

3D Printed Balloon Car

I decided that [redesigning the car from scratch in Fusion](#) was the easiest way to achieve the changes I wanted to make to the vehicle.

Refinements

Functional

- I used user parameters throughout the design so that I could change the values of the car on the fly.
- I used a conic curve to cut out the slot underneath the car to be able to choose the shape and how much material I was cutting out.
- I gave the balloon connector a mouthpiece for ease of filling with air. This will most likely need support.

Aesthetic

- I gave the nose more shape than my previous redesign, because the flat nose was just not something I liked about my car.
- I used fillet on most of the edges from side to side of the car, but used chamfer on the edge all the way around the car.

3D Printing

- I made the balloon connector very short from the top of the car so it wouldn't need supports for the center part of the connector.
- I gave the axle tubes on the chassis a .3mm offset so that I could have an easier time fitting the axles in.

https://youtu.be/hubp7x_pfY8 first video

https://youtu.be/0_-1KCXeT6M second video

https://youtu.be/OMv_ipfRXnQ third video

Printing the Car

I printed the car in the CCI Makerspace, [sliced the STL](#) with Prusa Slicer, and printed out the car using the Dremel printers. I worked with another student, Luke, on decisions regarding the supports, which were necessary for the overhangs I had on the car. After making the support decisions, Alvin approved my car, and I [started printing](#). I did end up having to leave before it was finished and came back the next day to pick it up, but I got pictures up until about halfway

through the printing process. As Alvin was approving the car, he noticed that I hadn't put holes in the extra wheels to put them on the axles, and I hadn't noticed that until the print had already started. I was originally going to glue the wheels to the ends of the axles, so I brought the car home to post-process.

When I started [post-processing the car](#), I realized the axles were too large to fit inside the car. The axles ended up not being the width of my AxleWidth user parameter (5mm), but were 6mm in width, which made them too large for the axle holes on the car. I had to make a decision, and I decided I would [redesign the wheels](#) by adding holes to the extra wheels and making the axles smaller. I did that again in Fusion and went back to the CCI Makerspace to [re-print the wheels](#).

Once I returned with the reprinted wheels and axles, I [post-processed them](#) and put them on my car. After that, it was time for testing. Before I even put a balloon on the car, I realized the axles still were a little too big for movement, so I knew it wouldn't go too far. Note to self: .3mm is not enough offset to make a big enough axle tube.

Testing the Car

Finally, it was time to test my car. I ran my first test:

https://youtu.be/hubp7x_pf8

This test showed the balloon was being dragged across the floor, causing unnecessary friction. After that, before my second test, I used a rubber band around the center of the car to hold the balloon in front of the car, where it wouldn't make contact with the ground. My second test:

https://youtu.be/0_-1KCXeT6M

In this test, all the car did was make a little U-turn and didn't really go anywhere. I wanted to try one more time, so I ran one more test:

https://youtu.be/OMv_ipfRXnQ

This was the farthest distance it had gone - albeit not very far. Still, some movement is better than none. After all my processing, assembly, and testing, I realized a few things

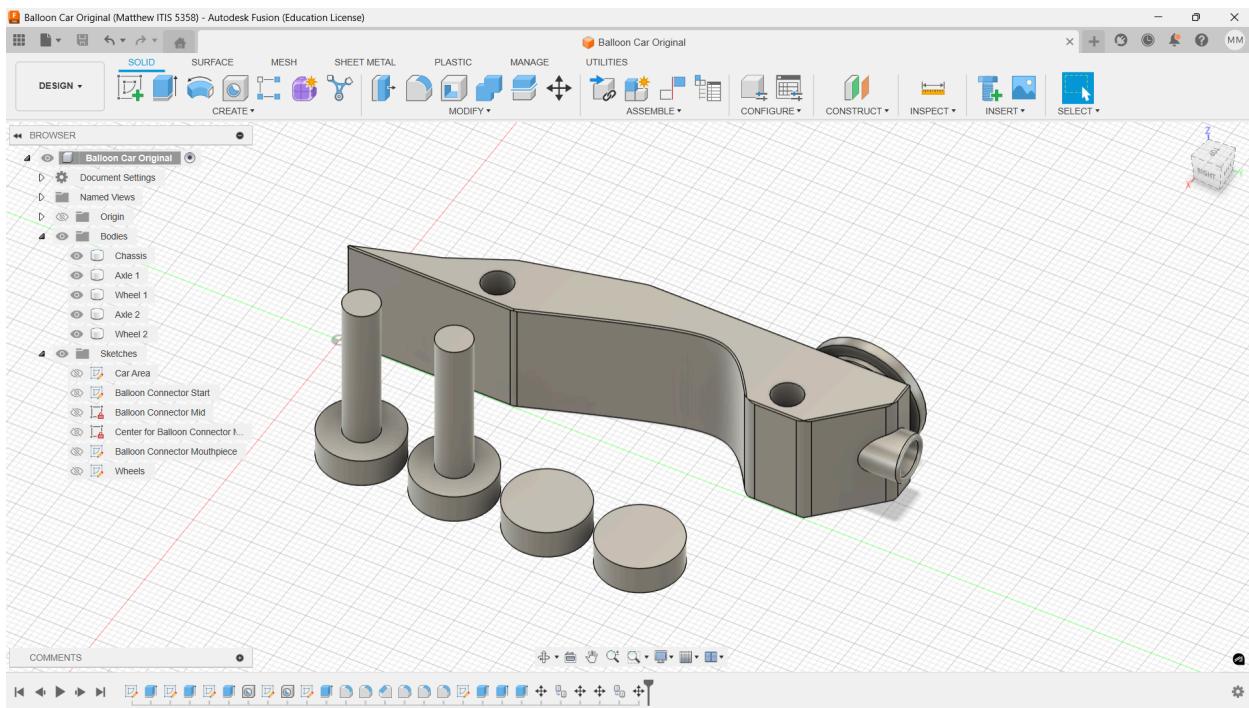
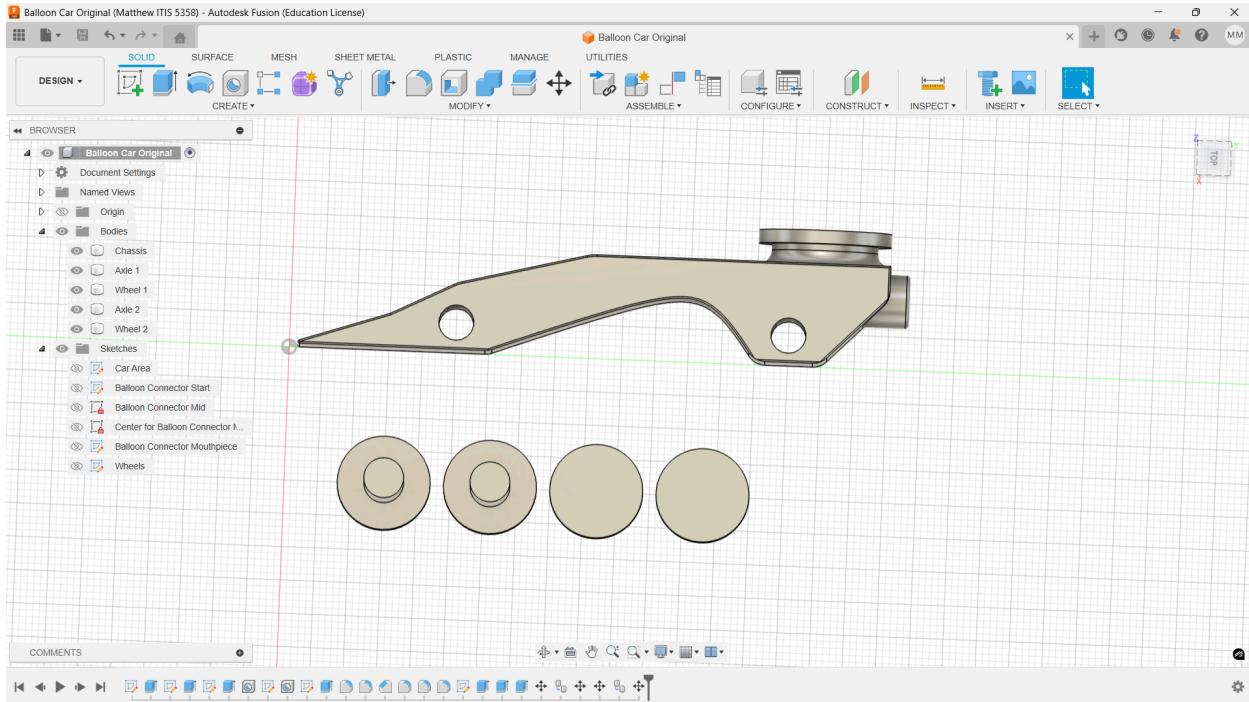
Conclusion

