

Ferris Wheel

2/2/2023

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Partnered With :

Ashley C, Vanessa C, Luke D, Abdul H

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Project Objective

Our objective for this project is to design and build decorative piece of woodwork. It should be aesthetically pleasing and capable of motion, that is both enjoyable to both children and adults alike. In addition to this, the project itself should not exceed 1.5 feet in size (excluding the base) in order for it to be easily placed on tables or shelves.

Research & Design Ideas

When deciding upon a Ferris Wheel, there were several things to consider, ranging from how we could connect the seats to the wheel and how we could get the wheel to move itself.



We referenced images of existing ferris wheels & based designs from different aspects of each of them.



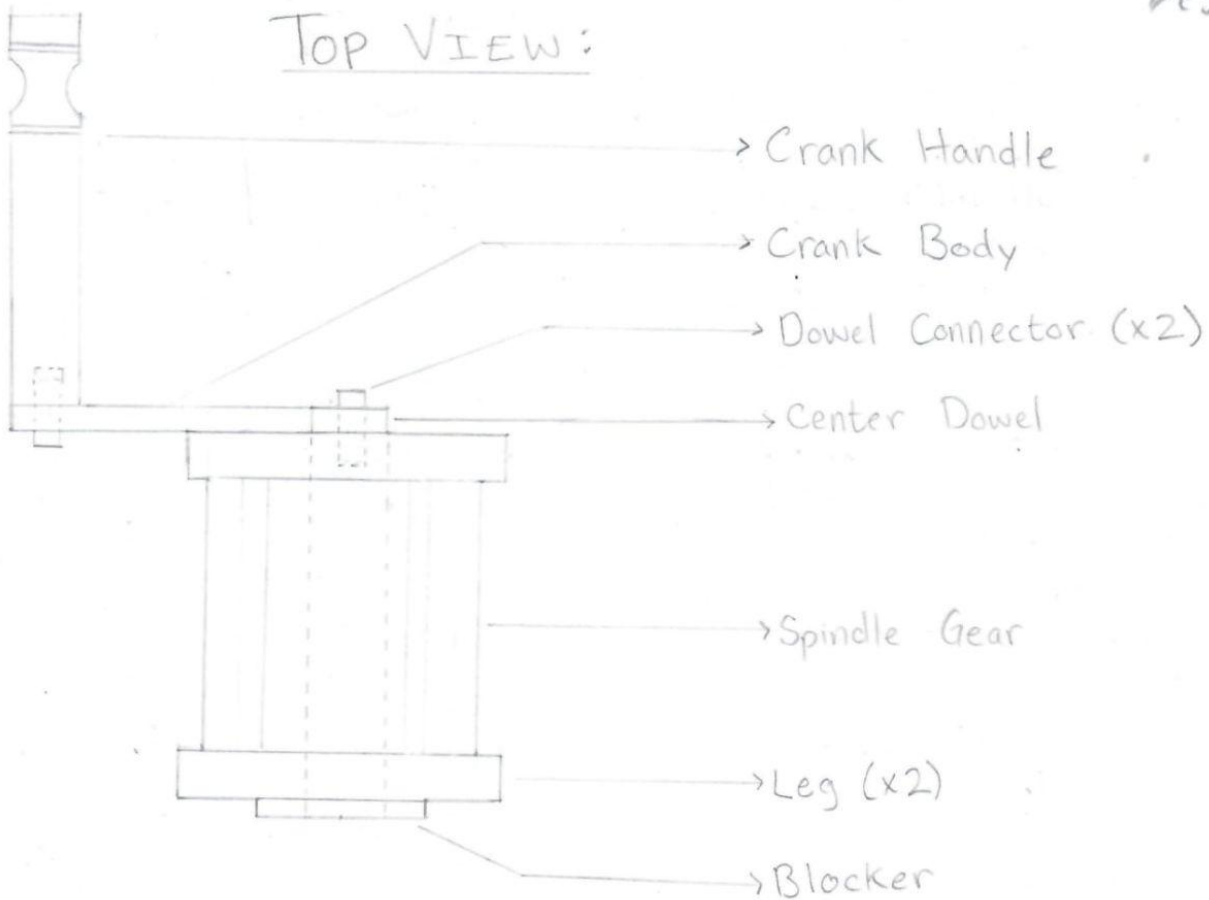
Hand Sketches

Research & Design Ideas

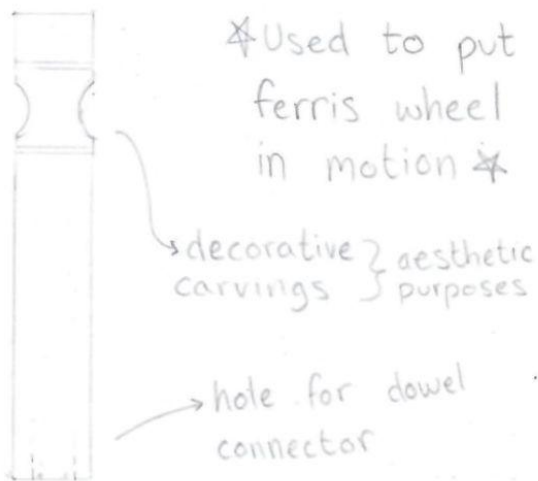
HAND SKETCHES - CRANK SYSTEM

Kamiesha
Deswal

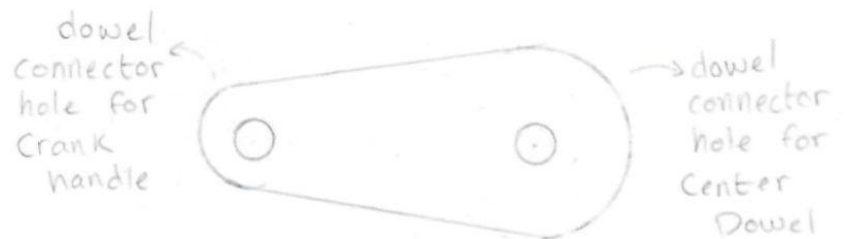
TOP VIEW:



CRANK HANDLE:



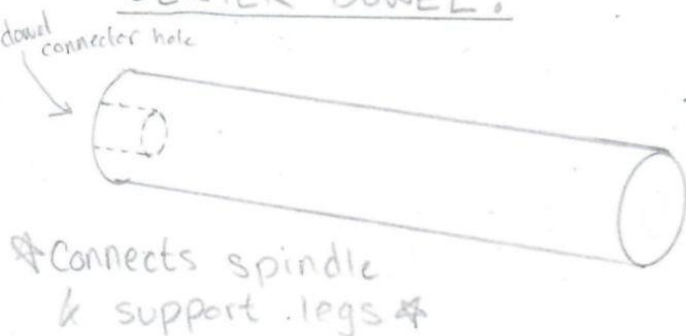
CRANK BODY: (front view)



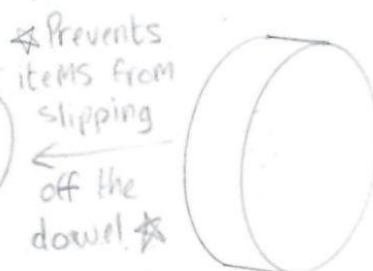
✳ Connects center dowel to crank handle ✳

CONNECTION PIECES:

CENTER DOWEL:



BLOCKER:



x2



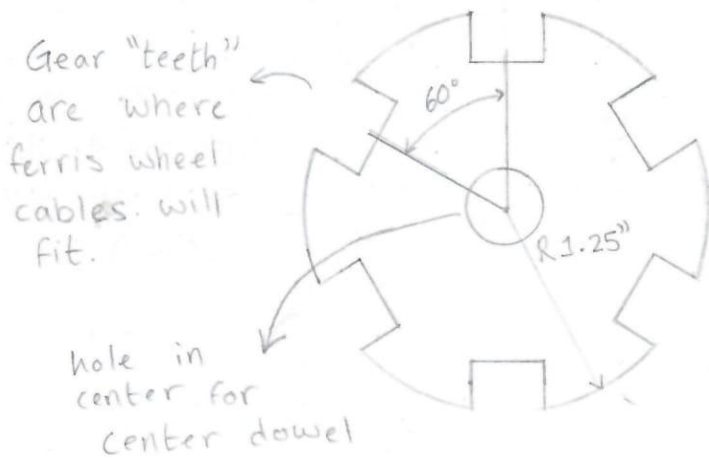
DOWEL CONNECTOR

✳ Used to connect crank system parts together ✳

HAND SKETCHES - CRANK SYSTEM

Kaniesa Deswal

SPINDLE GEAR (front view)



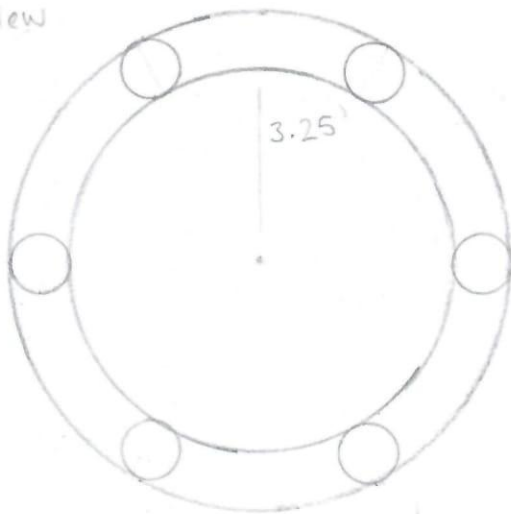
✱ Allows the rest of ferris wheel to rotate with the crank ✱

↳ When crank moves, this spins through the center dowel, and causes cables connected to it to also spin...

