Thermoformed Tableware

DES 310, PROJECT 2

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Design Brief

Our assignment is to design and manufacture a set of polystyrene or acrylic tableware that is suitable for use in a specific environment. We are evaluated on the following:

- Depth and breadth of design process
- Suitability of design to target environment
- Aesthetic relevance and appeal
- Coherence of design across all pieces
- Final model quality

I have chosen to create tableware for children that takes into consideration safety, portability, and cleanliness.

User Persona
Mason

About
- 2 years old
- Lives in California
- Loves cows, toy cars, and the show Bluey
- Has a 6-month-old baby sister

Goals

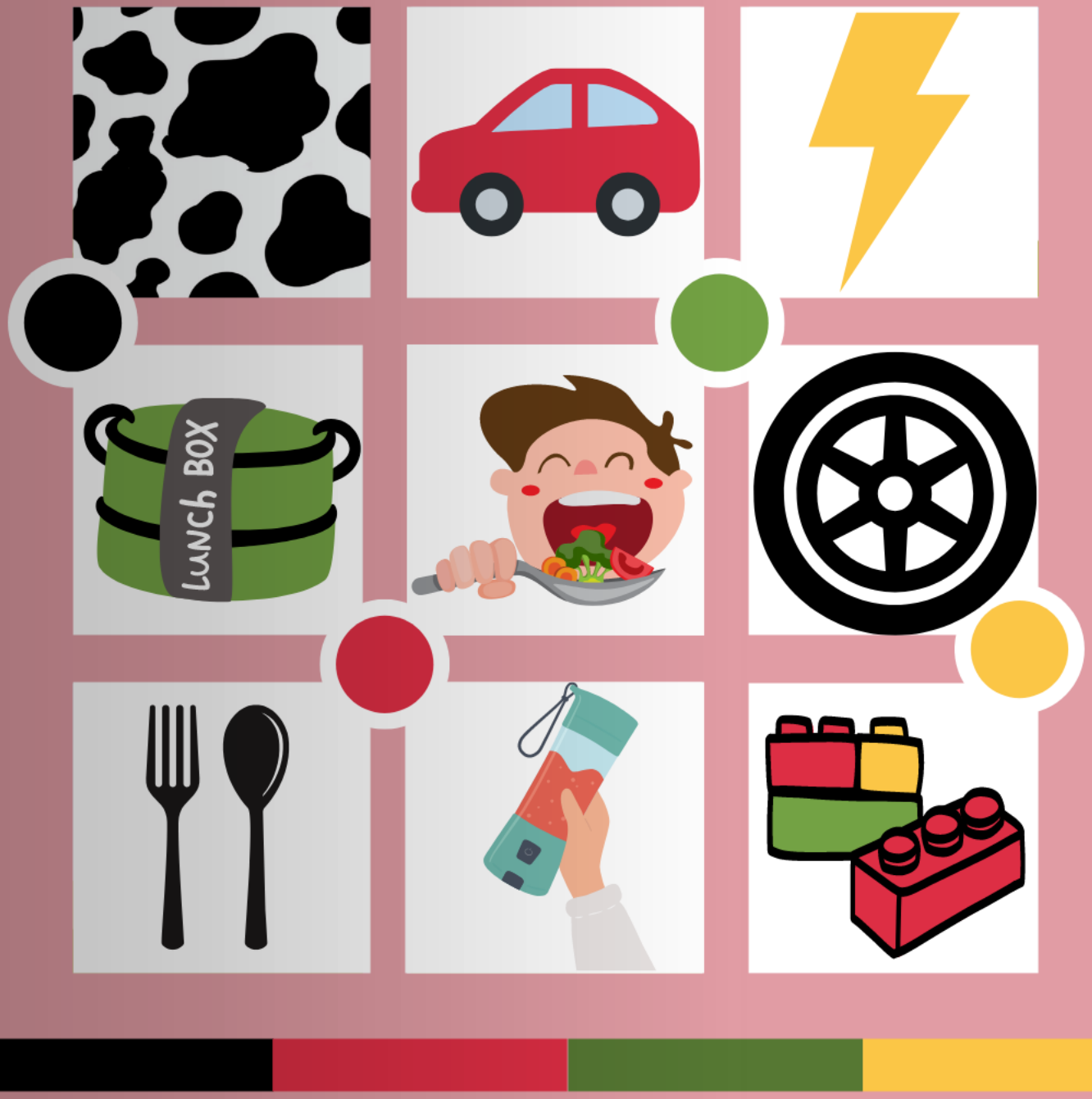
Mason still eats in a highchair or on the lap of his mom or grandma. Ideally, the tableware should assist him in learning to eat unaccompanied.