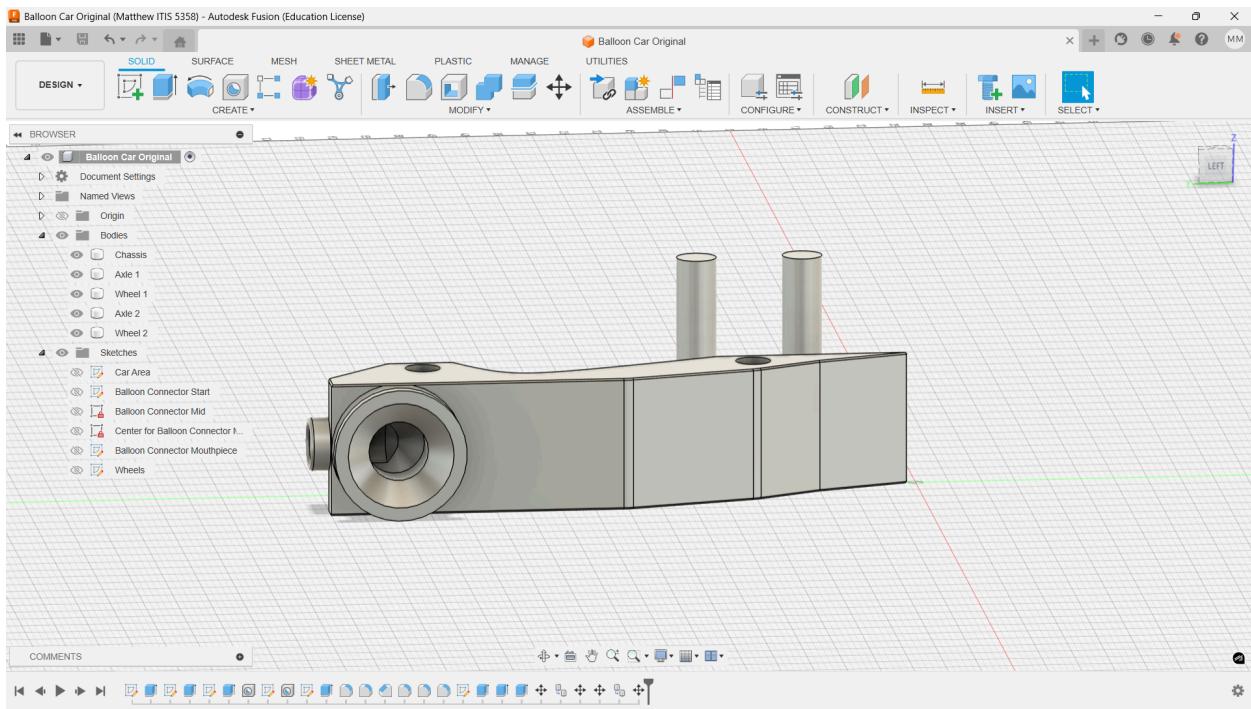
If I were to print another car, I would make the axle tubes slightly larger, make the wheels larger, and make the car taller. I think all of my other functional, aesthetic, and printing changes were helpful, but I could have done more. Regardless, it was still a fun experience.

