



Indigo Beavers

Final Design Presentation

May 20, 2021

Introduction

Our Community Partner

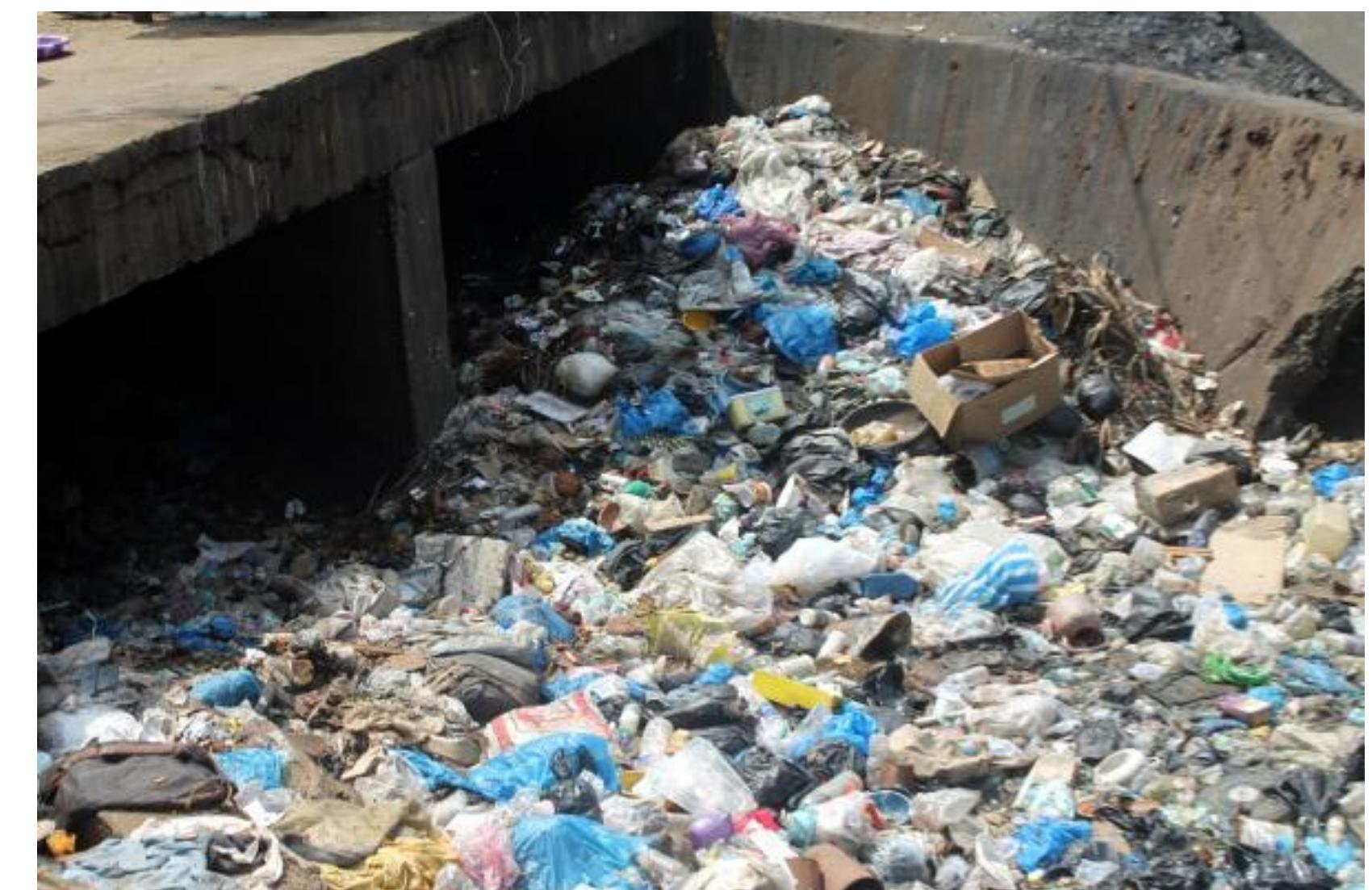
Environmental Response Initiative

Design Challenge

Despite large population increases, Liberia has a poor waste management system, resulting in 80 tons of domestic waste per day, with littered plastic water sachets contributing considerably to this problem.

Project Statement

To create “value” from “waste” and educate communities affected by plastic waste pollution by exploring how plastic water sachets can be recycled into waste bins for indoor and outdoor use by schools, governments, markets, and community centers.



