

CDR

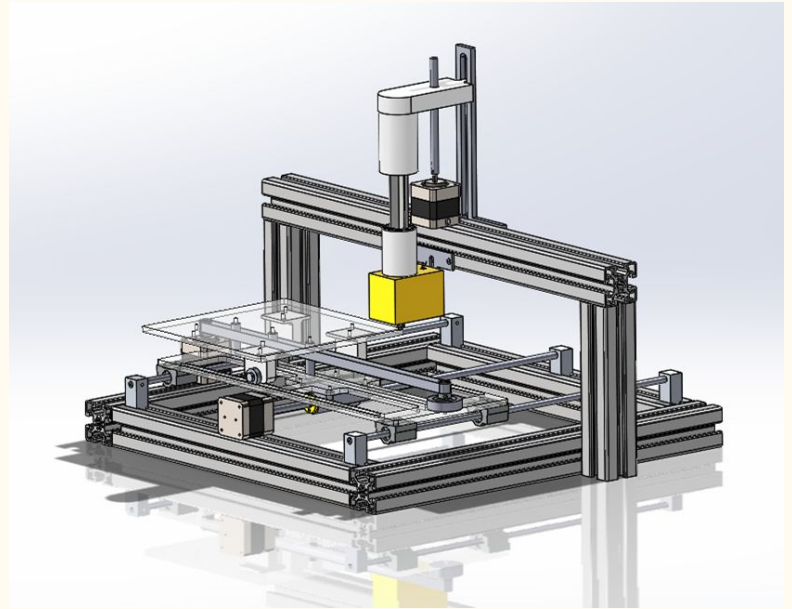
Gabe's Chocolate Factory

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SOLIDWORKS Assembly

This is the image of the finalized 3D model for the Chocolate printer.

The entire assembly is available for download on the website.



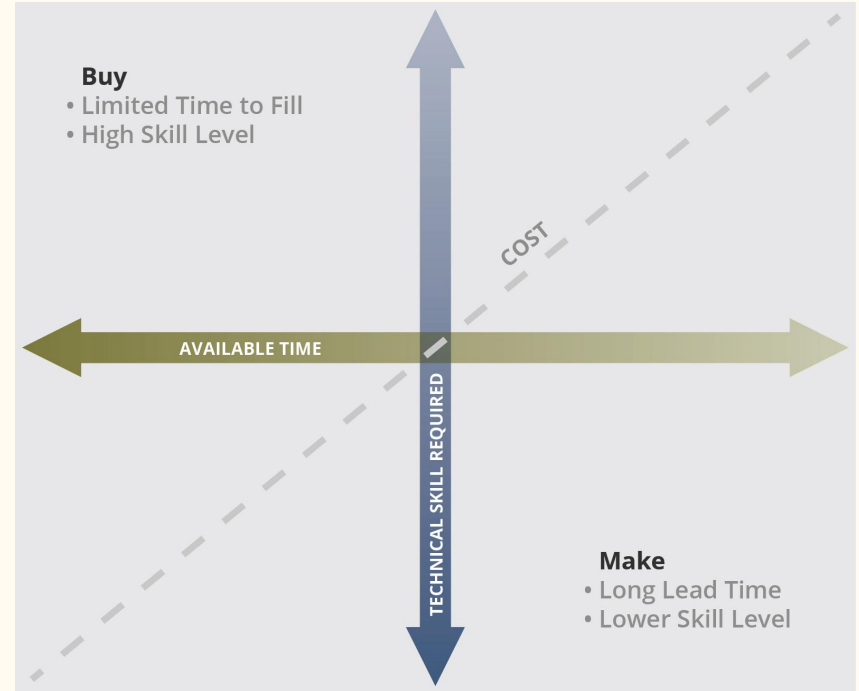
Bill of Materials

This is the current [Bill of Materials](#) for the project. The Bill of Materials contains all of the parts for our printer as well as links to all the outside vendors that some of the parts are being purchased from. There are 31 unique parts in the Bill of Materials that make up the printer and when fully assembled the printer will be comprised of roughly 57 parts.

