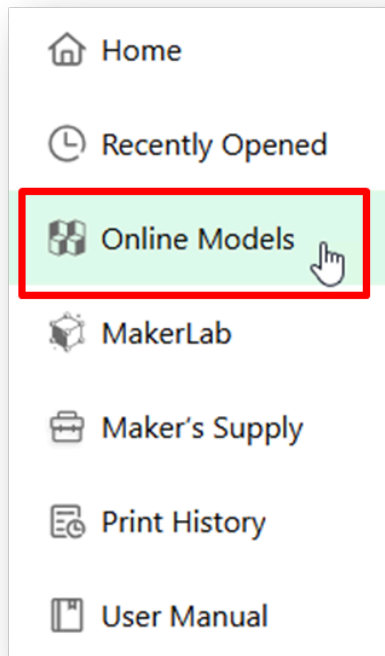


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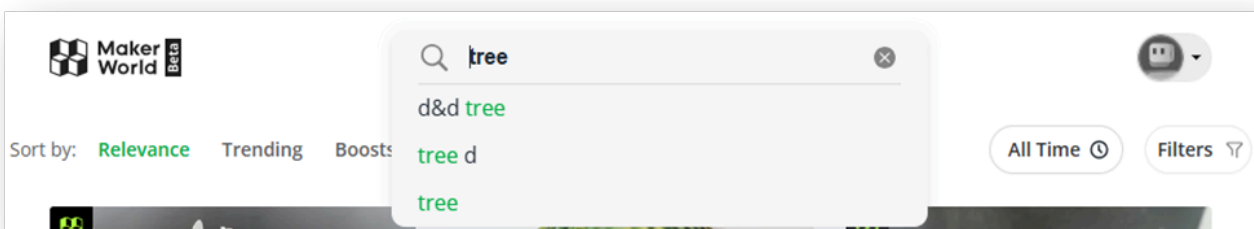
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4. Selecting a Model to Print via Makerworld

4a. Choose Online Models



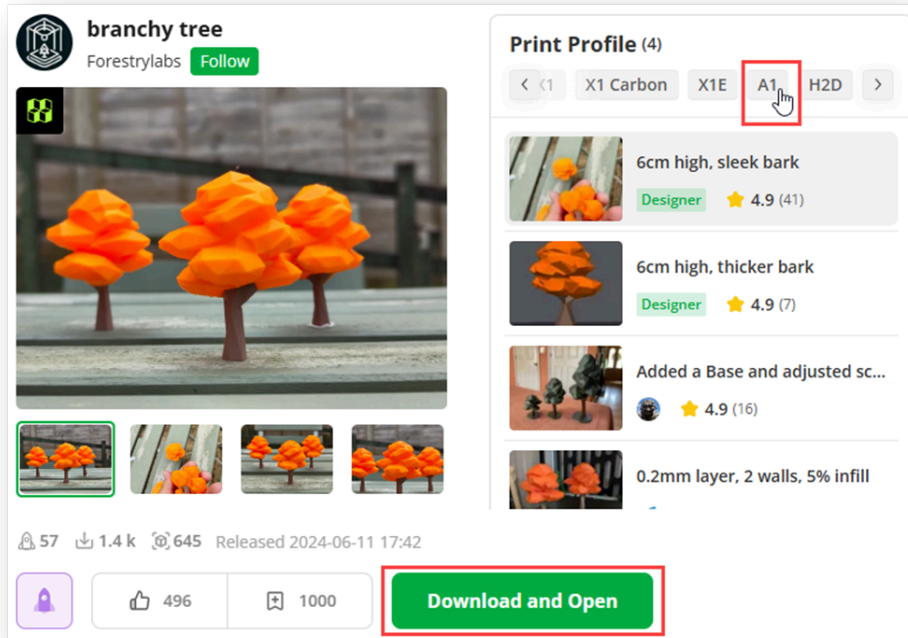
4b. Search for a model to print



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4c. Choose the A1 Print Profile; click Download and Open