Frustrations
- Short attention span
- Likes to have multiple food options
- Does not have fine-tuned motor skills

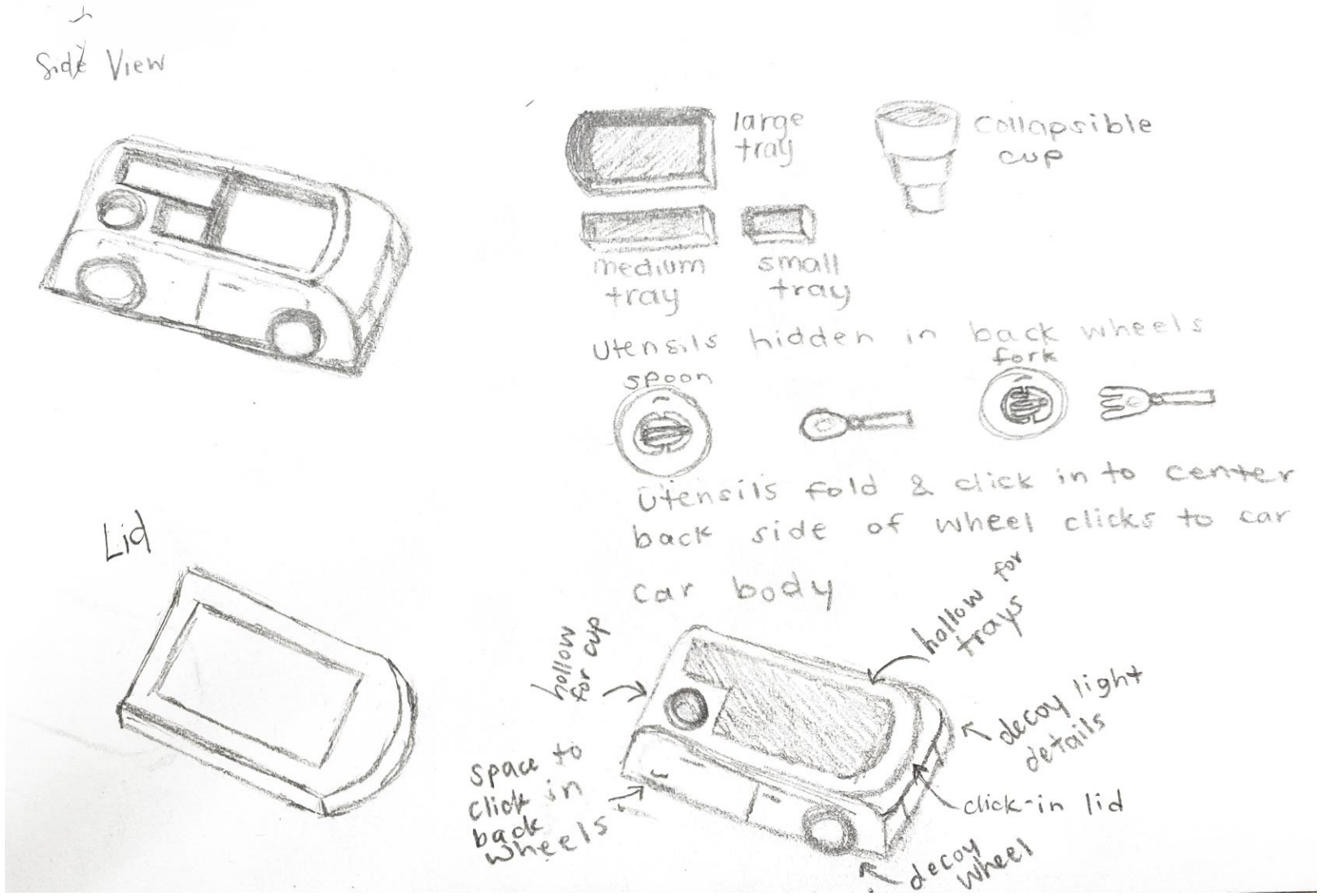
Motivations
- Independence
- Prepare for preschool