Initial Ideas

Mold recycled plastic into **needed products**



woven tote bags



school bags



geometry set



recycling bins

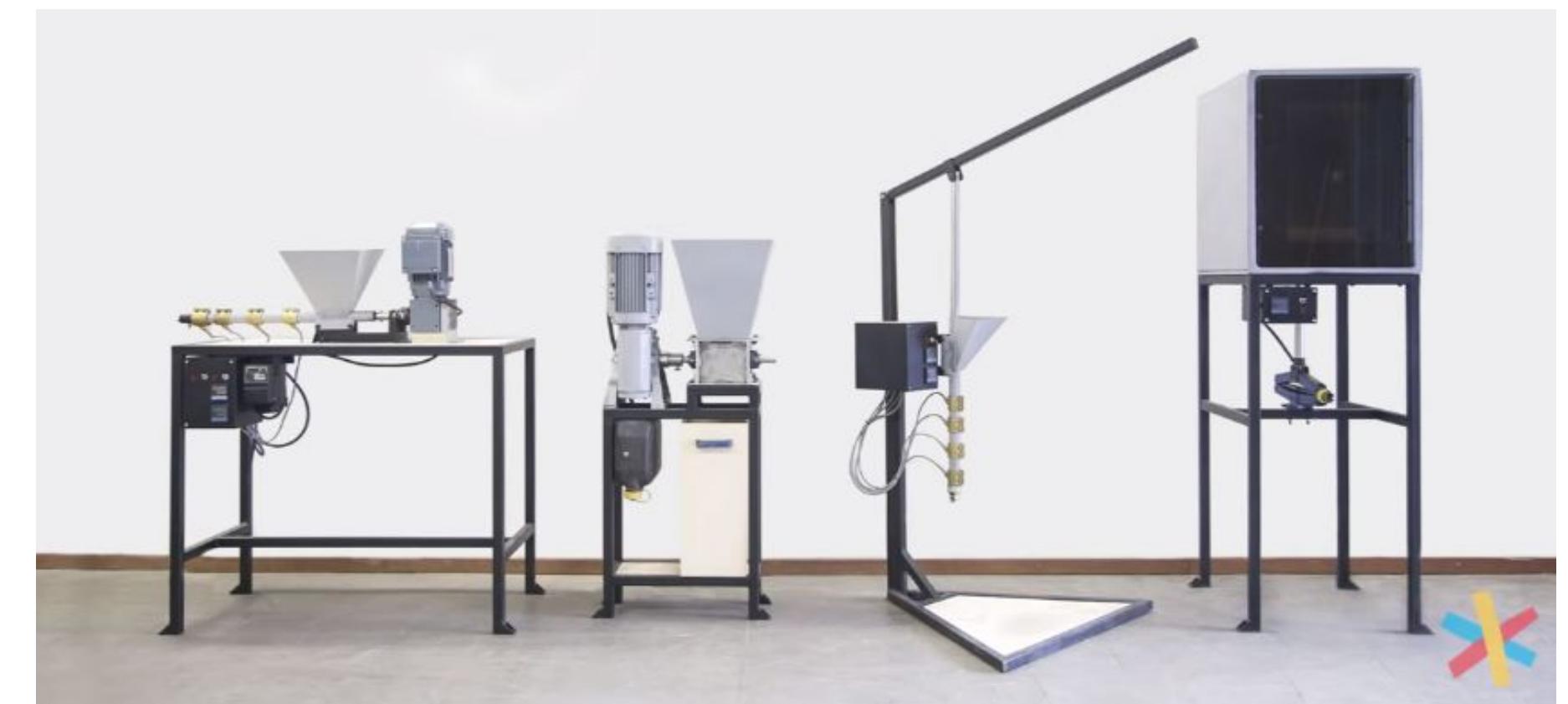


tents / sleeping bags



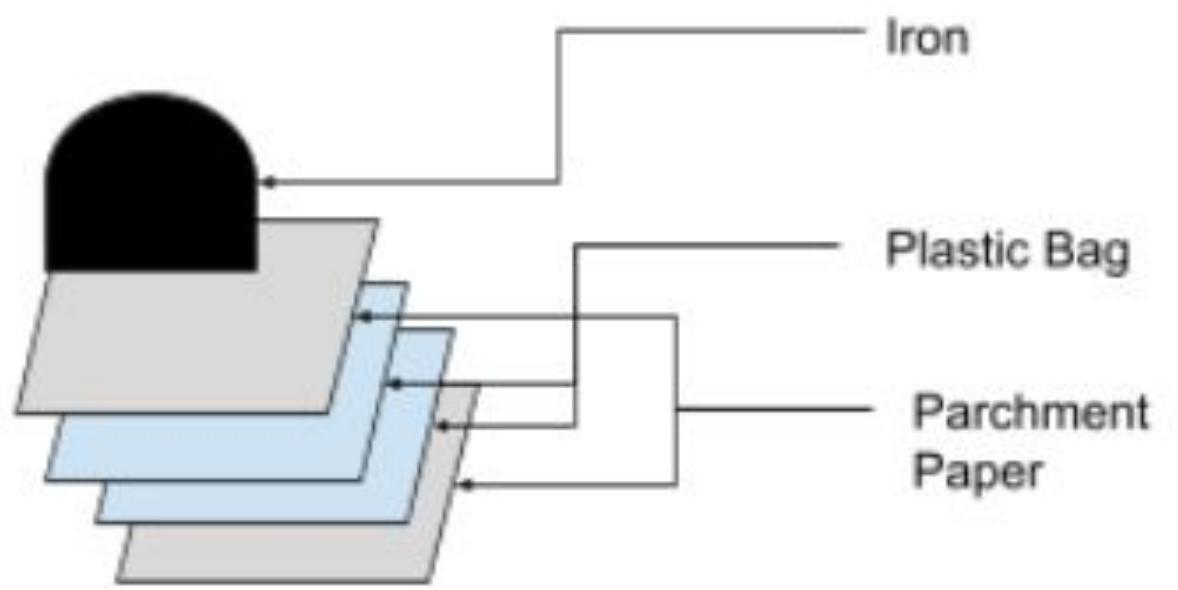
face shields

Create safe, healthy, environmentally friendly
plastic recycling machinery

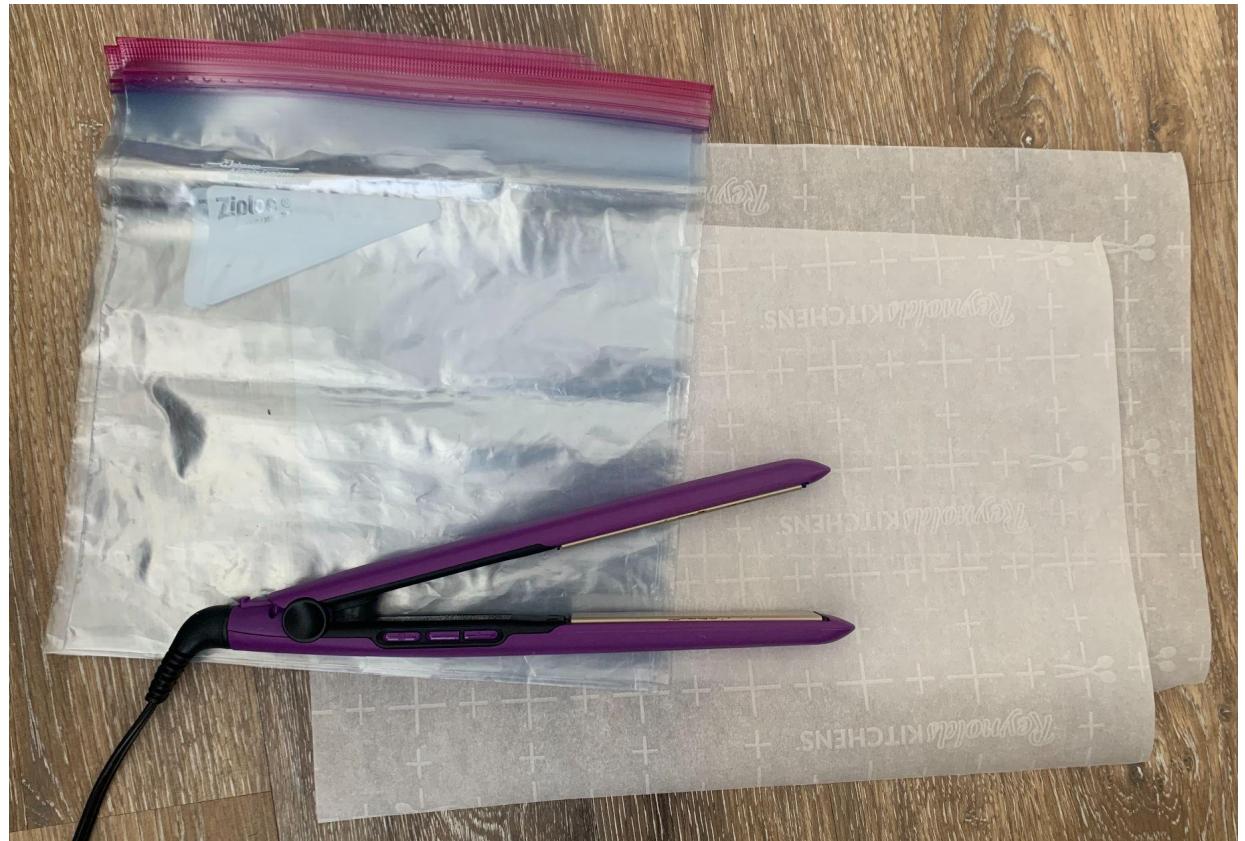
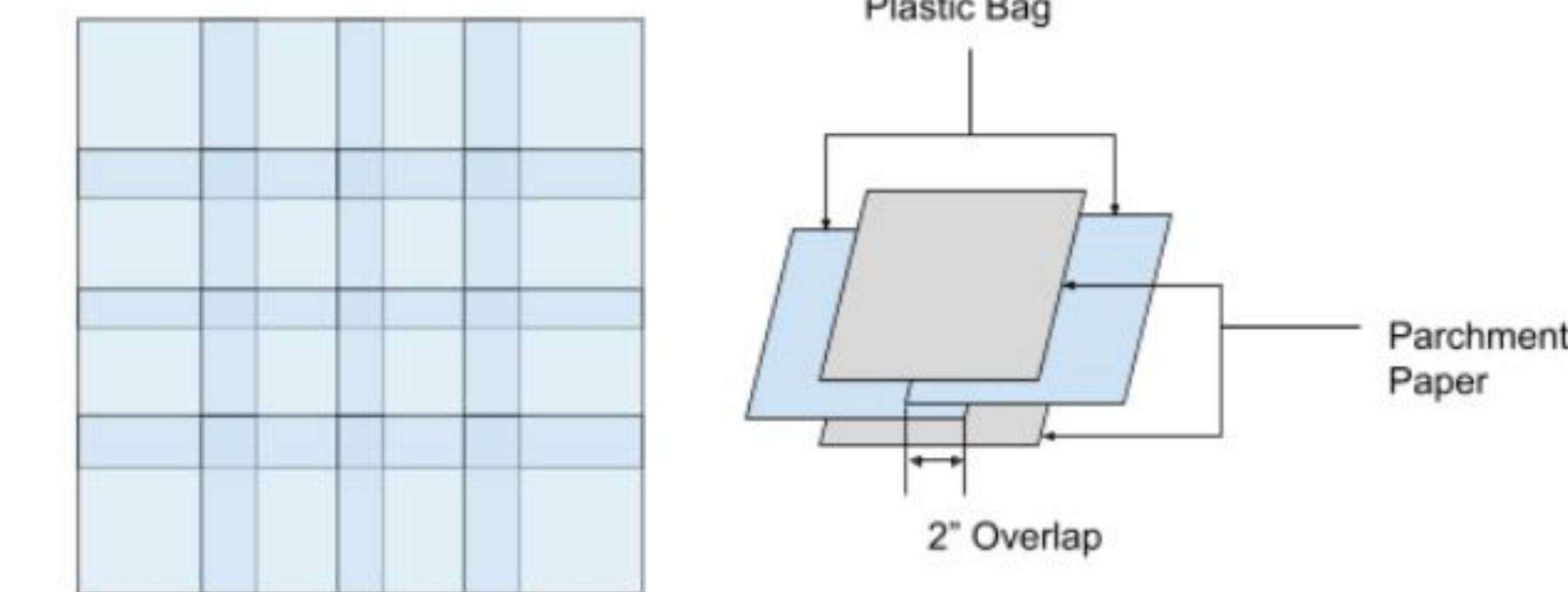