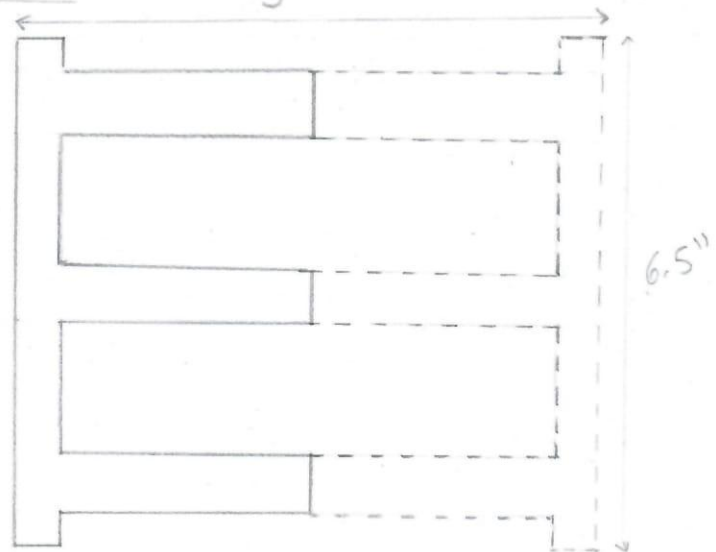
↳ located in center of ferris wheel

INNER CIRCLE X2

Front View

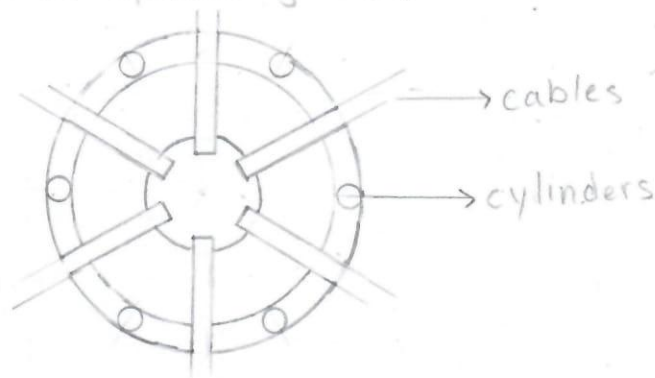


Side View



✱ Provides extra support ✱

NOTE - Cylinders are spaced to not interfere with cables (which are joined with spindle gear):

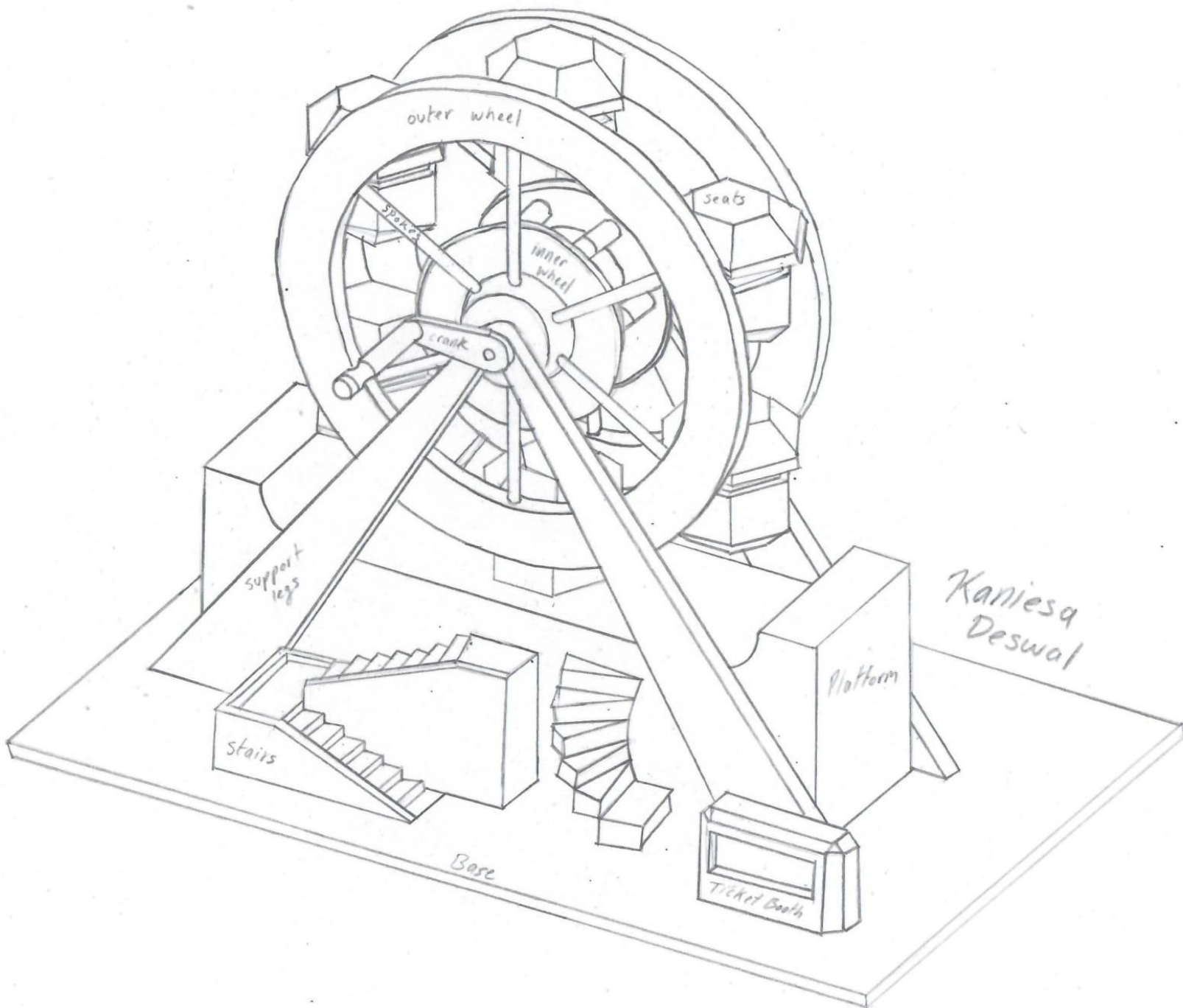


Don't Interfere!!