Needs
- Areas for multiple foods
- Simple utensils
- Spill-free (or spill-conscious) design

Mood Board

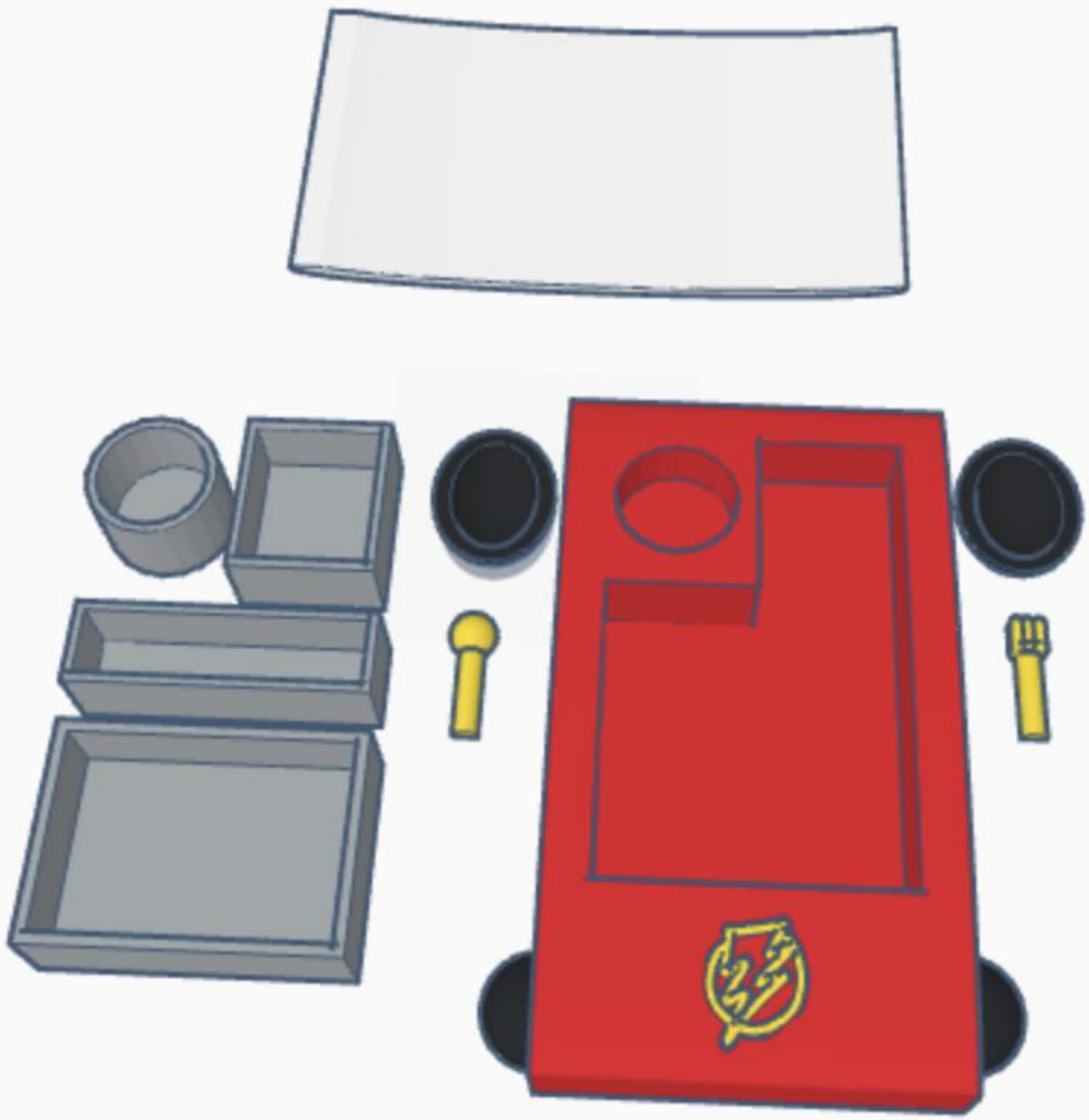


Preliminary Sketches



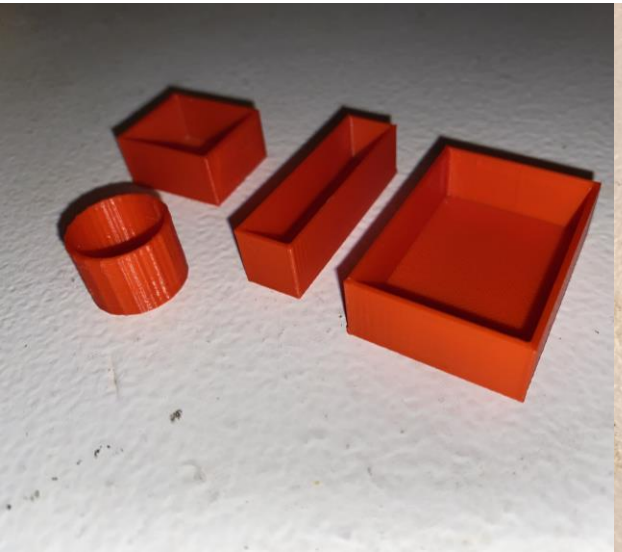
CAD Model

Link to 3D Rendering



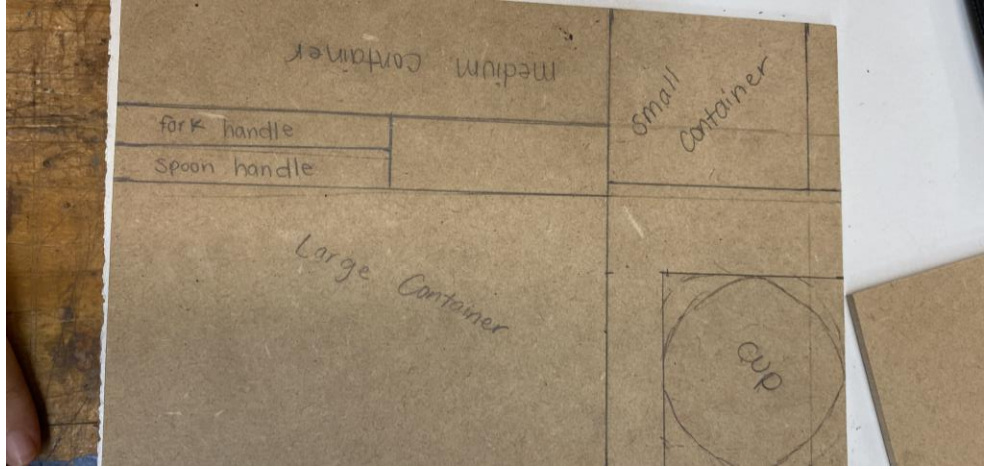
Prototype

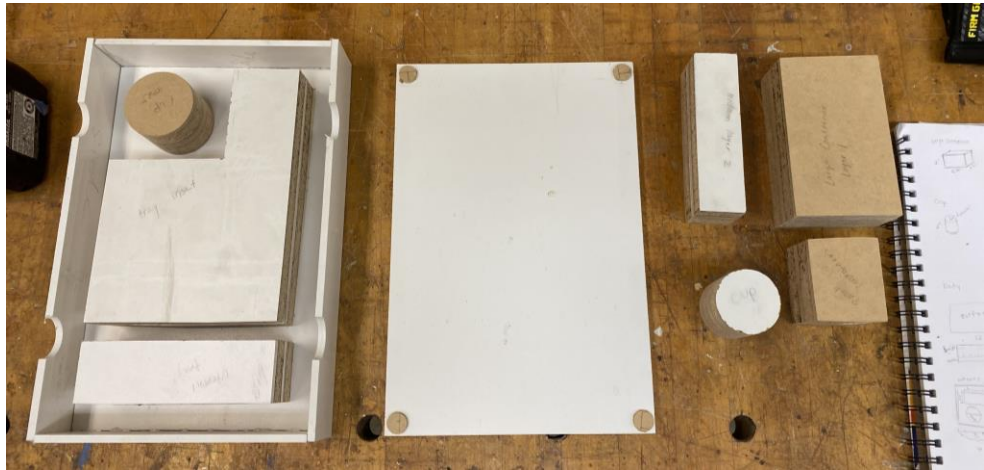
For my prototype, I decided to 3D Print the model I made in CAD. Once I had printed it, I realized that my idea to store the utensils in the tires was not realistic and needed to modify this aspect of the design. As well, the curved top edge would be too difficult to reproduce as a negative for the mold given our project specifications, so I decided to even this out.



Manufacturing

My first pass at tool design is shown to the right. I realized that the barrier I had built on my main tray would likely not perform well with the thermoforming machine due to the height. Because of this, I modified my molds.