Initial Prototyping

Plastic Layer

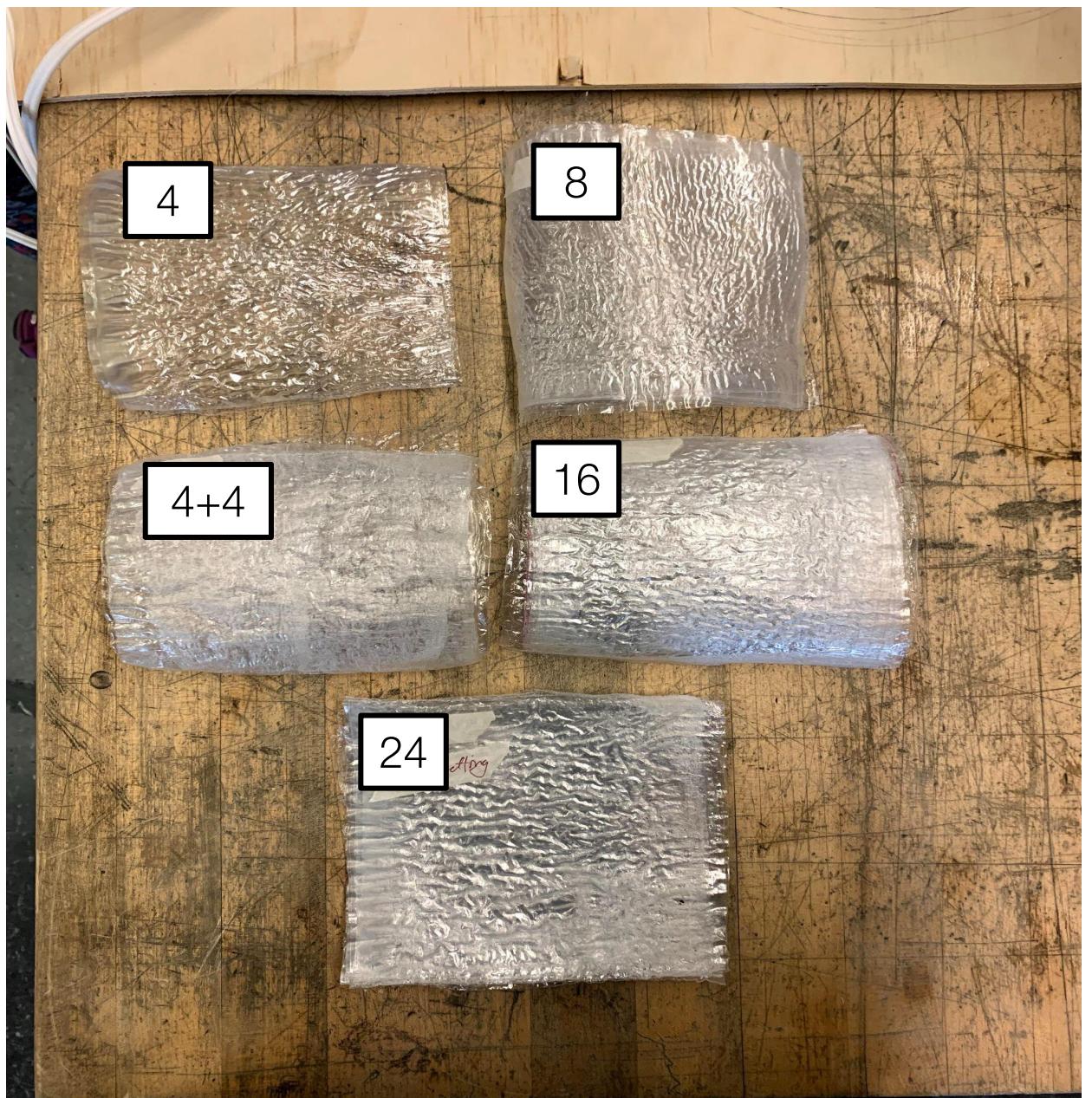


Plastic Quilt



Plastic Layering Observation

- Minimum number of layers: 16
- Fusion faster when heated altogether
- Longer heating times results in smaller wrinkles and more opaque color
- Layering bags like bricks results in longer sheet

