manufacture

Overview: This is the story of how a pyramid became a cylinder, and was the most meaningful project of my undergraduate career in Engineering and Design. The assignment was to create a product with a mechanical interaction using the manufacturing techniques we would be learning for the quarter. This project took place over the course of my third Product Design quarter. Ultimately, the quarter would be cut short by COVID, but not before I created something I am truly proud of.

ilumenum

an illuminated aluminum knob

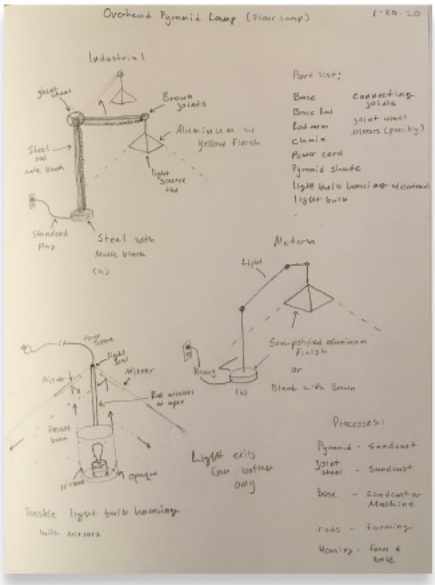
ME 103 | Product Realization: Design and Making with **Dave Beach**

exploration
validation
realization
iteration & communication

01

meaning

I wanted to make a pyramid. My idea was that the shade would be solid metal and that light would only escape from underneath, creating a pyramidal cone of light.



02

rapid prototypes

Rapid prototyping demonstrated the feasibility of the lamp shade. I discovered a neat effect with the foam core prototype and reimagined my design.

03

structured labs

While designing the lamp, I was exposed to the methods of sand casting, welding, milling, and lathe work through structured labs. It took three attempts on the lathe to get the threading on the handle.