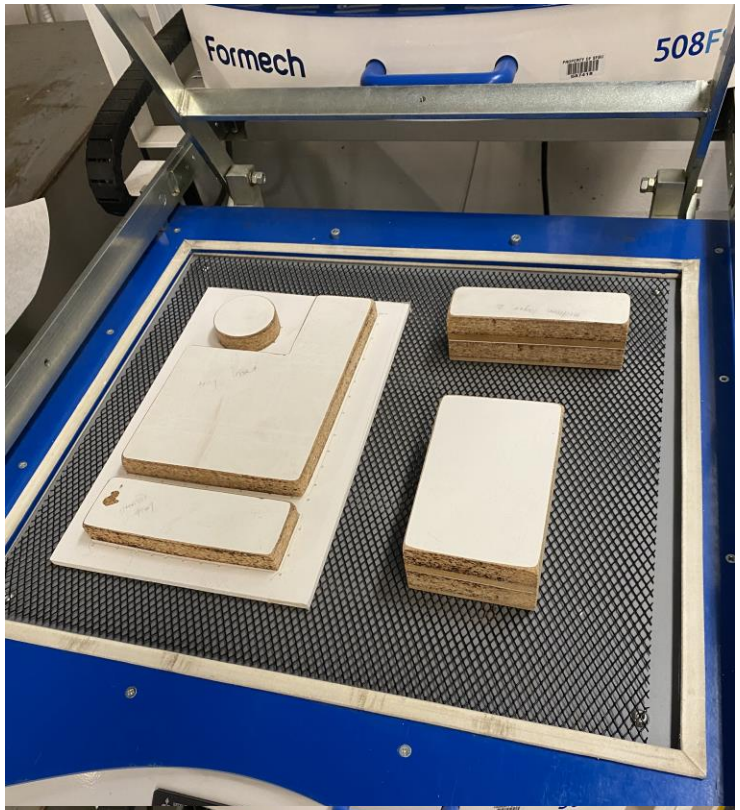


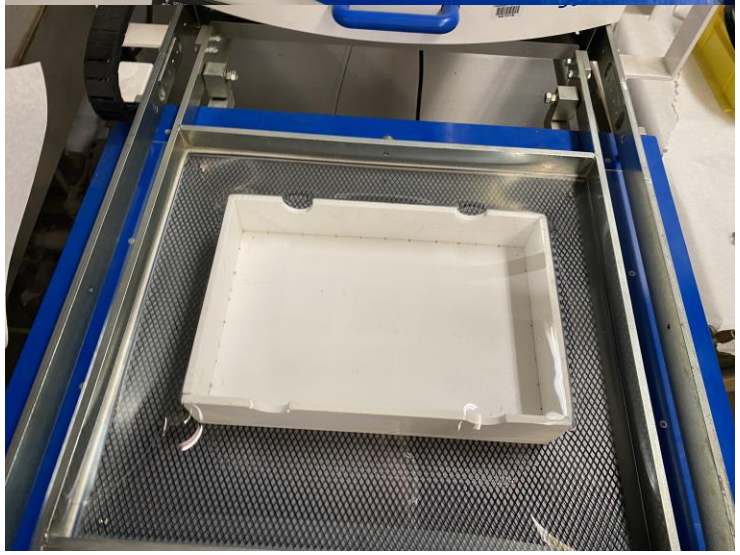
Manufacturing Part 2

The revised molds included rounded corners for ease of release and shallower pockets. I kept a deeper lid, but unfortunately this did not work with the thermoforming machine.

Thermoforming