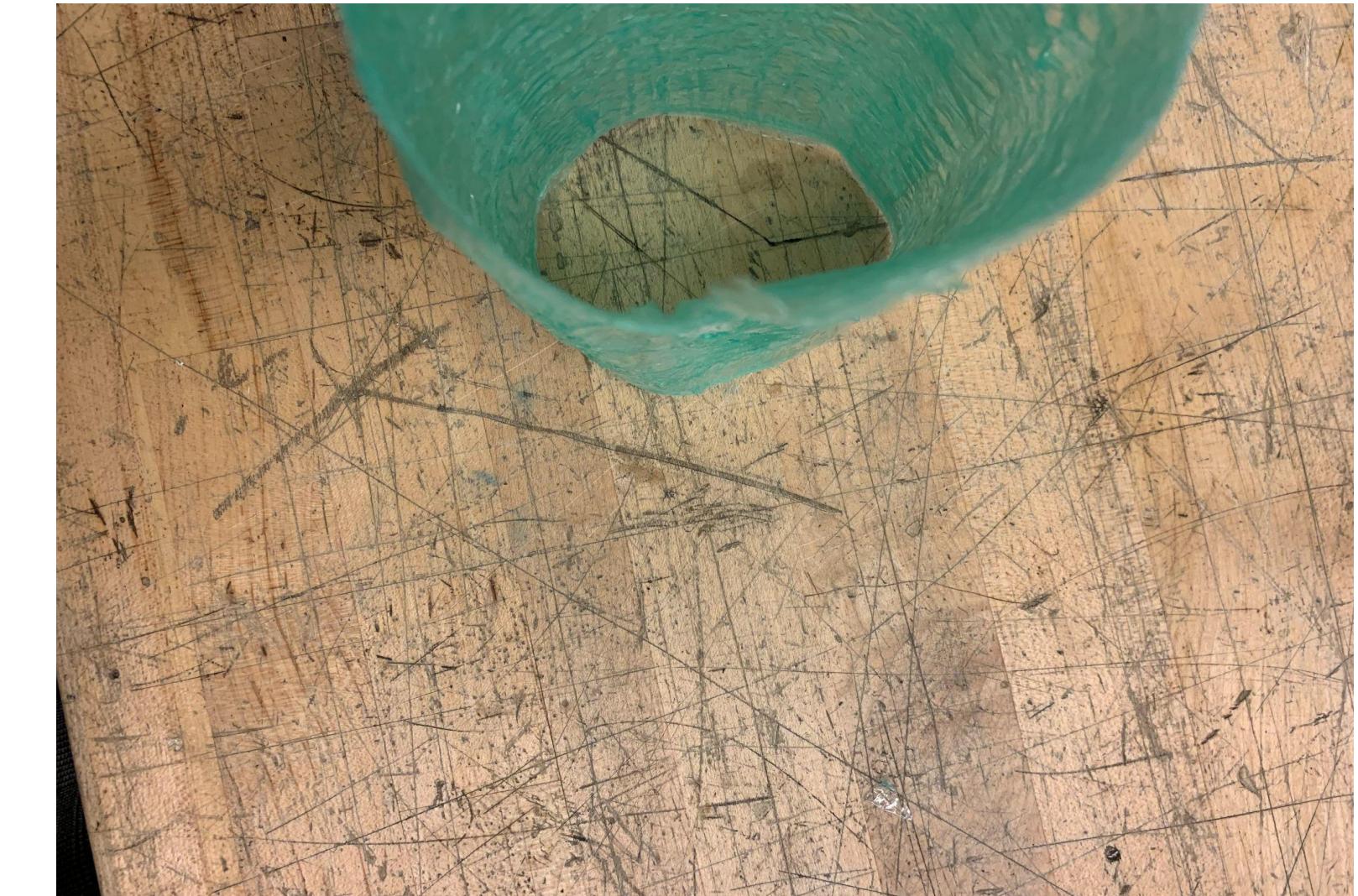


Application

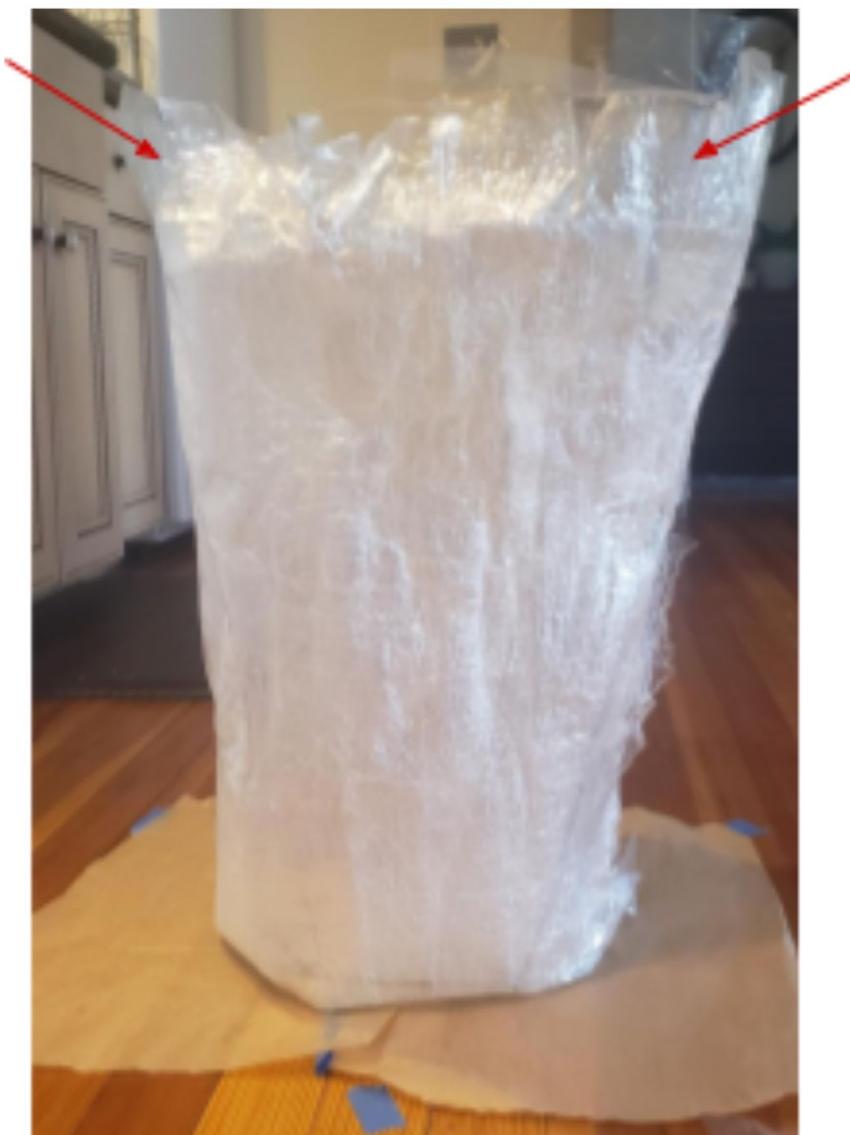
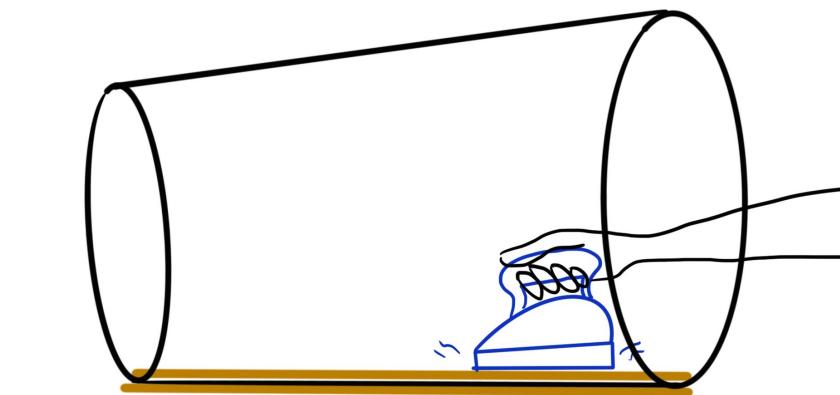
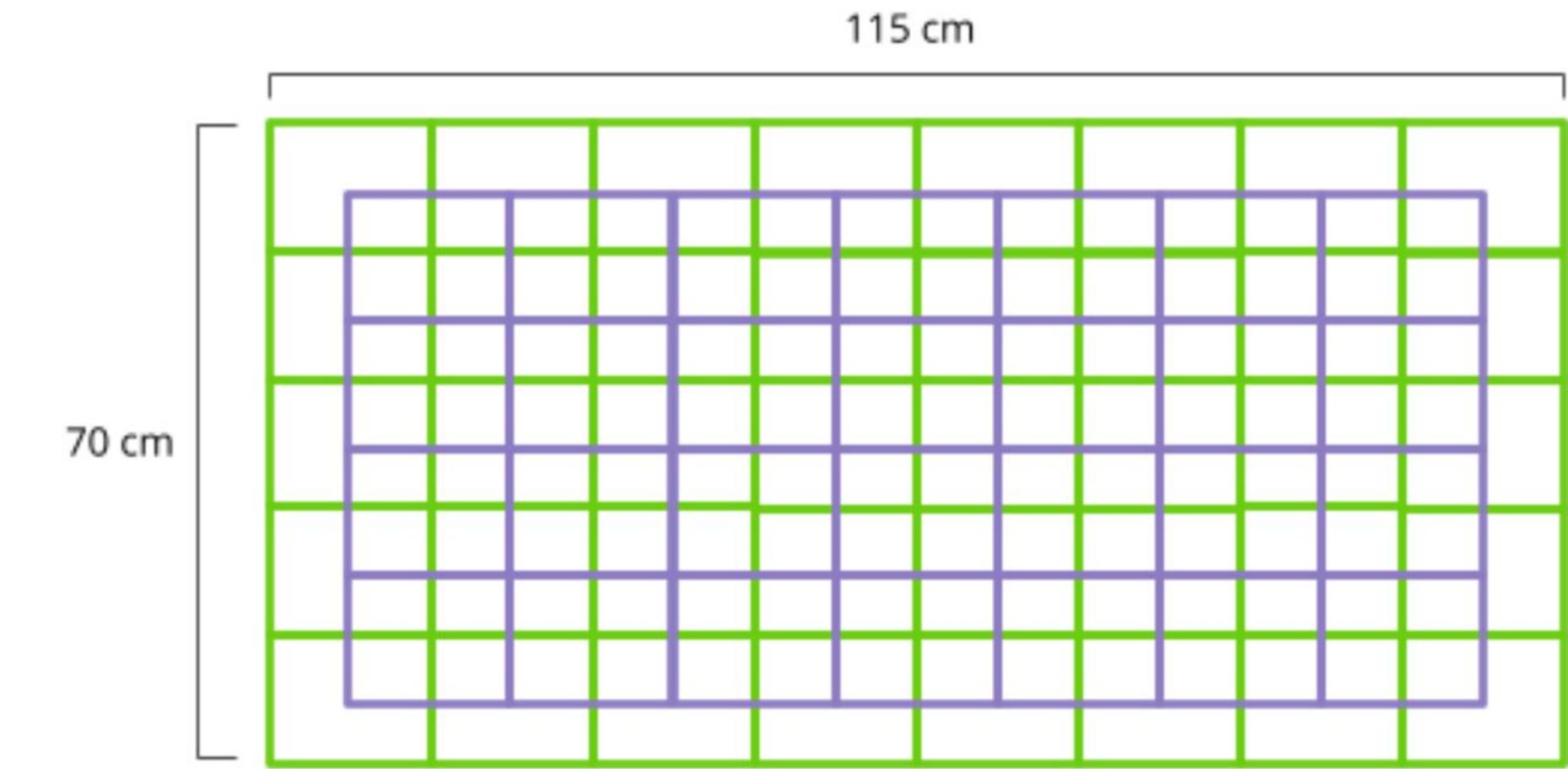