Pictures and Screenshots

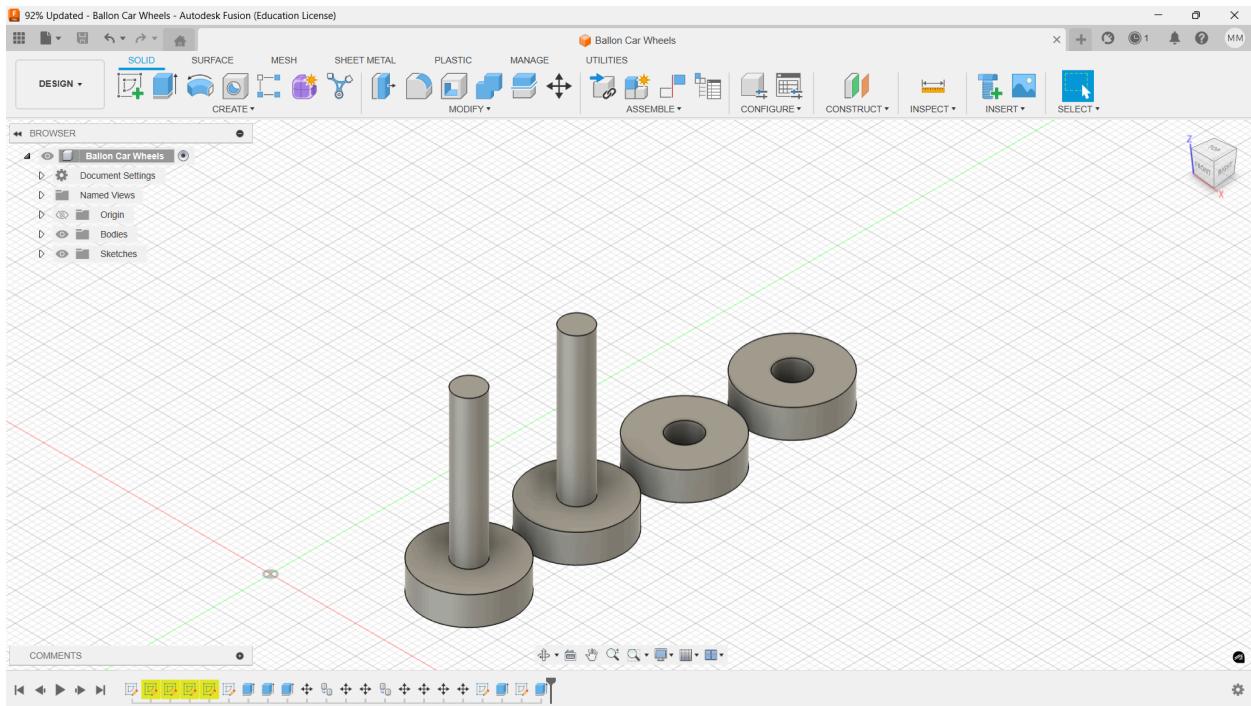
Fusion Designs

The Car

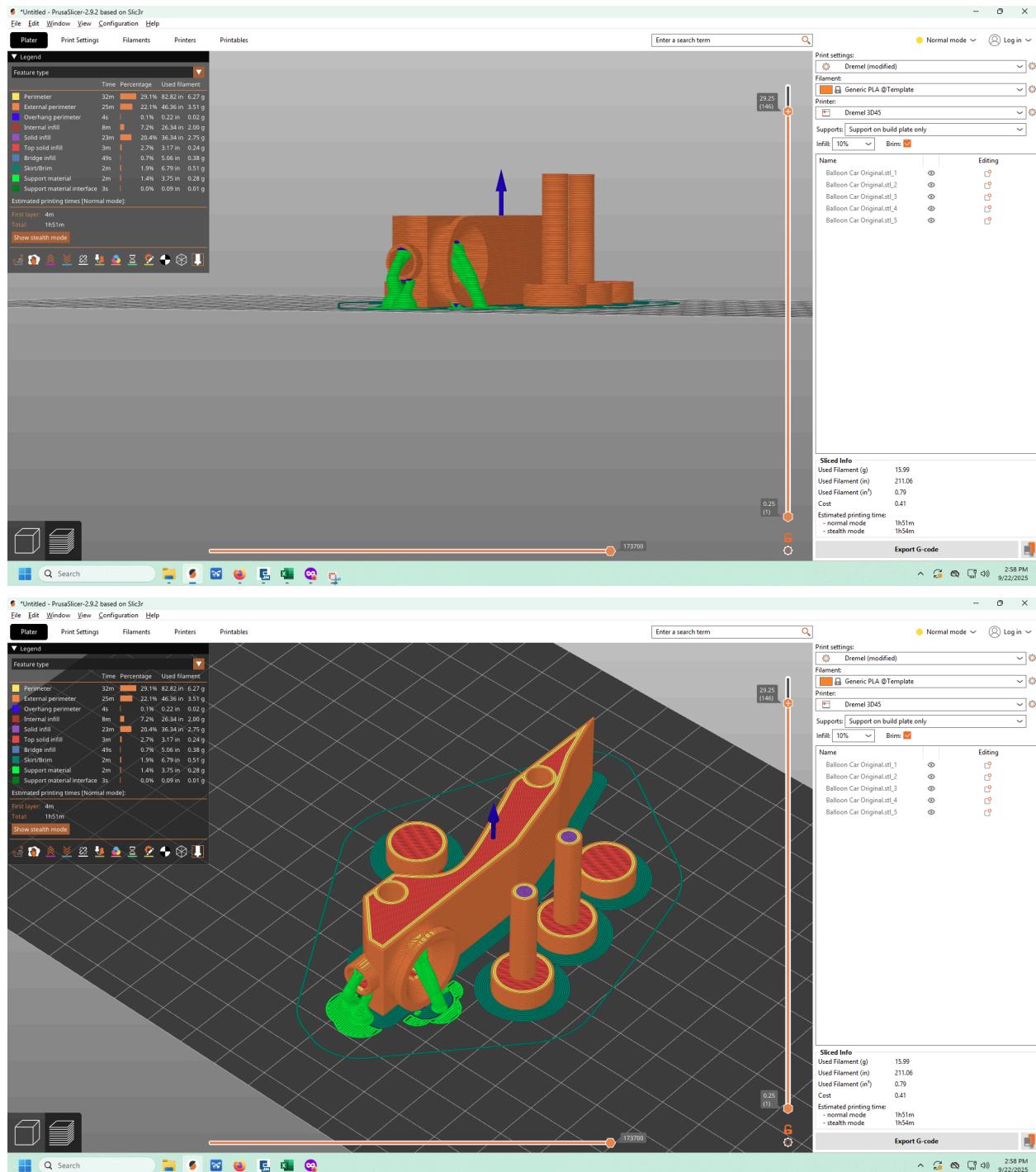