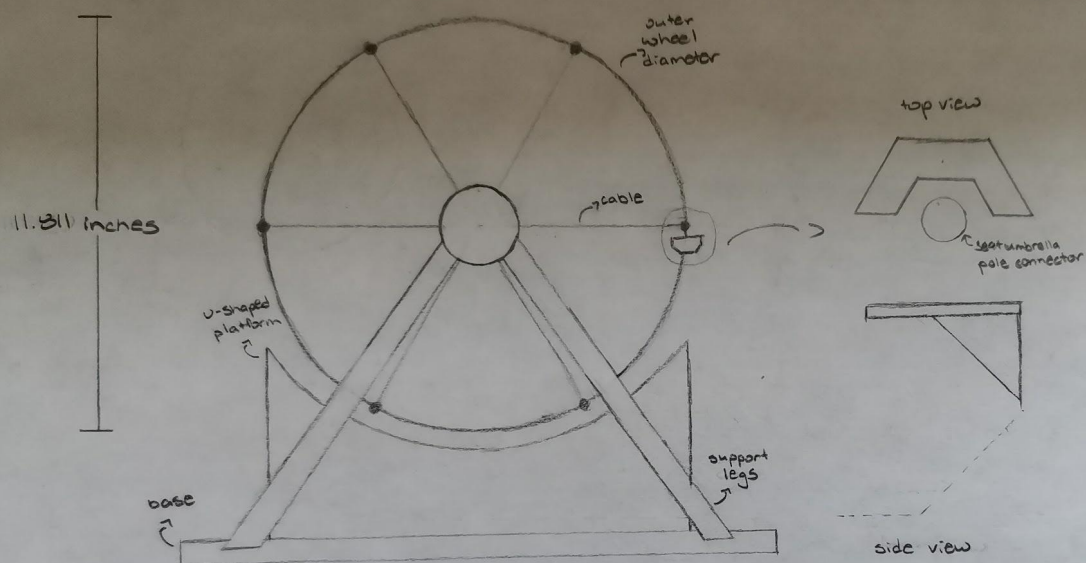
FUTURE EDIT:

The inner circle proved to not provide extra support & was changed to serve aesthetic purposes instead :>

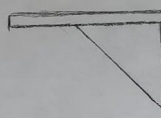
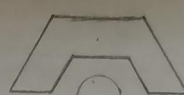
HAND SKETCHES - Isometric - View