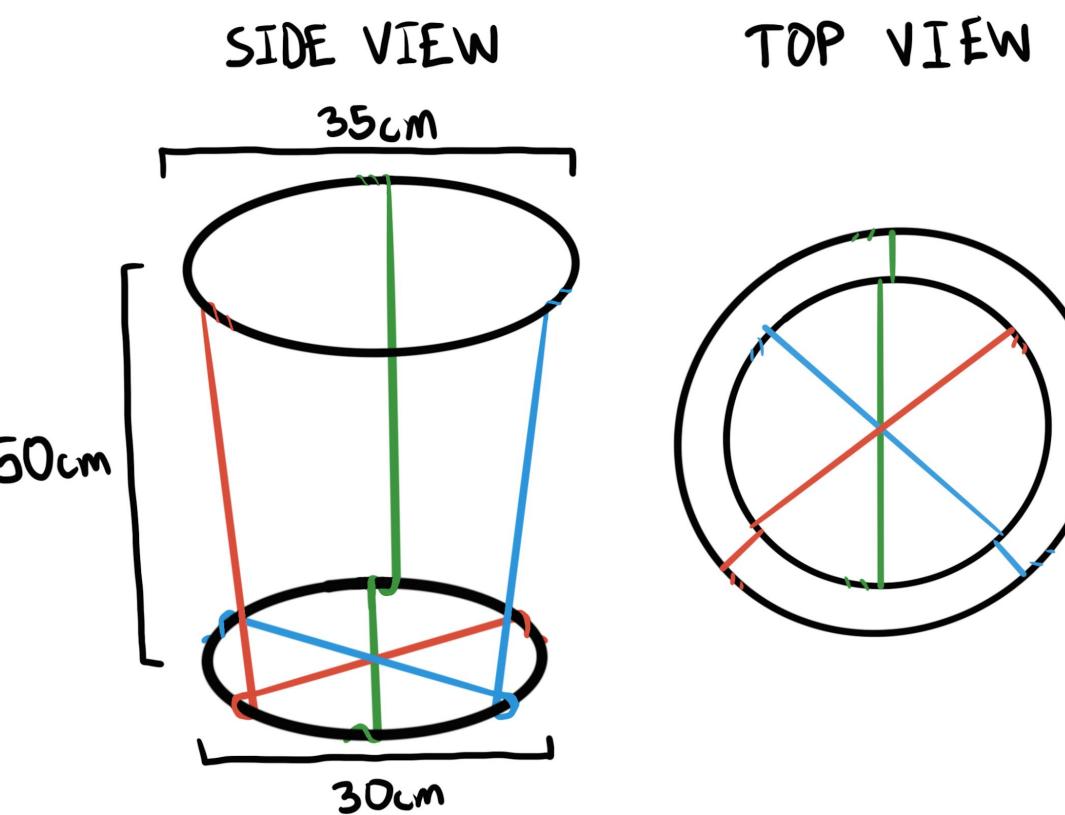
Community partners in Liberia were able to replicate some of these tests with their water sachets