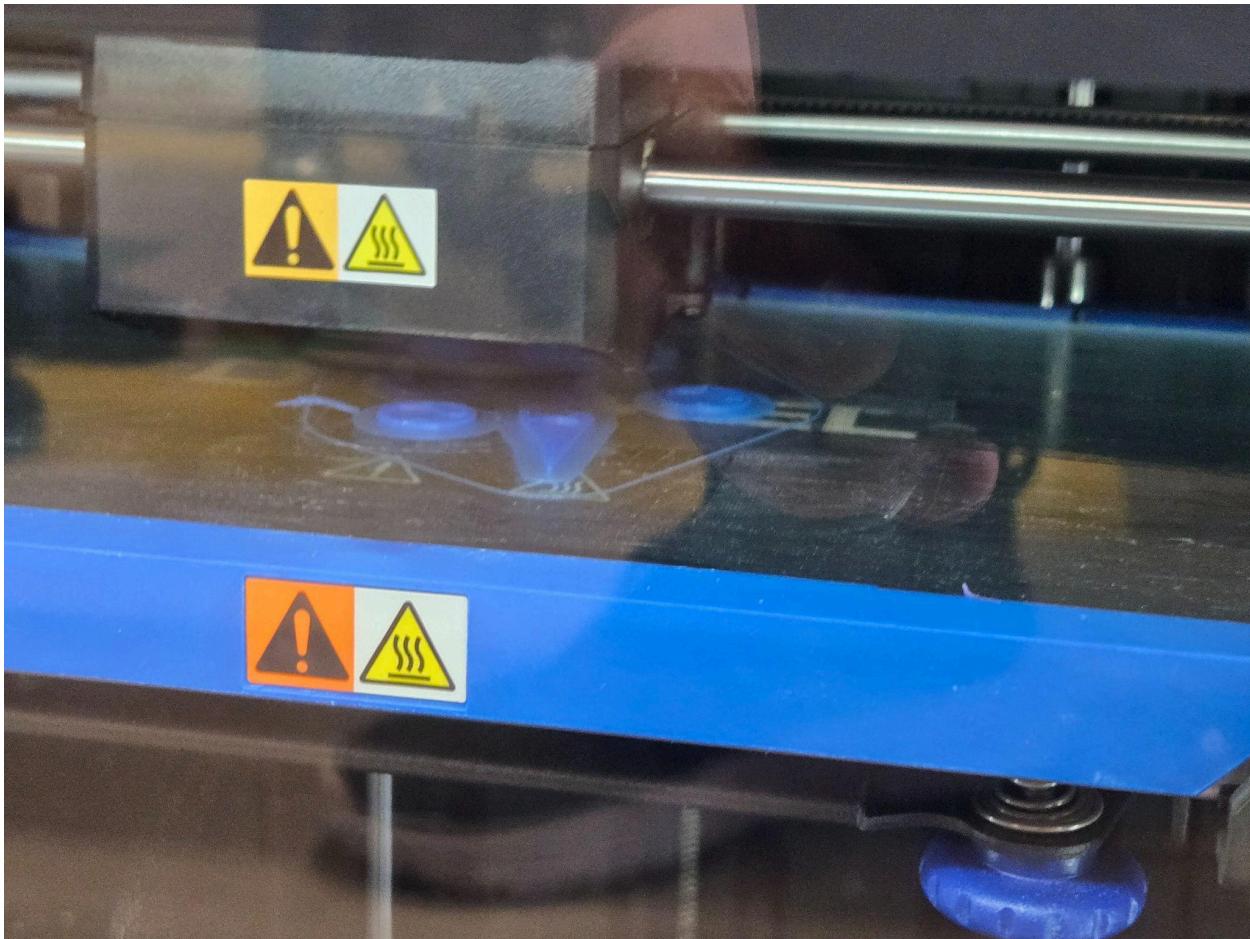
Wheel Redesign

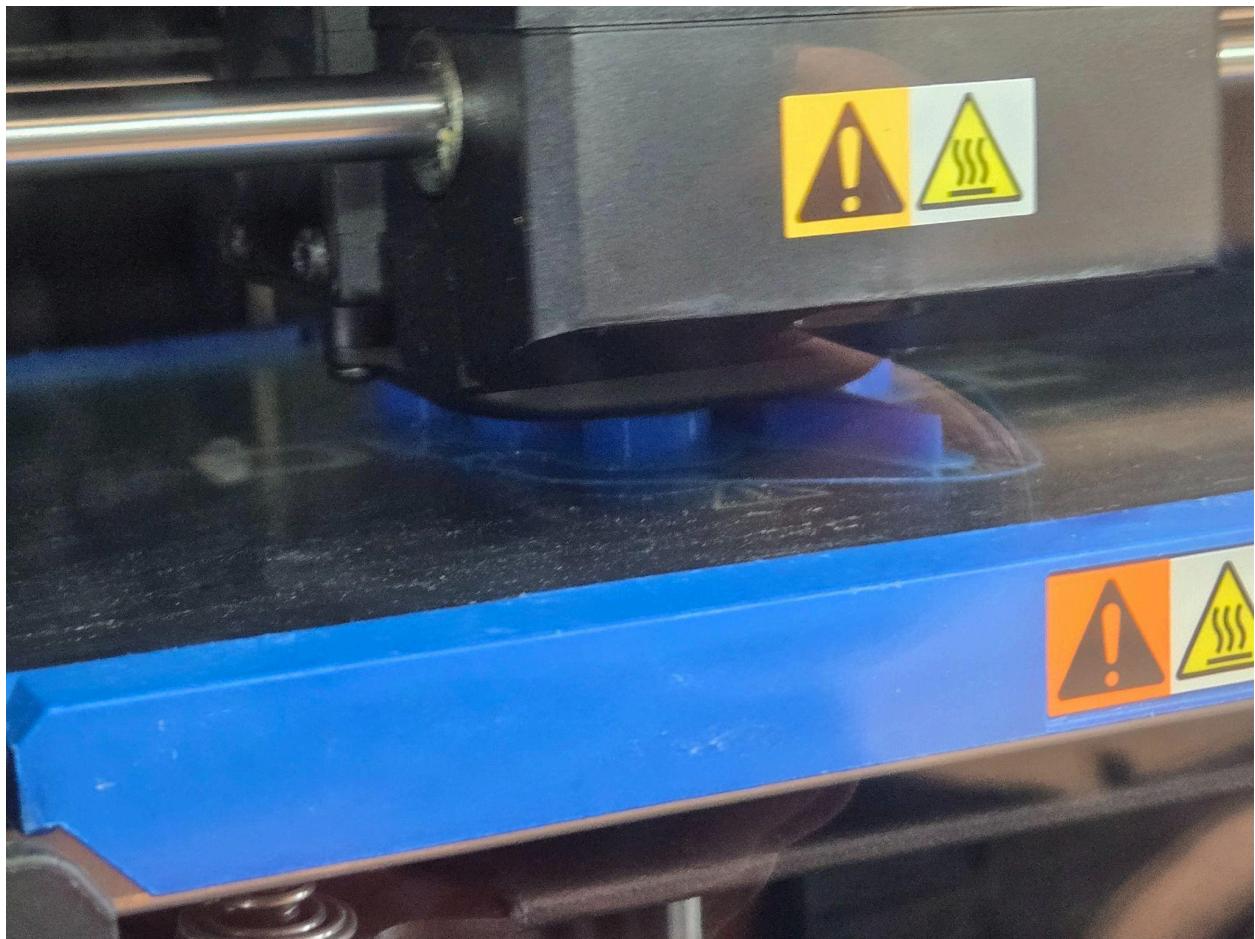