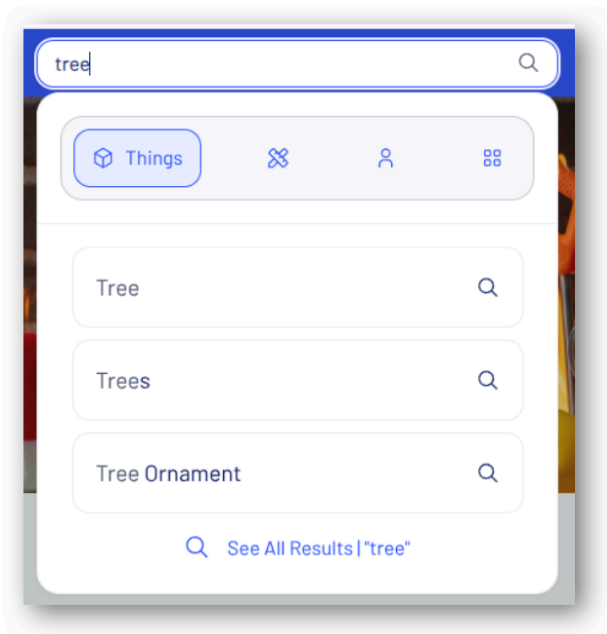


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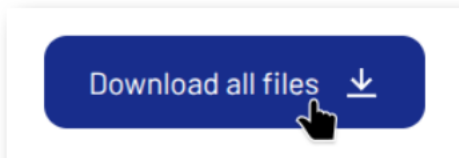
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5. Selecting a Model to Print via Thingiverse

5a. Go to <http://www.thingiverse.com> and find a model



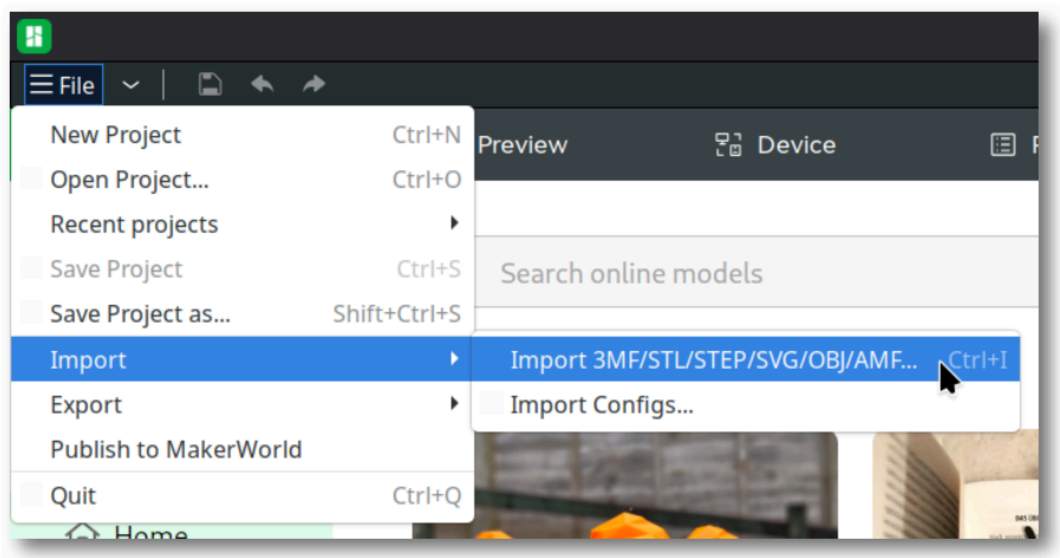
5b. Click Download all Files and extract the files from the .zip to the desktop