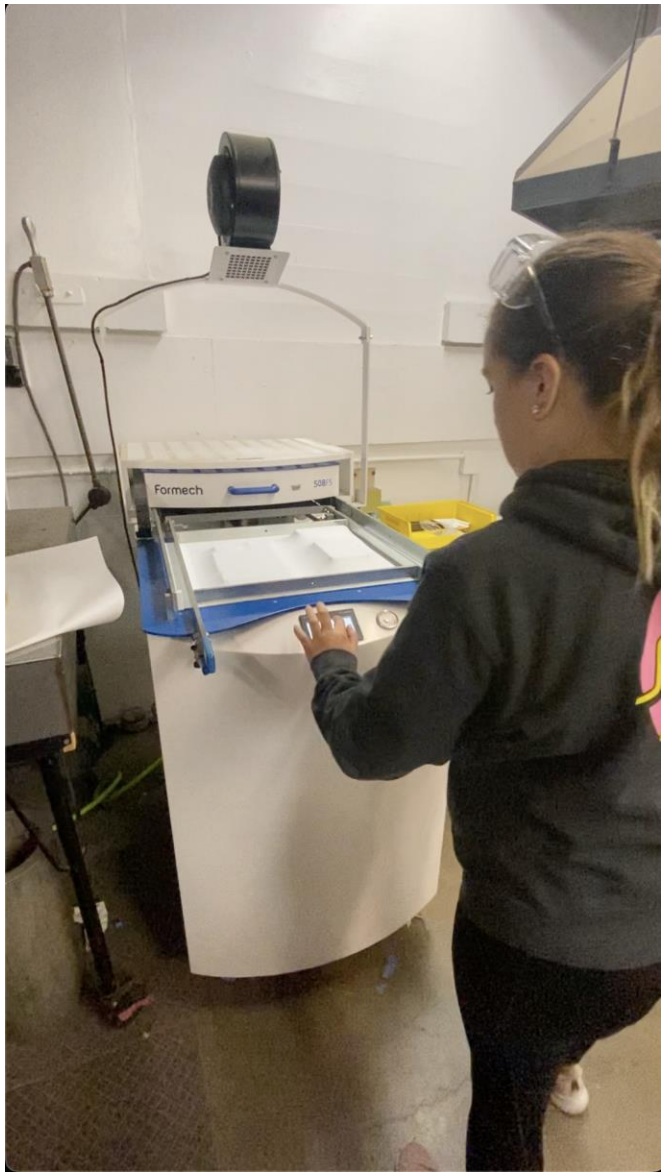
The top press with the main tray and two of the four inserts came out very successful. As you can see in the bottom right image, the lid was unsuccessful. Despite this, the tray is still functional for its original intention of serving children.