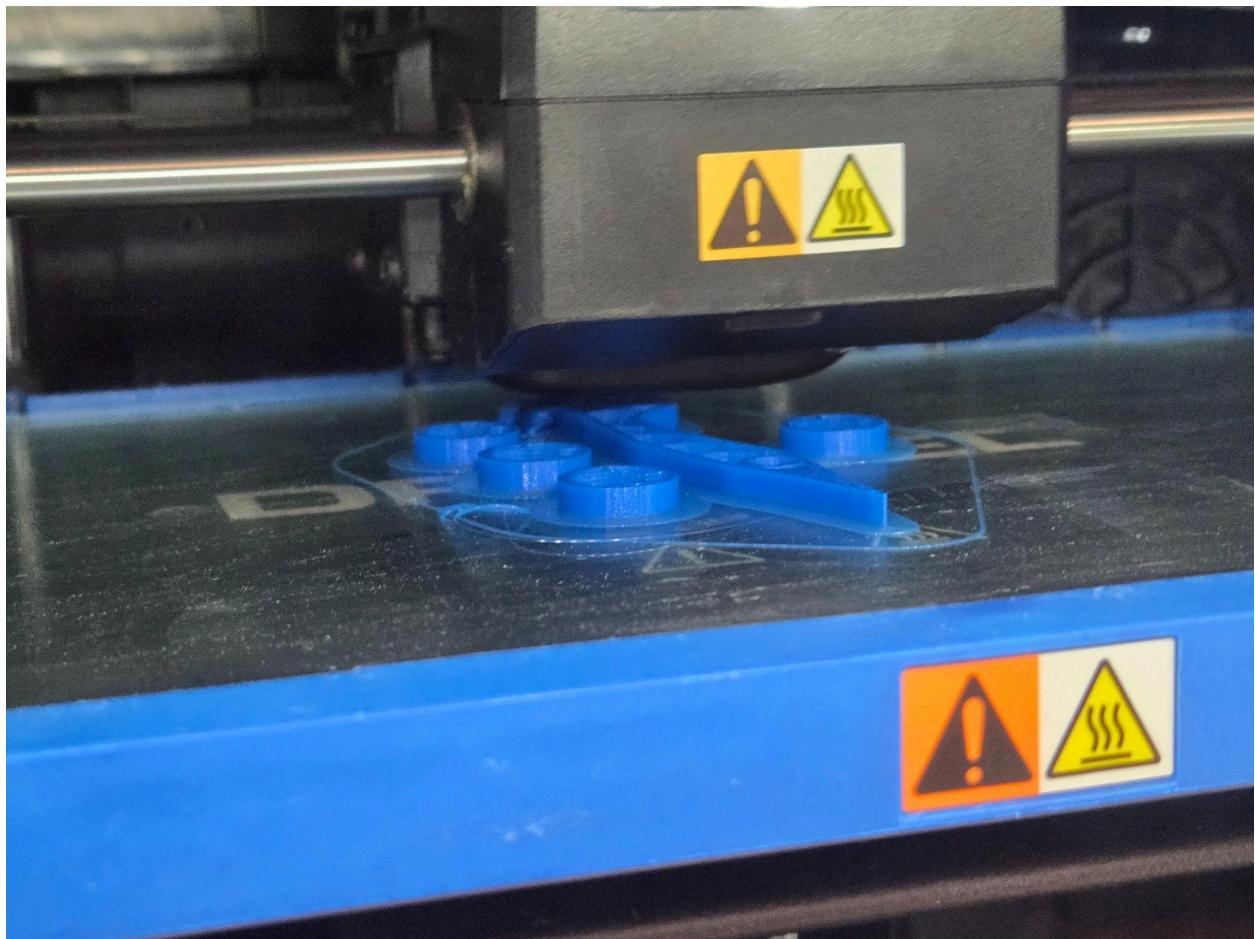
Slicer

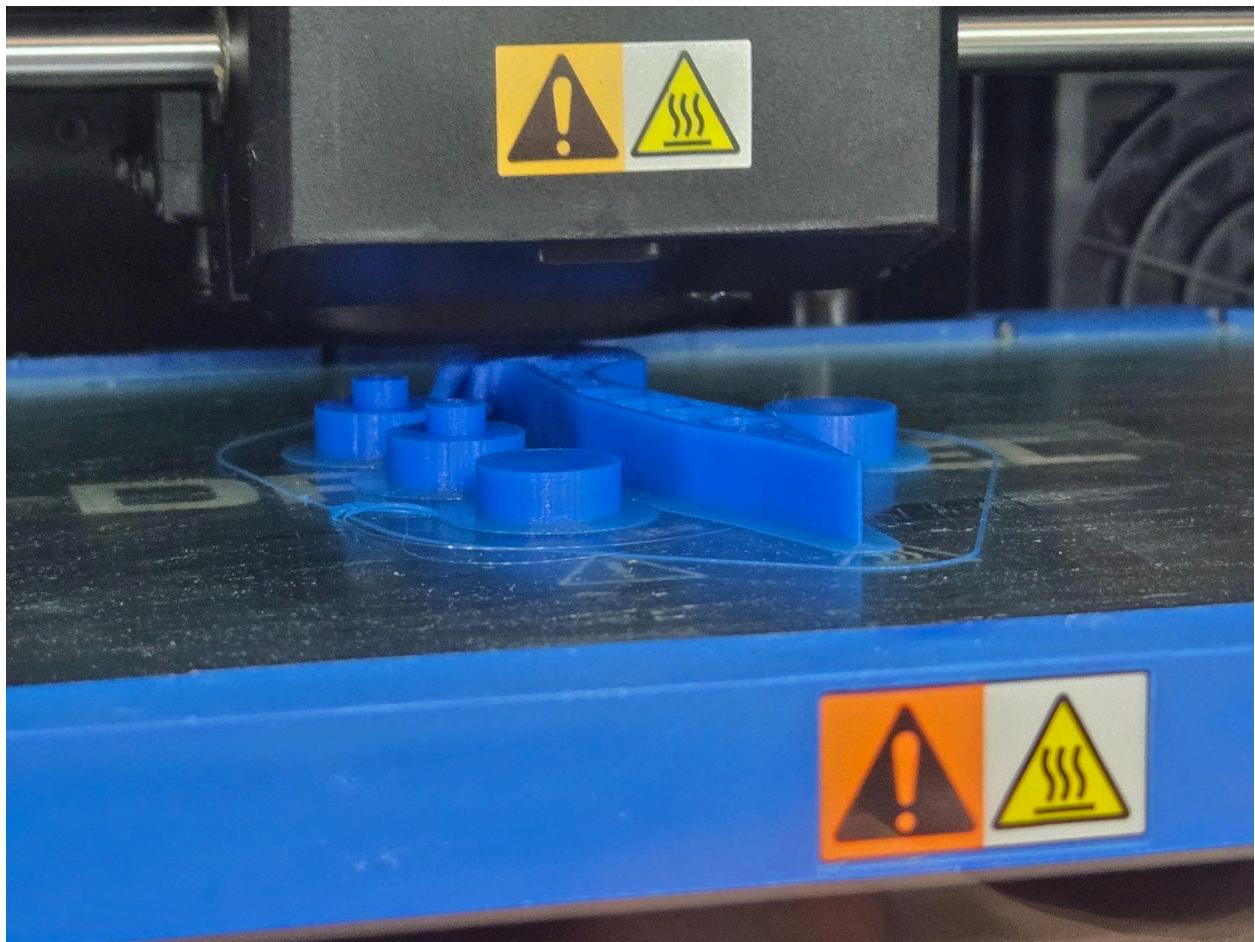


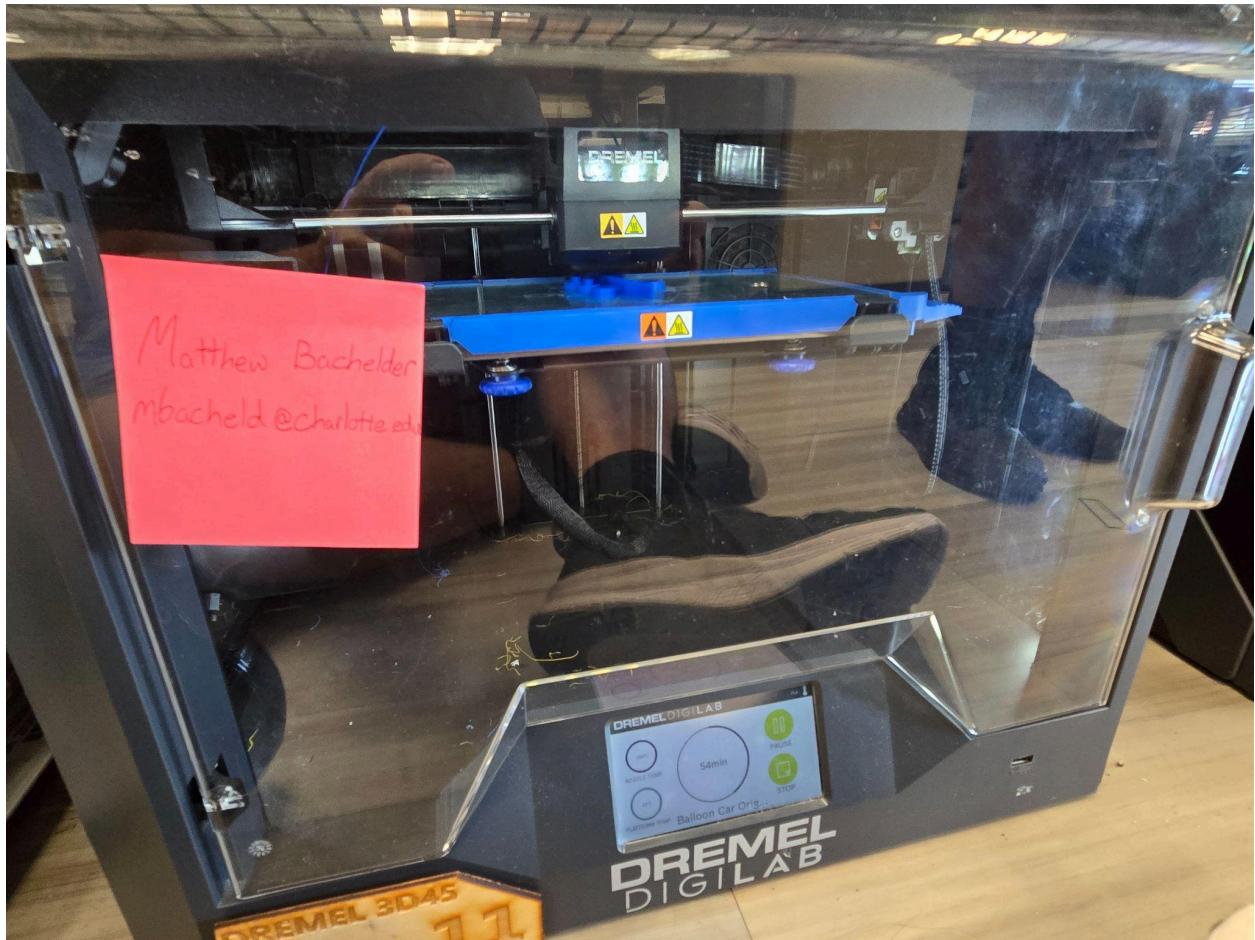