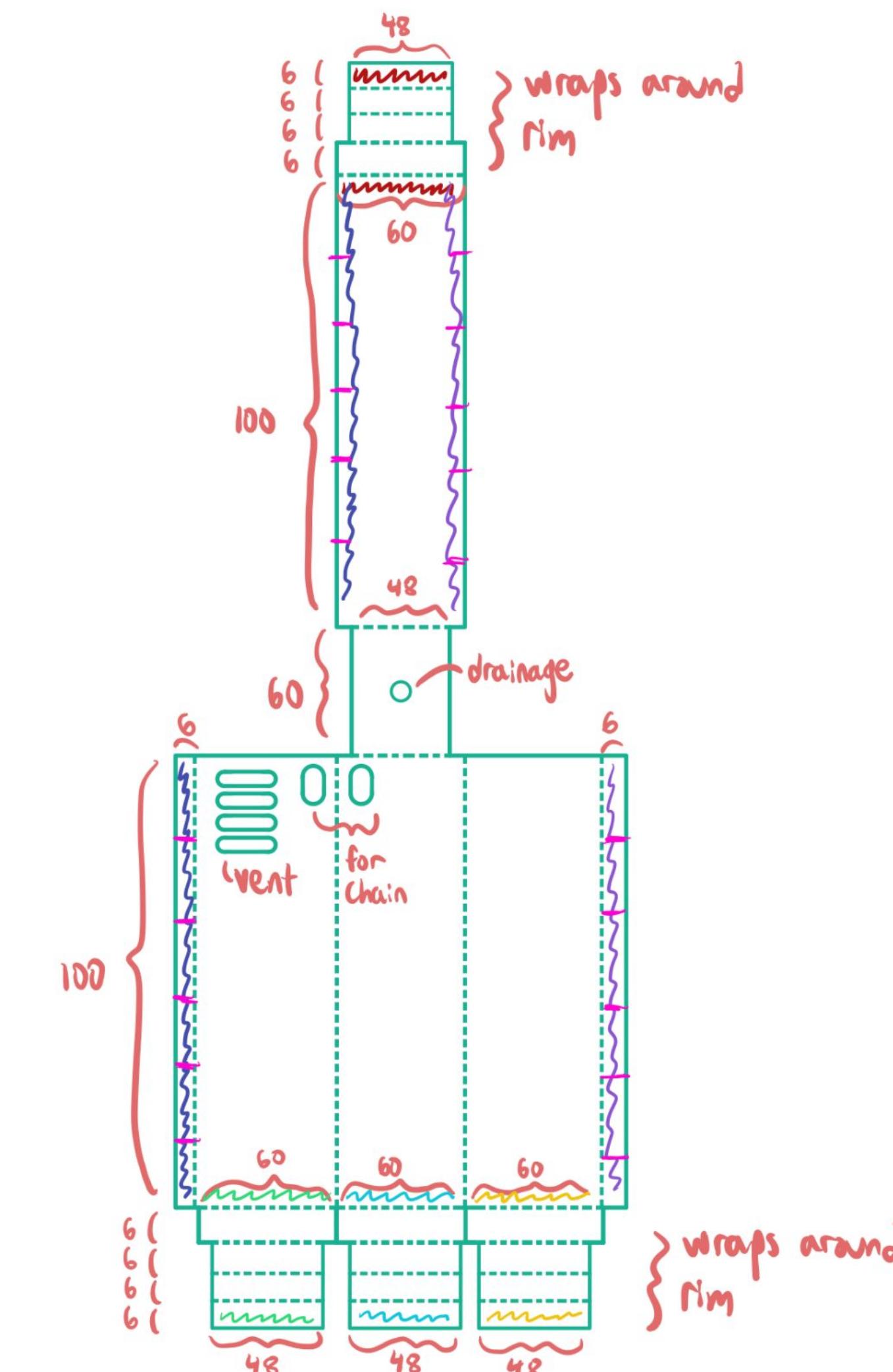
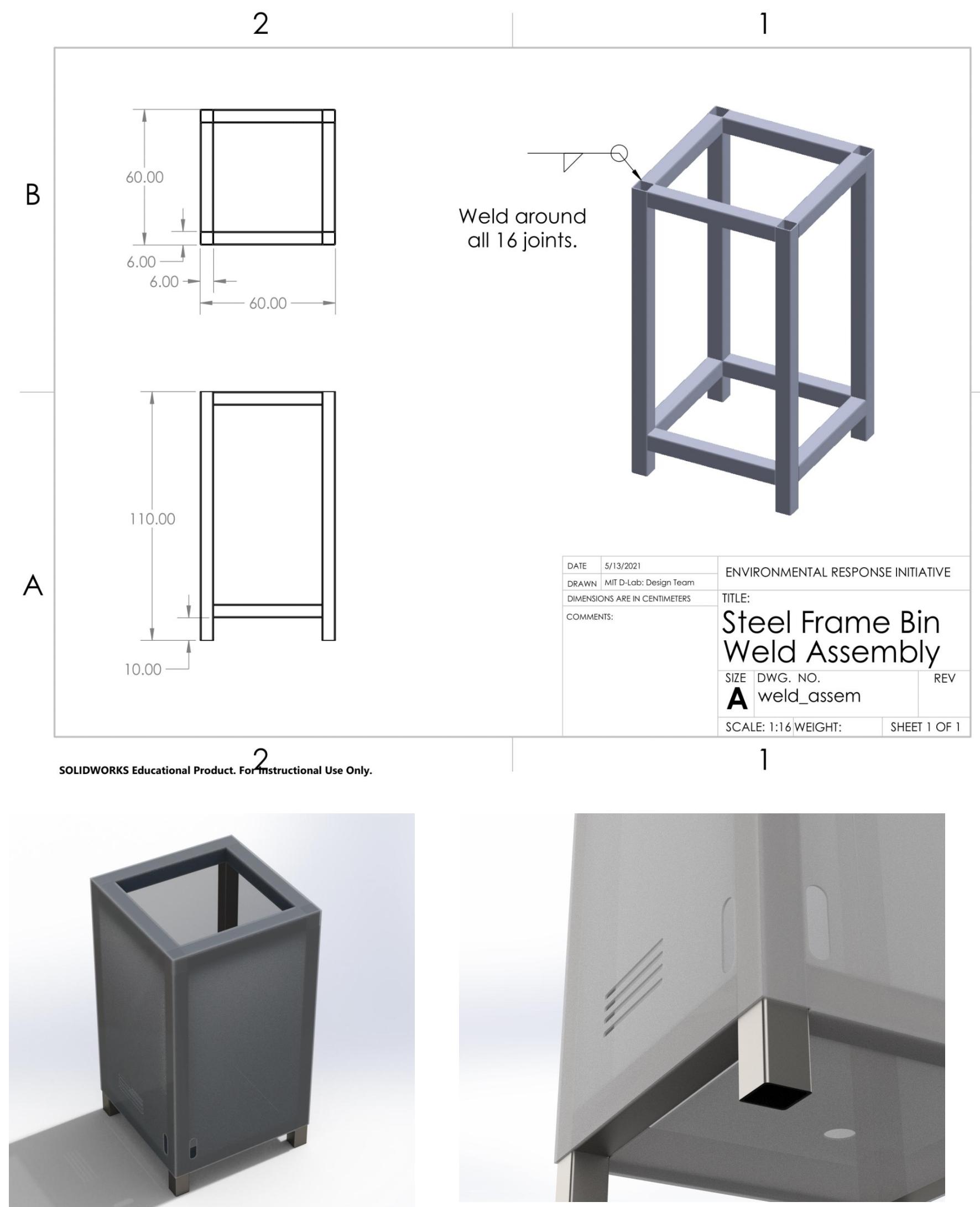
Fusing Plastic