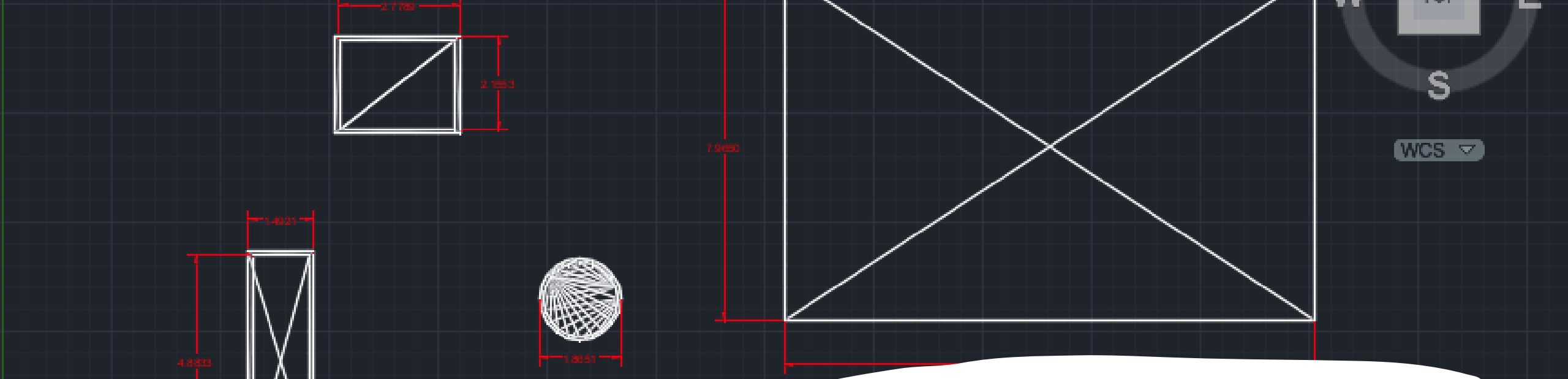




Thermoforming Process

SEE YOUTUBE LINK HERE.



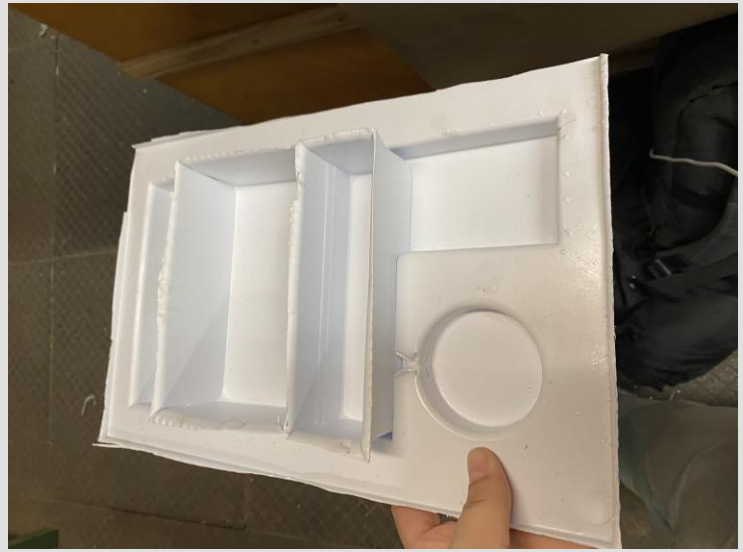


Revised CAD

- Link to 3D Rendering

Final Product

I was a bit too liberal with my usage of the heat gun on finishing and warped my final pieces. However, the essence of the project is still present in creating a playful tray for toddlers.



Material List

Item	Bought/Manufactured	Description
MDF Molds	M	Blocks made using saw, sander, glue, etc. To form the negatives of the shapes being created for the final product.
Tray mold Large inset tray mold Medium inset tray mold Small inset tray mold Cup mold		
Acrylic Sheets	B	Sheets used with thermoforming machine for tray creation from mold negatives

Conclusion

Despite the less than ideal end product, I really did enjoy this project and learning more about tool manufacturing. I also realized I could have used more patience on the de-molding process, then I probably would not have cracked the smaller pieces. If I could do this project again, I would create a shallower and more concise design for ease of manufacturability.