Printing the Car





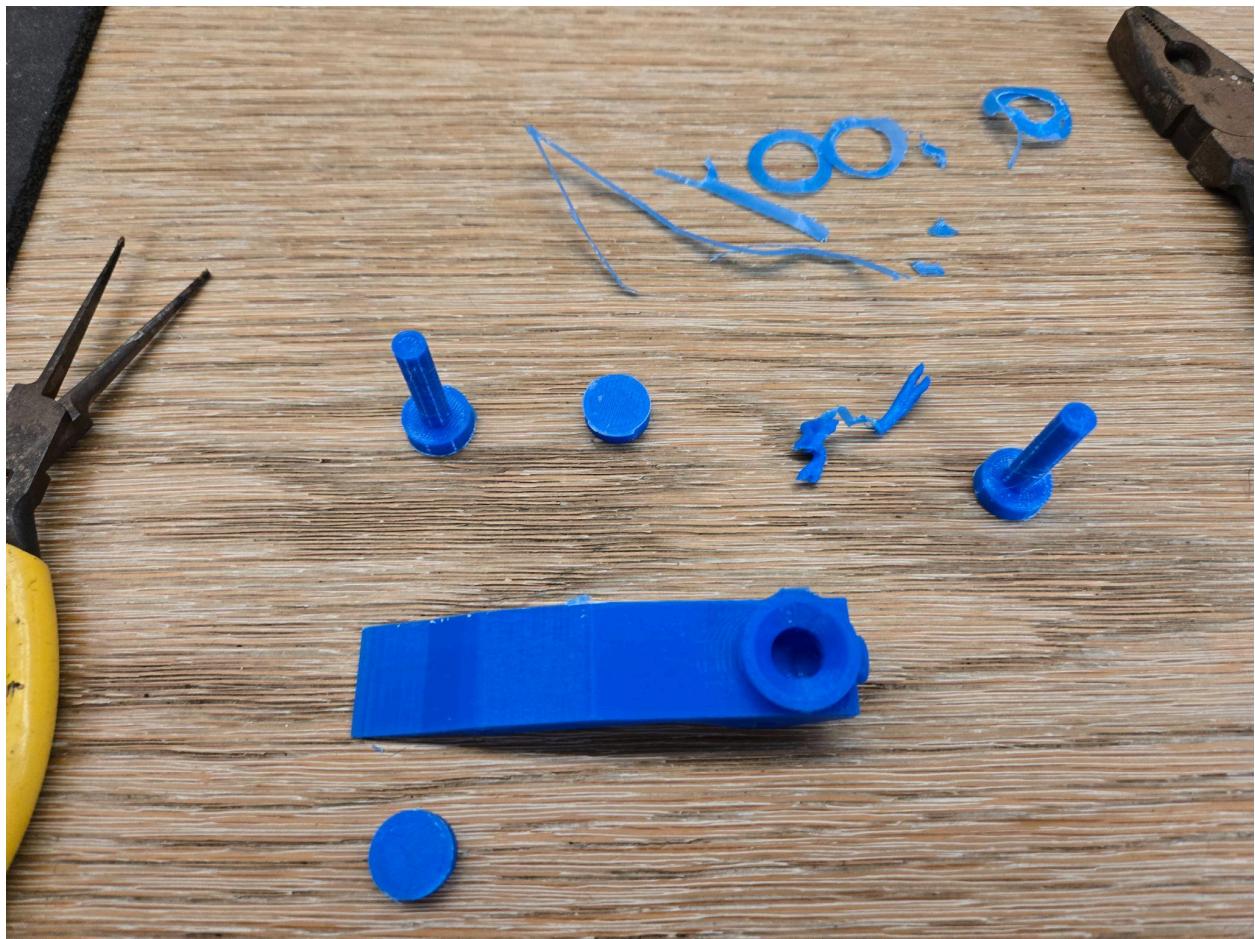


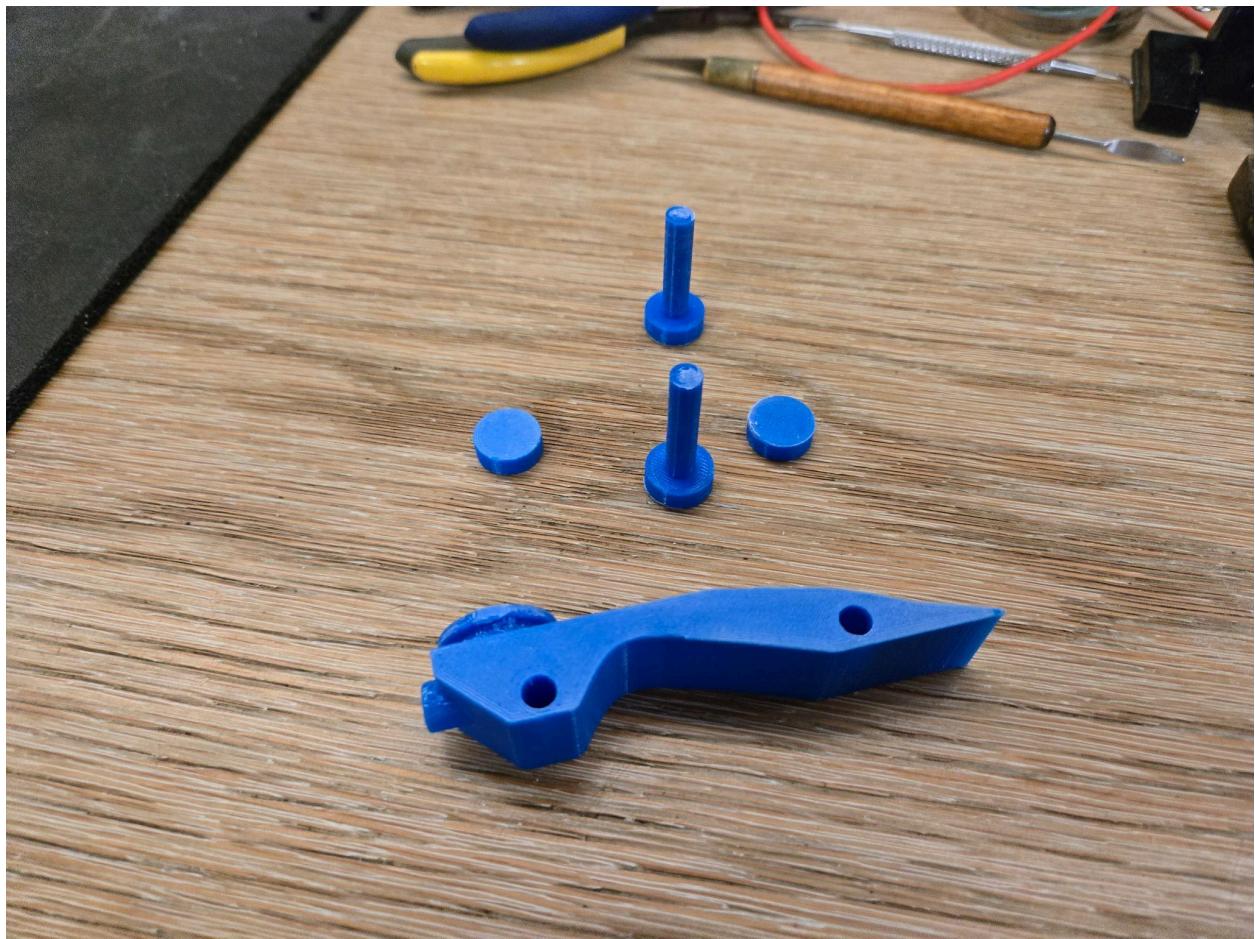