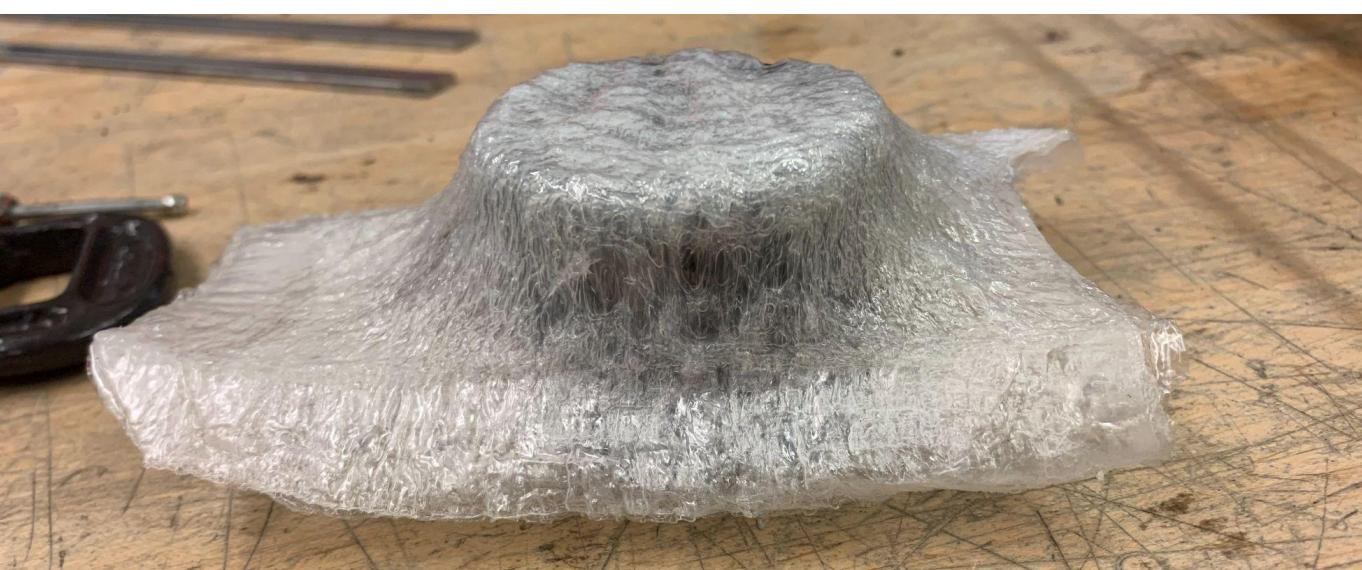
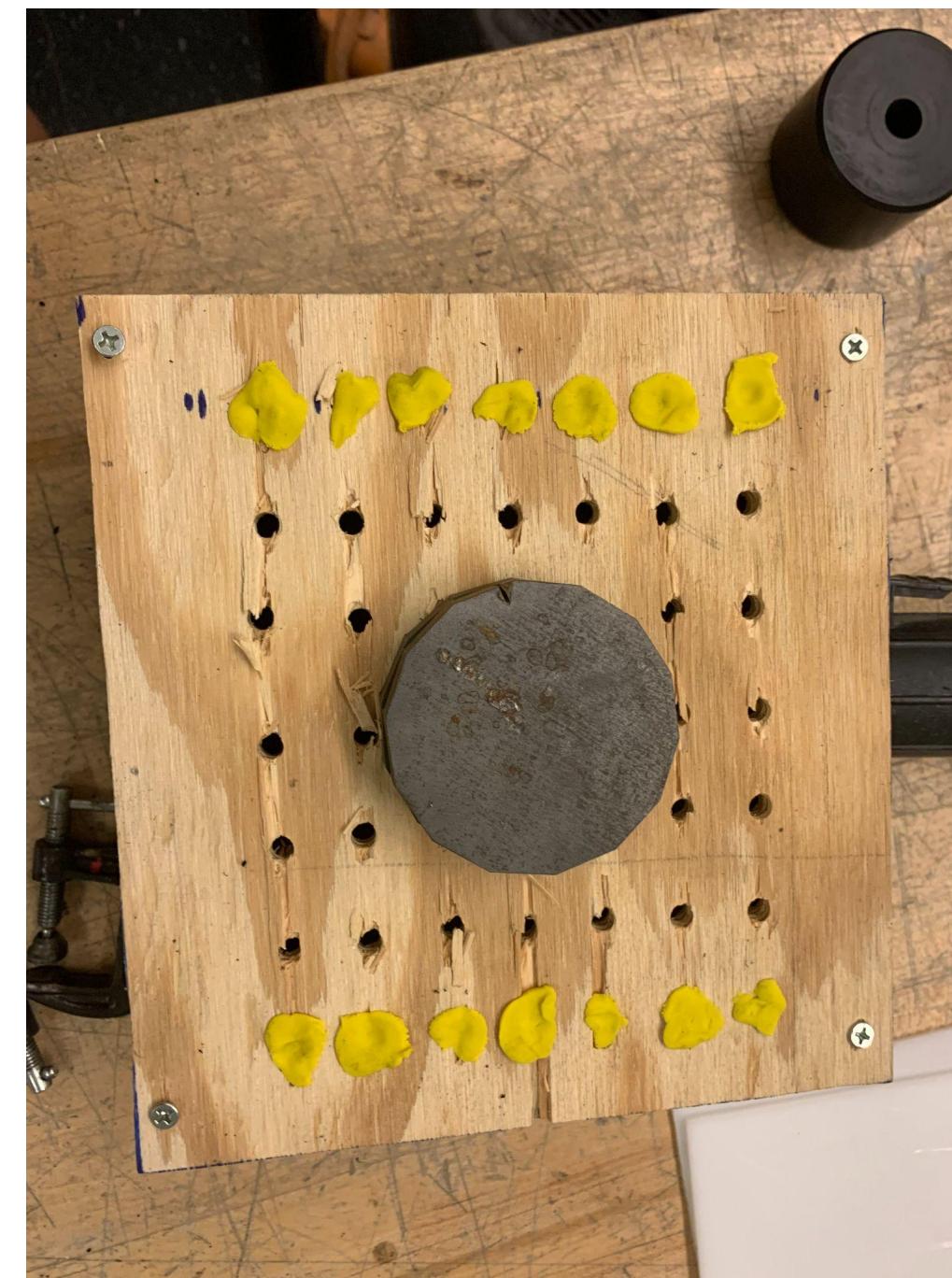
1. Wire Frame Bin