5c. In Bambu Studio, go to the File menu, choose Import STL and open your file

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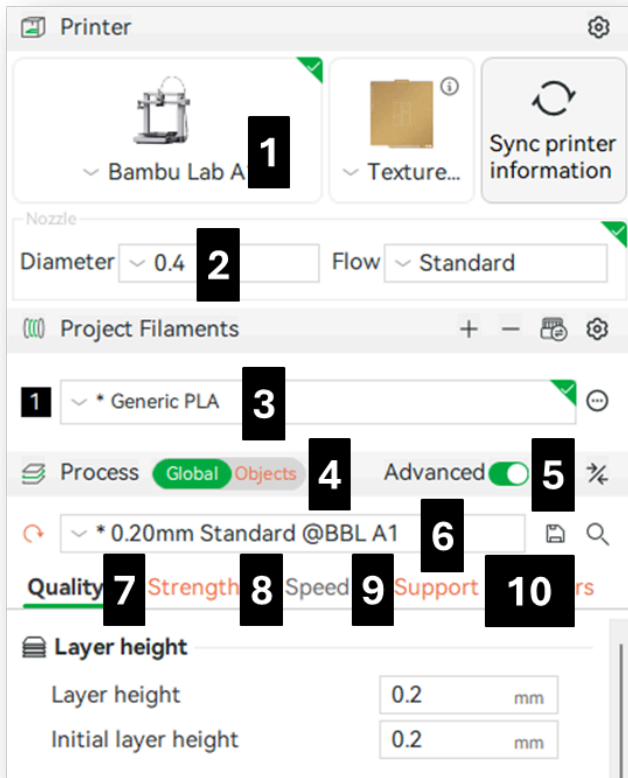


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6. Bambu Studio Layout

6a. Printer Settings

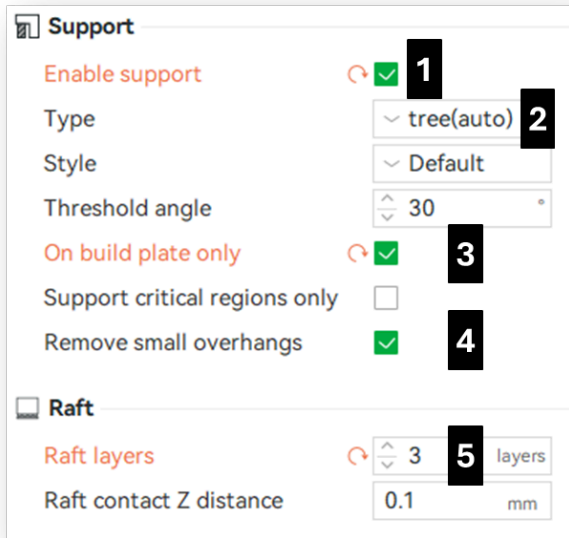


1. Printer Model - always set to **Bambu Lab A1**
2. Nozzle Diameter - always set to **0.4**
3. Filament type - always set to **Generic PLA**
4. Global vs Objects - always set to **Global** to make changes to ALL objects on the build plate at once.
5. Advanced Options - toggle **ON**
6. Print Quality - The lower the number, the higher the quality. Do not set beyond **0.12 High Quality**. Higher quality jobs will take longer to print.
7. Quality settings - ignore
8. Strength settings - ignore
9. Speed settings - ignore
10. Support settings - See next section for more details.

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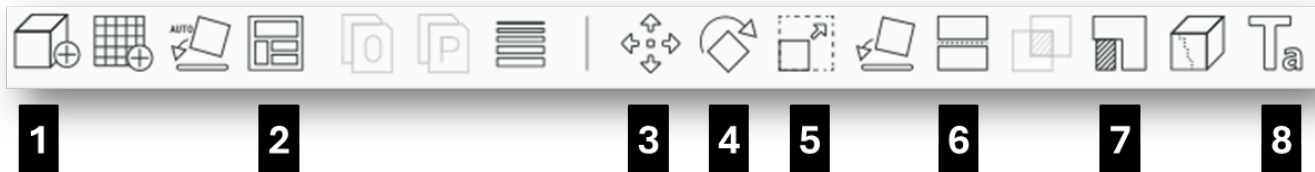
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6b. Supports Settings



1. For models with overhangs like the tree above, enable supports.
2. Set support type to **tree (auto)**.
3. To minimize contact with the model, check **On build plate only**.
4. Remove supports from small overhangs that might not need them.
5. For narrow objects, set a 3 layer raft