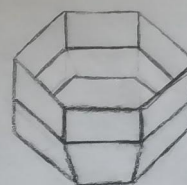
Ashley Cao



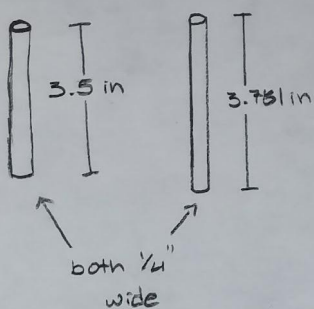
top view



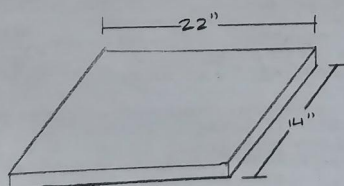
side view



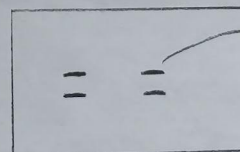
Spokes x 6



Base



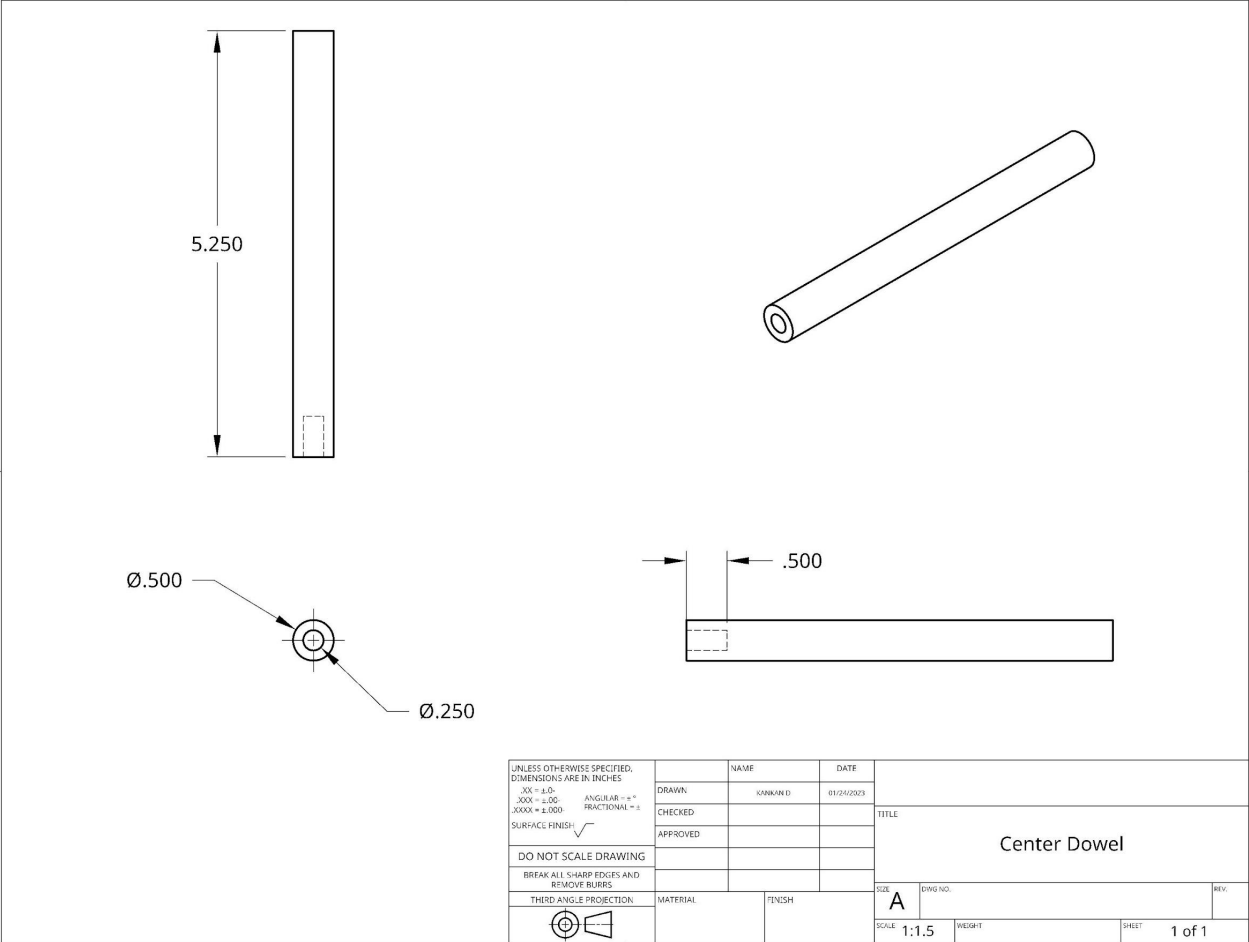
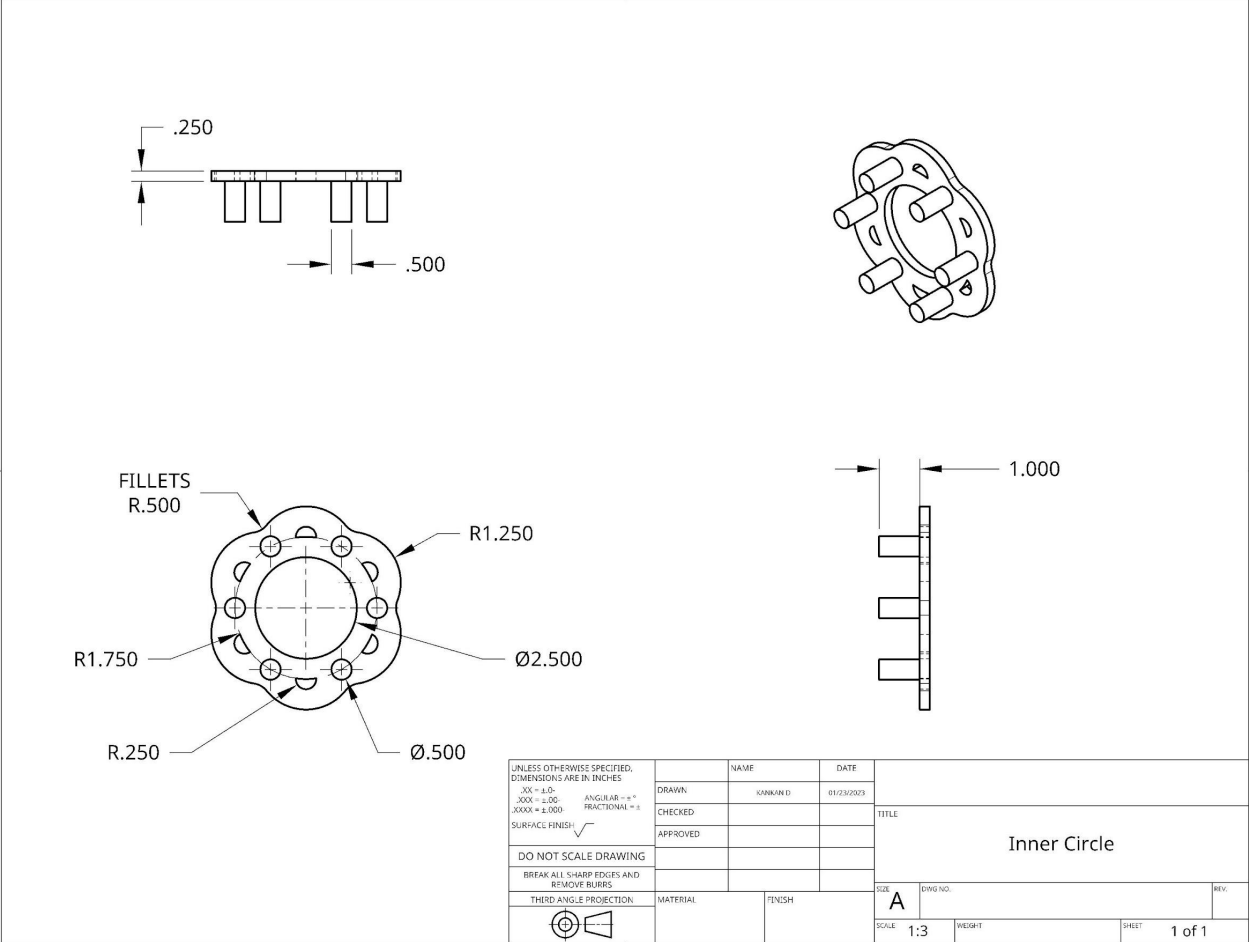
Top View