04

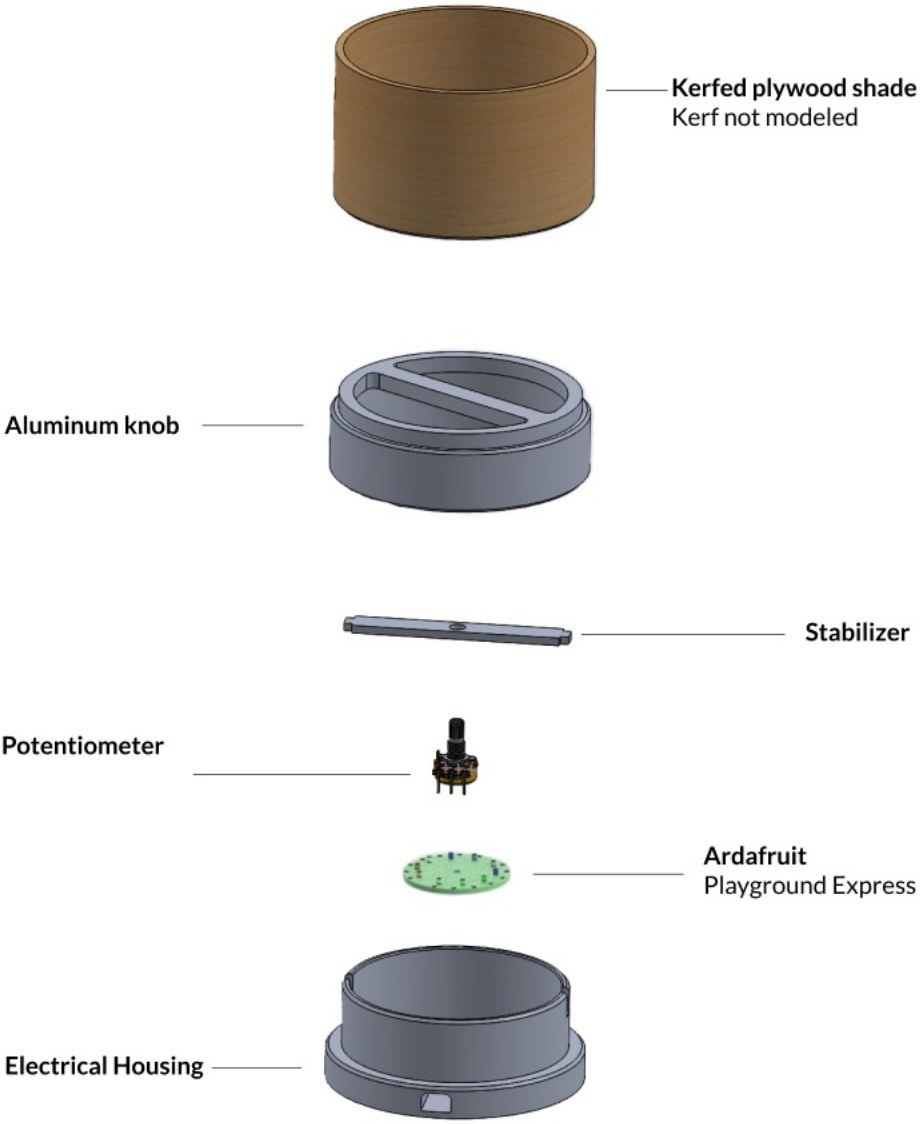
functional prototype

A table-top lamp became my ultimate objective for this project. Though, while building a functional prototype out of foam-core and a standard light bulb, I realized that this project was uninspired and unfeasible. My singular focus on building a pyramid had me locked in to a dysfunctional design.

05

inspiration

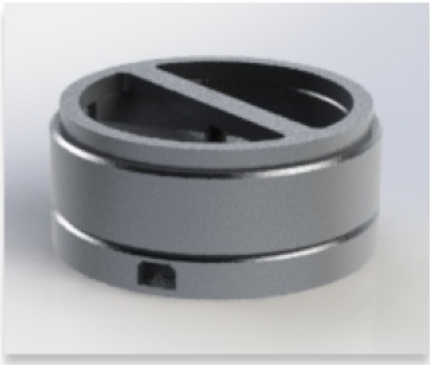
New inspiration was found when a previous student's work was shared with the class. Finally, I was able to envision a design I could proudly present at "Meet the Makers".



06

iteration

The design went through a total of four iterations along the way. Changes were made to account for aesthetic, hardware considerations, and functionality.



07

product rendering

The final design includes three original aluminum parts, a potentiometer, an Ardafruit Playground Express programmable LED as the light source, and a usb-mini power supply.

08

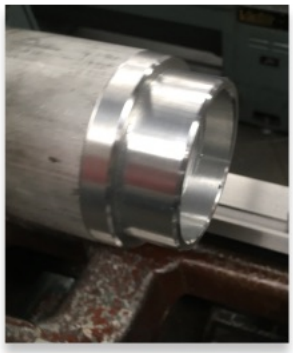
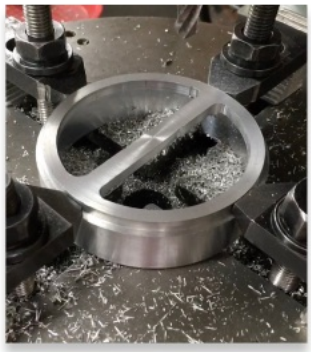
fabrication planning

With a form-fitting redesign, it was crucial that each piece was crafted with precision. My early failures on the lathe paid off with experience and gave me the confidence I needed to embark on the ambitious design.

09

machine

The lathe and mill were used to craft the base of the lamp. Needless to say, this was a critical piece of the process and was the most labor intensive. My earlier calculations and drawings assured that I met my tolerances and I'm satisfied with the machine finish.


10

finishing

When preparing to press fit the rotary switch into the knob, the lab was closed due to Covid-19. I still had planned to sandblast the aluminum, cut kerfs in the shade using 1/8" plywood, then stain and glue.


11

improvise

Using paper and sewing rings found at Michaels, I made my best attempt at completing the project from home. Though it was not the final version I envisioned, my precise metal work makes this lamp worth while.