6c. Object Controls



1. Add an additional object to the heatbed. Multiple files may be printed at once, but do not add more than one at a time or they will be grouped together.
2. Automatically arrange objects on the heatbed.
3. Move the object on the headbed.
4. Rotate the object - may be necessary for ideal positioning.
5. Scale the object - increase or decrease its size along each axis.
6. Cut the object in half - ideal for large prints.
7. Paint supports - manually add and ignore supports on your model; supports must be set to **tree (manual)**.
8. Add text to your model - best suited for geometric models.

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7. Slice and Print Your Model

1. Click **Slice Plate** in the upper-right corner:



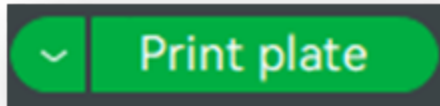
2. Look over the slicing results. Make sure the **Total Time** will let your print be done by the next time IdeaSpace opens. If not, you will have to adjust either the size or number of models on the plate, or lower the quality of the print to reduce the amount of time needed.

Slicing Result			
Color Scheme ▼ Filament			
Filament	Model	Support	Total
■ 1	3.04 m 9.08 g	0.46 m 1.38 g	3.51 m 10.46 g
Filament change times: 0			
Cost: 0.21			
Time Estimation			
Prepare and timelapse time: 6m17s + 8m42s			
Model printing time: 50m36s			
Total time: 1h6m			
Options		Display	
<input type="checkbox"/> Travel		<input type="checkbox"/>	
<input type="checkbox"/> Retract		<input type="checkbox"/>	
<input type="checkbox"/> Unretract		<input type="checkbox"/>	
<input type="checkbox"/> Wipe		<input type="checkbox"/>	
<input type="checkbox"/> Seams		<input checked="" type="checkbox"/>	

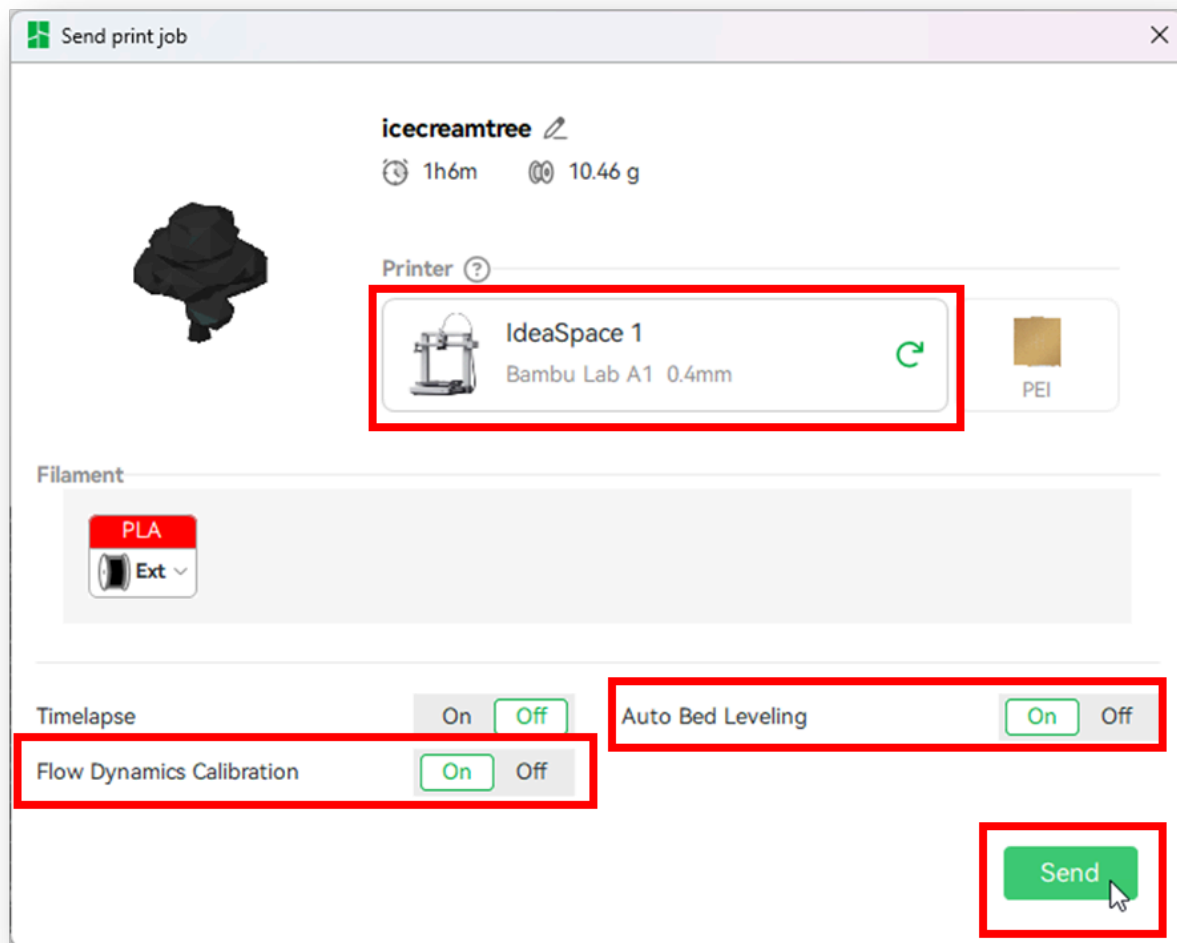
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3. Click **Print Plate**:



4. Set **Timelapse** to OFF and **Flow Dynamics Calibration** and **Auto Bed Leveling** to On. Make sure your assigned printer is selected (IdeaSpace 1, 2, 3, or 4) and click **Send**.



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LEVEL 2

Objective:

- *Learn troubleshooting tips and independently demonstrate Level 1 procedures to earn the 3D printer badge.*

1. Troubleshooting Tips

- **IMPORTANT:** If the machine is malfunctioning, please notify the desk staff immediately.
- **Pause or Cancel a print in progress**
Press the pause or cancel button on the touchscreen.
- **Clicking sound?**
Means there is a snag. Pause the print and run out the spool until you've exposed and eliminated the snag.
- **Filament not extruding?**
Push the filament extra hard into the bowden tube, then attempt to reload it.
- **Filament is dragging**
The Z-offset may need to be adjusted in the slicer settings. Speak with a staff member for help.
- **Toolhead is breaking off supports by moving too fast**
Tap the touchscreen → Control → 100% → 50%. This can be done mid-print.
- **Bambu Support:**
<https://bambulab.com/en/support>
IdeaSpace provides access to the **A1** model.

2. Safety Precautions

- When the printer is in motion: DO NOT touch the printer or jostle the work area.
- The toolhead is extremely hot. DO NOT touch it at any time.
- Always ask a staff member to remove your print from the heat bed
- Only CRRL-provides filament is allowed
- The cover over the time lapse camera must remain in place at all times. DO NOT remove it.

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- Children younger than 6th grade are not allowed to use the printers
- Failure to observe these precautions could result in the loss of 3D printer privileges.

3. Successfully demonstrate the Level 1 procedures to the staff member supervising your training at a MakerLab session

4. Sign the MakerLab Agreement and get your badge

Congratulations! You are now ready to operate the Bambu Lab A1 3D printer independently.

Free 3D Design Software

- <https://www.tinkercad.com/> - online basic 3D modeling for beginners.
- <https://www.blender.org/> - advanced open source 3D modeling software that supports the entire creative pipeline.
- <https://www.freecad.org/> - open source parametric modeler.

Learn more about 3D printing

- Coursera: <https://www.coursera.org/courses?query=3d%20printing>
- YouTube:
 - <https://www.youtube.com/@3DPrintingNerd/videos>
 - <https://www.youtube.com/@MAKE>
 - <https://www.youtube.com/@MadeWithLayers>