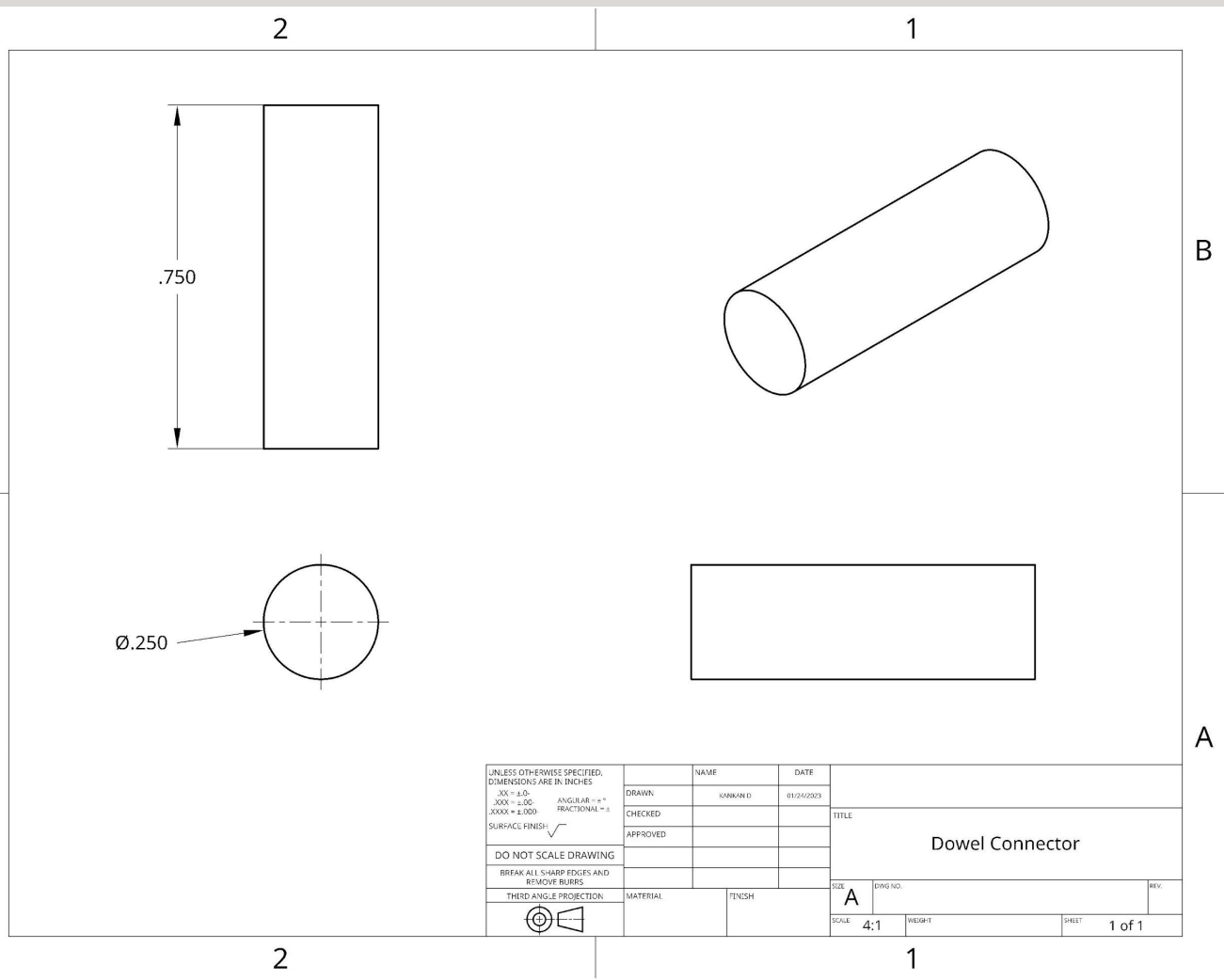
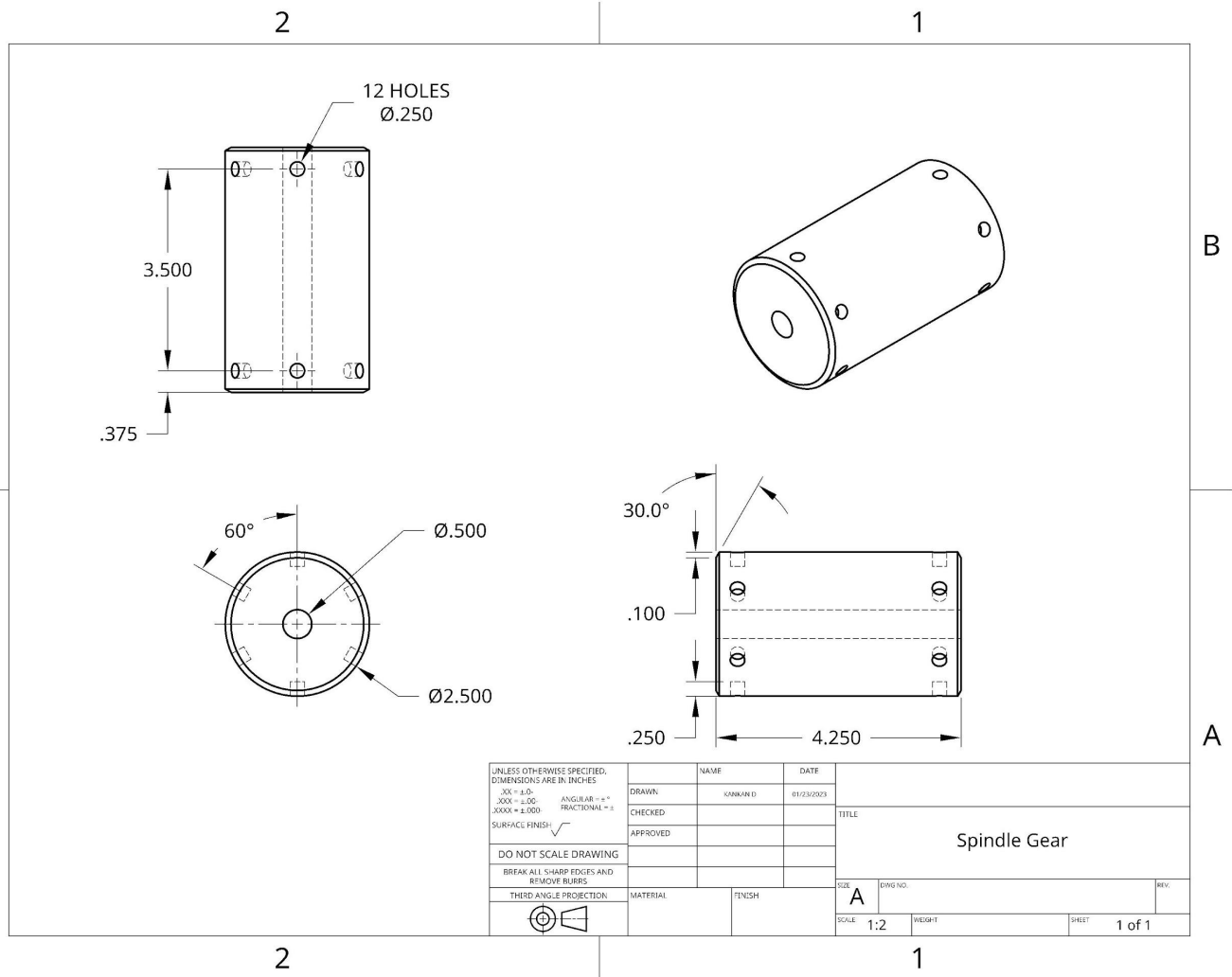