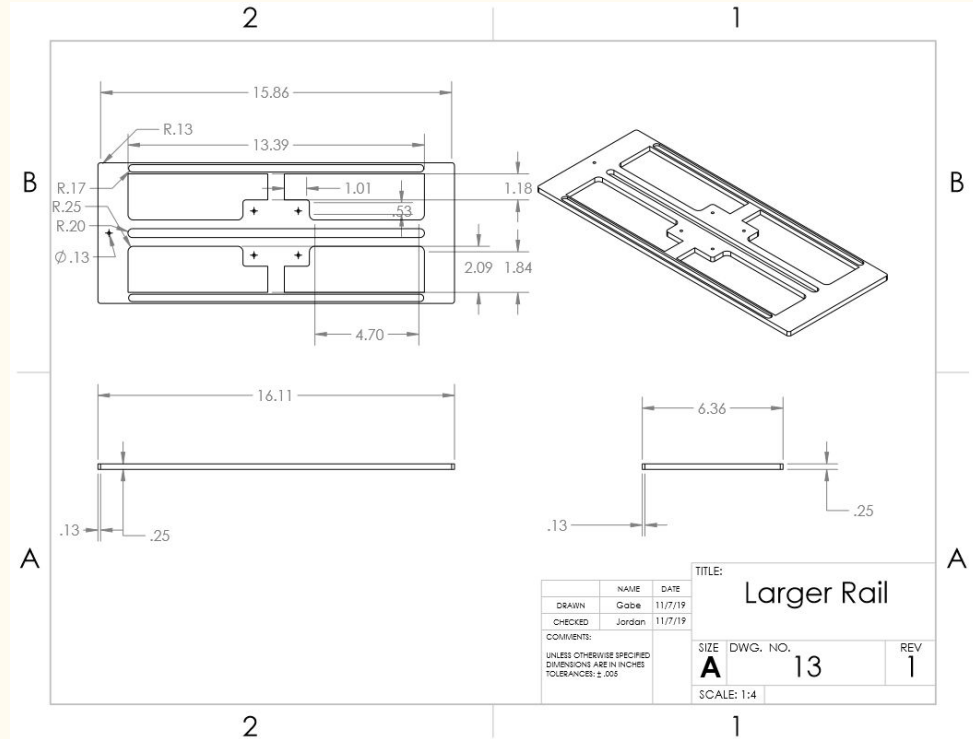
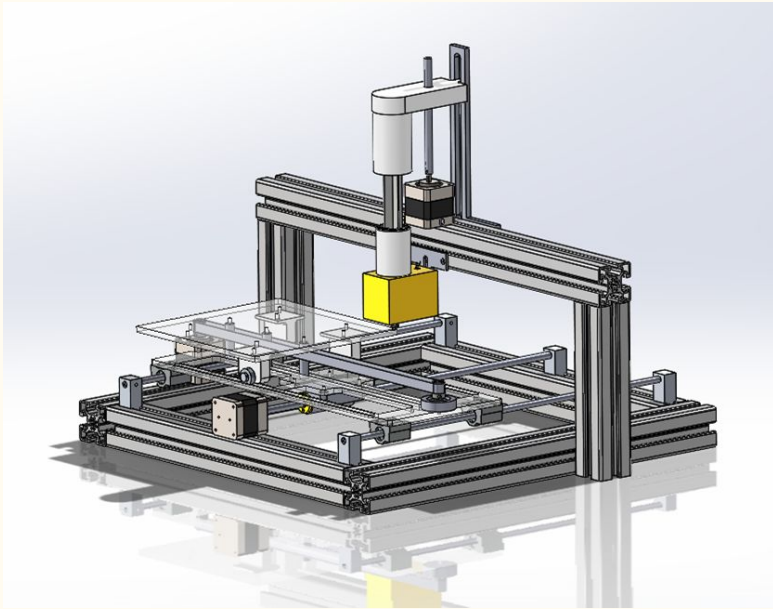
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.				
1	Extruded Aluminum	Buy	2	21	Washer	Buy	1
2	Rail Holder	Manufacture	4	22	Clamp on adjust	Manufacture	1
3	Rail	Buy	2	23	Spacer	Manufacture	1
4	Linear Bearing	Buy	4	24	014-0244 ITEM1 Barrel	Buy	1
5	Largerail	Manufacture	1	25	014-0244 ITEM2 Plunger	Buy	1
6	BED	Manufacture	1	26	014-0244 ITEM3 Gasket	Buy	1
7	TableGuide	Manufacture	3	27	Heating Element	Buy	1
8	3dprintedbedlift	Manufacture	4	28	Lead screw shorter	Buy	1
9	hold up pin	Manufacture	4	29	plunger push	Manufacture	1
10	bearing	Buy	5	30	Head Guide	Manufacture	1
11	NEMA17	Buy	3	31	Timing Belt	Buy	1
12	Shaft	Buy	3				
13	GT2 Timing Gear Alumium For Belt	Buy	2				
14	Bearing holder	Manufacture	1				
15	non_motor_shaft	Manufacture	1				
16	Lead screw 3d print	Manufacture	1				
17	Lead screw	Buy	1				
18	Rail Holder custom	Manufacture	1				
19	screw nut_M8_normal_ste	Buy	2				
20	Bronze Heater	Manufacture	1				

Make vs. Buy

There are 29 parts that we are considering making. This decision came down to which parts we would have the time and skill level to create. Most of the parts being made will be designed by a group member and if not will have its 3D model downloaded from a reputable online source. These parts will have engineering drawings to accompany them so that the parts will be repeatable for anyone who downloads them. The parts that will be bought are parts that we either do not have the skill level yet to replicate or will not have the time to dedicate to creating such models. One such example is the extruded aluminum used to create our printers frame.