2. Steel Frame Bin



3. Vacuum Forming



Comparing Specifications for Waste Bins

Need	Reasoning	Spec	Wire Frame Bin	Steel Frame Bin	Vacuum-Formed Bin
Resilient bin wall	Withstands hitting/damage	0.125" thickness		✓	✓
Max. weight of load	Can hold desired amount of waste	30 lbs		✓	✓
Volume of bin	Can hold desired amount of waste	3 ft ³	✓	✓	✓
No-touch operation	Sanitary to prevent disease spread	Foot pedal		✓	✓
Withstands rainy weather	The 6-month rainy season in Liberia can cause waste to leach	covering, drainage, and vent		✓	✓
Gap for chain	Protect bin in public settings	-		✓	✓
Composed mainly of recycled material	Sustainable by maximizing reuse and educational to the users	>75% by volume	✓		✓

Recommendations & Next Steps

- The **Wire Frame Bin** can be made by students as an educational activity to learn about the importance of recycling
- The **Vacuum Formed Bin** is the most potentially successful and scalable concept that maximizes the recycling of plastic in its production, and we recommend that they explore this idea further, potentially combining it with steel reinforcement
- The **Steel Frame Bin** can be used in parks and public spaces since it is heavy and durable
- Our community partner will use our remaining budget using ironing/sewing methods to create **rain suits, shopping bags, purses**, etc. out of water sachets, which will serve as a source of income generation for vulnerable households in the Raymond Camp Community



Budget Proposal

S/N	Item Description	Unit	Cost	Total
1.	Sewing Machine	1	200.00	200.00 USD
2.	Pressing iron	1	35.00	35.00 USD
3.	Pond to clean and dry plastics waste	1	50.00	50.00 USD
4.	Initial items (thread, zipper, needle, scissors, etc.)	1	166.4	166.4 USD
5.	Zinc to complete roofing of plastic storage	1	45.00	45.00 USD
6.	Total			496.4 USD

Thank you!

Questions, comments, feedback?

Our Journey