Post-Processing the Car

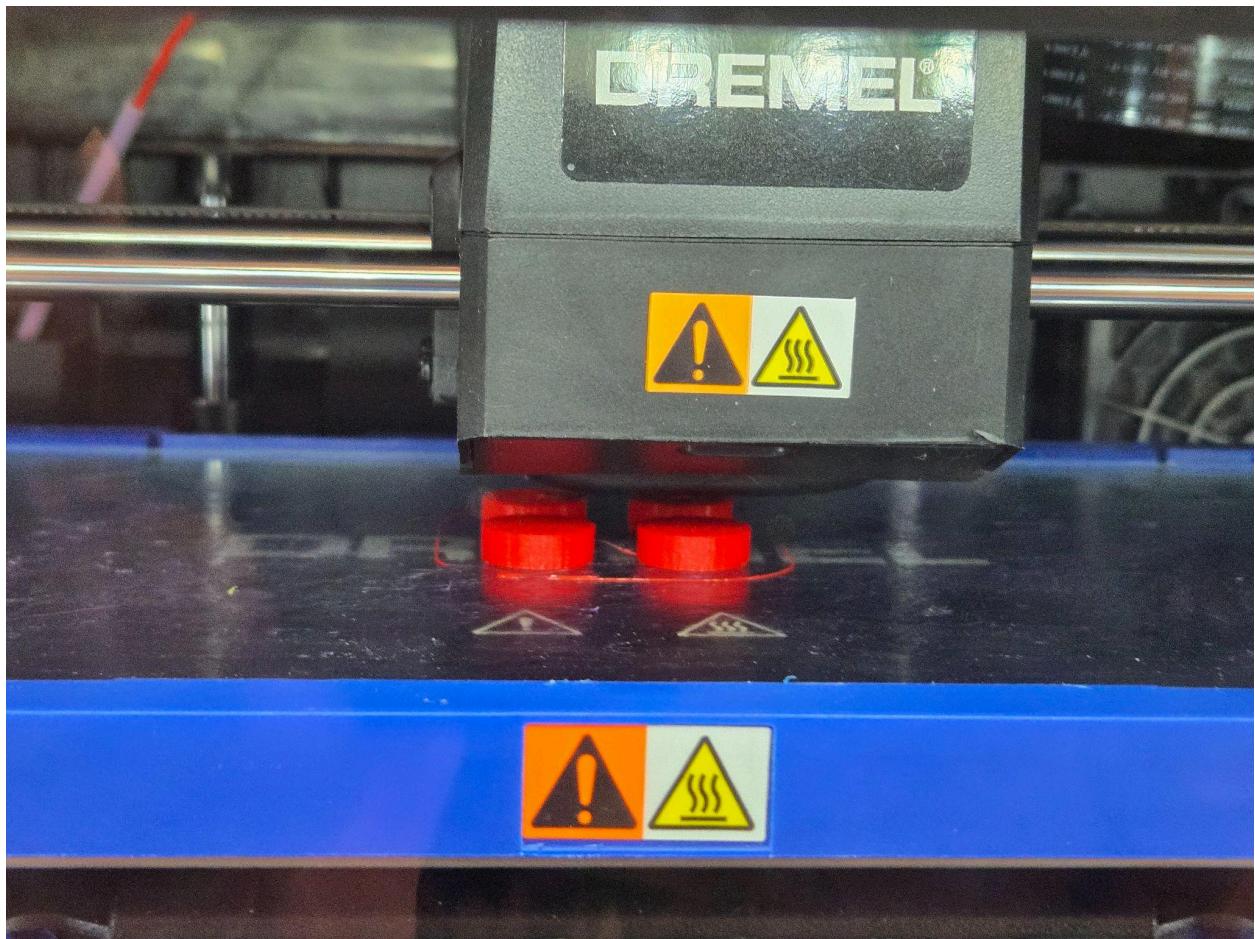


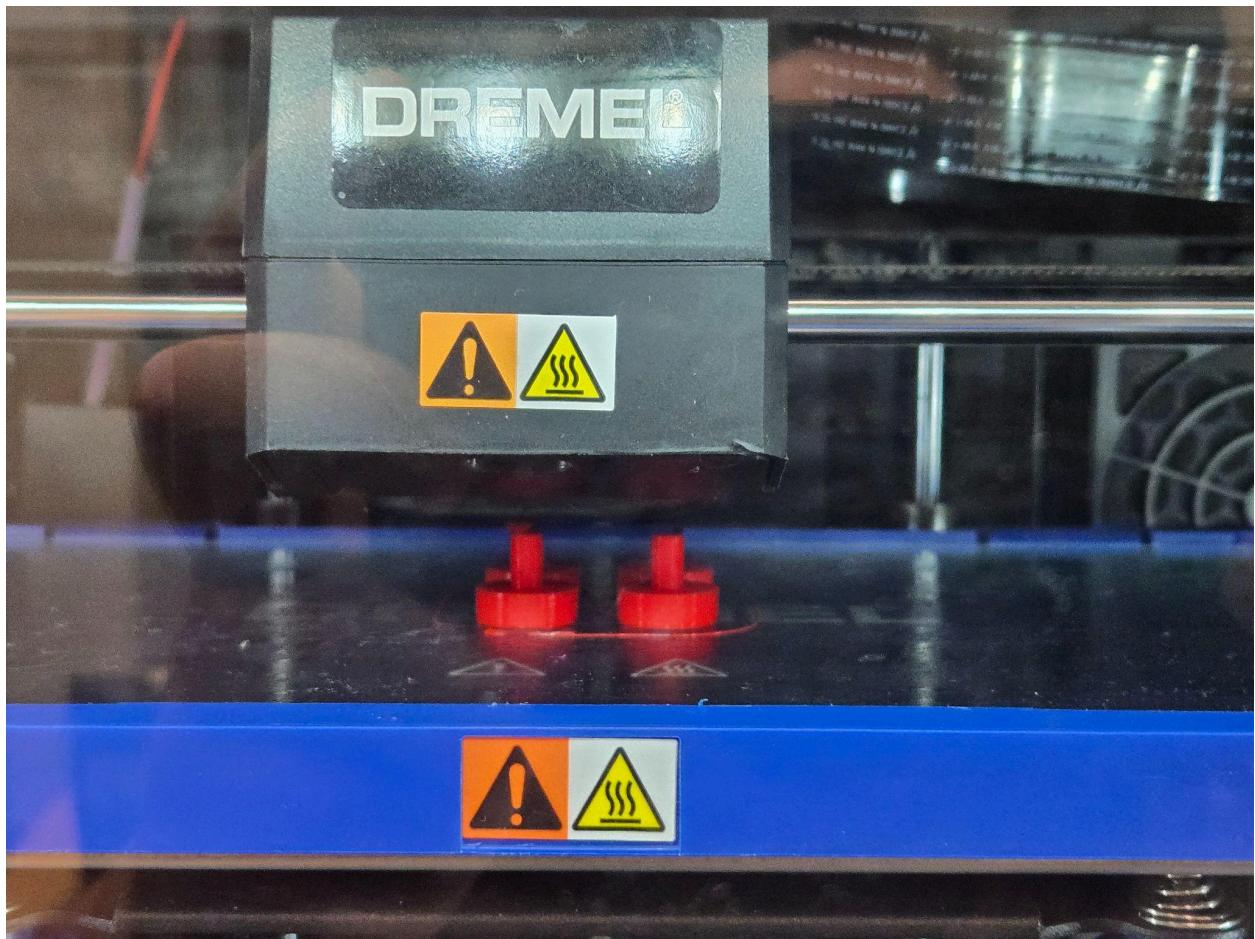