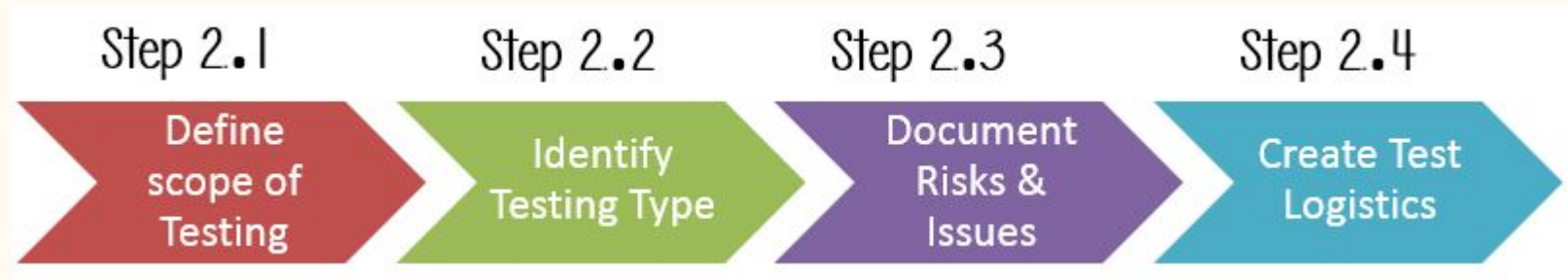
Make vs Buy



Test Plans



1. How accurately can the print bed be moved around?
2. Is the amount of backlash minimal?
3. Can the syringe maintain a constant temperature?
4. Is the printer dispensing a reasonable amount of material?
5. How much chocolate can the syringe hold before weight becomes an issue?
6. Can the printer produce shapes and letters that are within an acceptable range of error?



Updated Evaluations

Move bed 1 inch and pause. Measure actual distance. Repeat for entire build area.

Move bed 1 inch. Place dial indicator on table. Move back .25 in and measure actual movement. Repeat 4 times.

Temperature gauge will be set on syringe and measured for variation throughout the extrusion process.

Volume per second will be measured as the feed rate. It will be evaluated for the jog speed of 10 mm/s.

Updated Evaluation

Head will be loaded with maximum chocolate capacity and measured for speed difference from being emptied. It will be in an acceptable range if it is within 1 mm/s difference in speed.

The printer will be tested to an accuracy of 3mm inches.

The chocolate will be tested to be at the correct temperature where it does not run on the bed.

The team will attempt to clean the printer after use to see the level of ease.

Requirements Met

Prints in chocolate

Has a variety of decoration applications

Easy to sanitize

Adequate chocolate volume and build area

Low cost



Cost

Item	Price
T&B Gt2 2 Meters Timing Belt and 2 X Aluminum 20t 8mm Pulleys Set	\$8.99
Fenstore Linear Rail 2 Pcs 8mm x 400mm Cylinder Liner Rail Linear Shaft Optical Axis + 4 Pcs Rod Rail Shaft Support	\$23.95
4pc 2020 CNC 3D Printer Parts European Standard Anodized Linear Rail Aluminum Profile Extrusion for DIY 3D Printer	\$29.99
PZRT 2PCS Silver 2020 Aluminum Profile European Standard Anodized Linear Rail 2020 Aluminum Profile Extrusion	\$15.99
OctagonStar T8 L400mm 8mm Lead 4 Start Lead Screw and Nut	\$9.90
Professional 3D Printer CNC Kit, GRBL CNC Shield +UNO R3 Board+ RAMPS 1.4 Mechanical Switch Endstop+DRV8825 GRBL Stepper Motor Driver+Nema 17 Stepper Motor	\$57.47
uxcell 635-2RS Deep Groove Ball Bearing 5x19x6mm Double Sealed ABEC-3 Bearings 10-Pack	\$8.79
Shipping + Tax	\$18.58
	\$173.66

Updated Requirements

This comes from the customer

Requirements were kept the same

Customer was happy and content that all needs were met

Future models were already being discussed

Updated Concepts

Guide for the Z-axis plunger

3D Printed corner brackets

Belt tensioner

Smaller aluminum frame

Conclusion

Questions about the project so far?