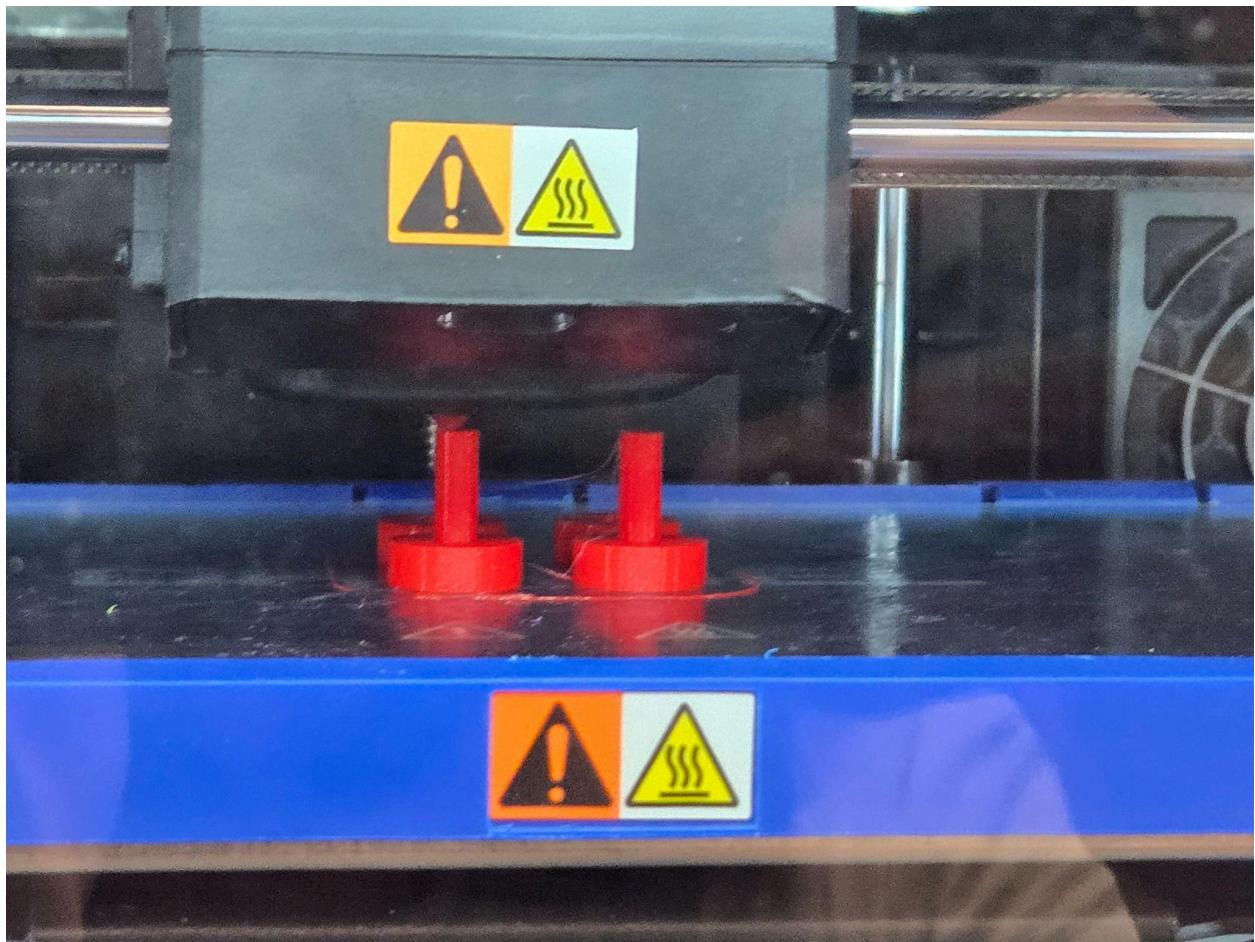


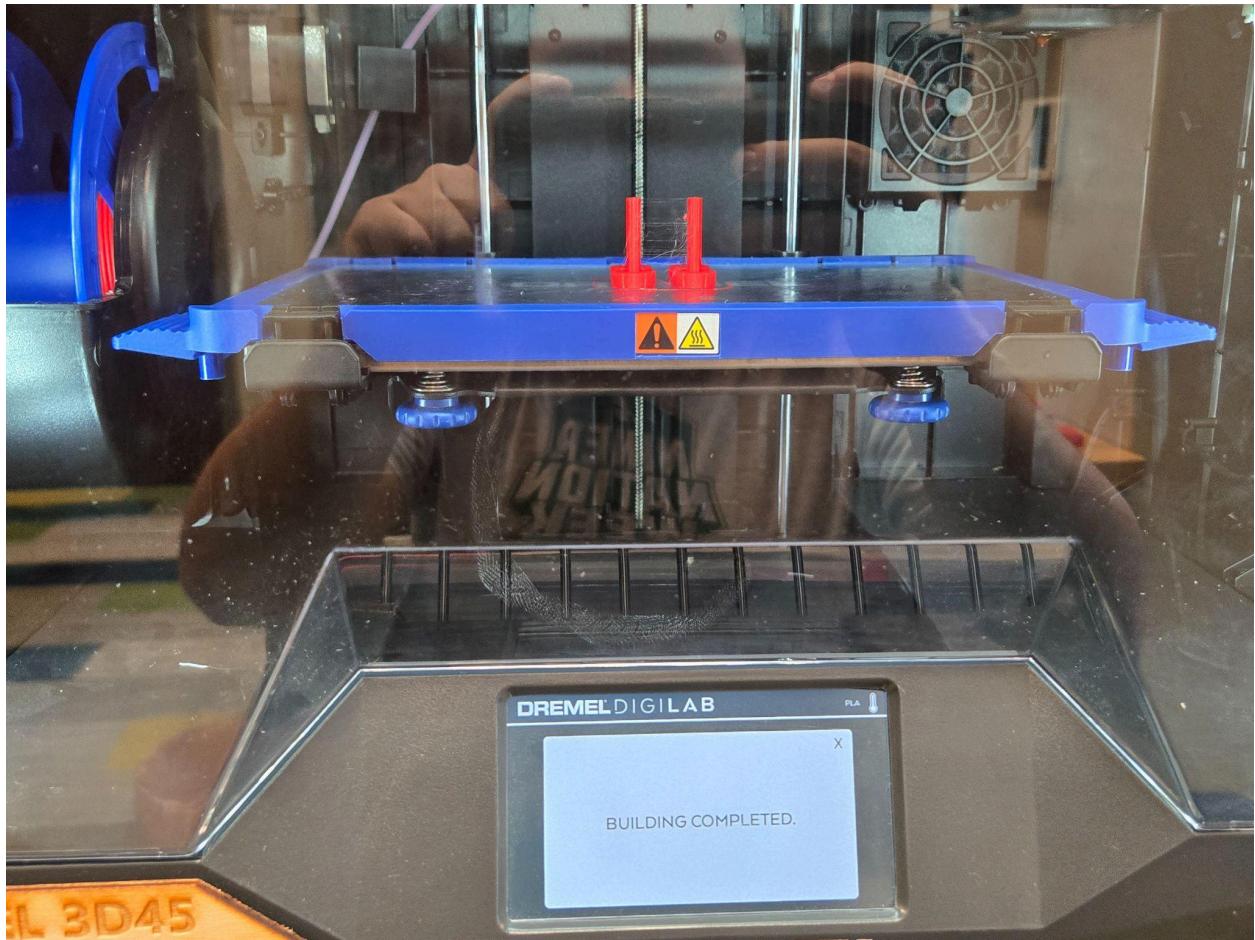
Wheel Reprint











Post-Post-Processing