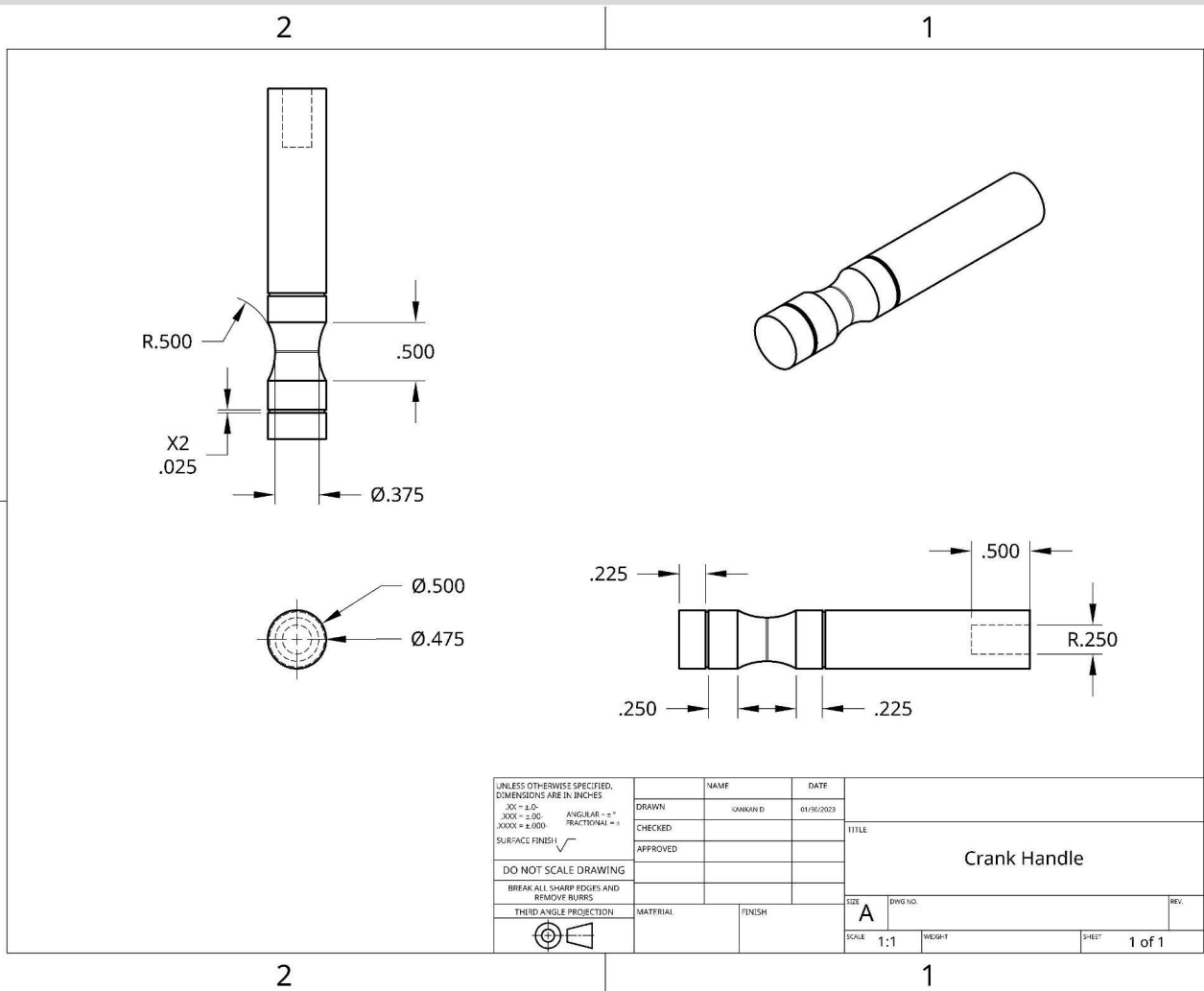
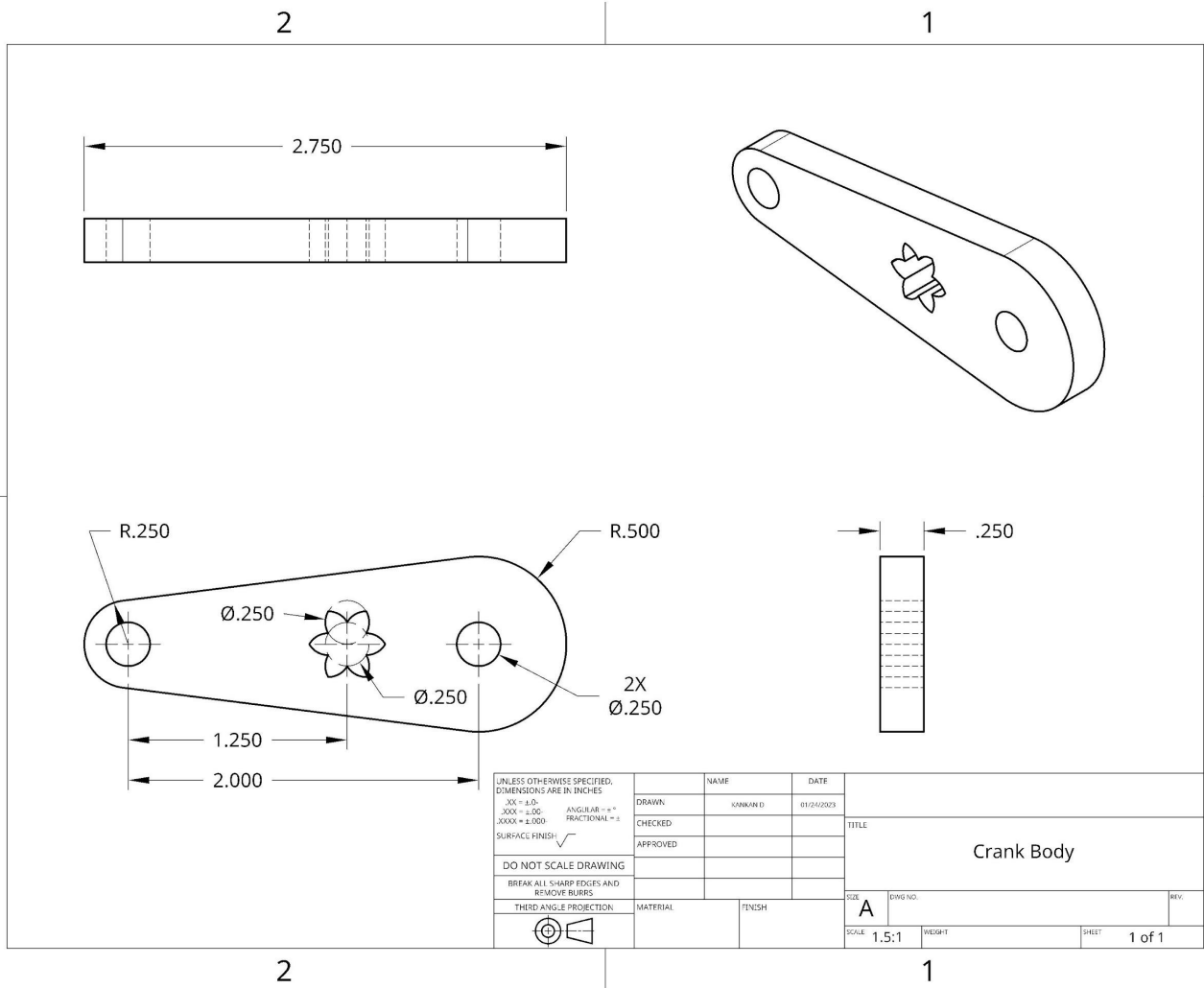
holes are going to be cut for the support legs to ensure stability of the entire ferris wheel

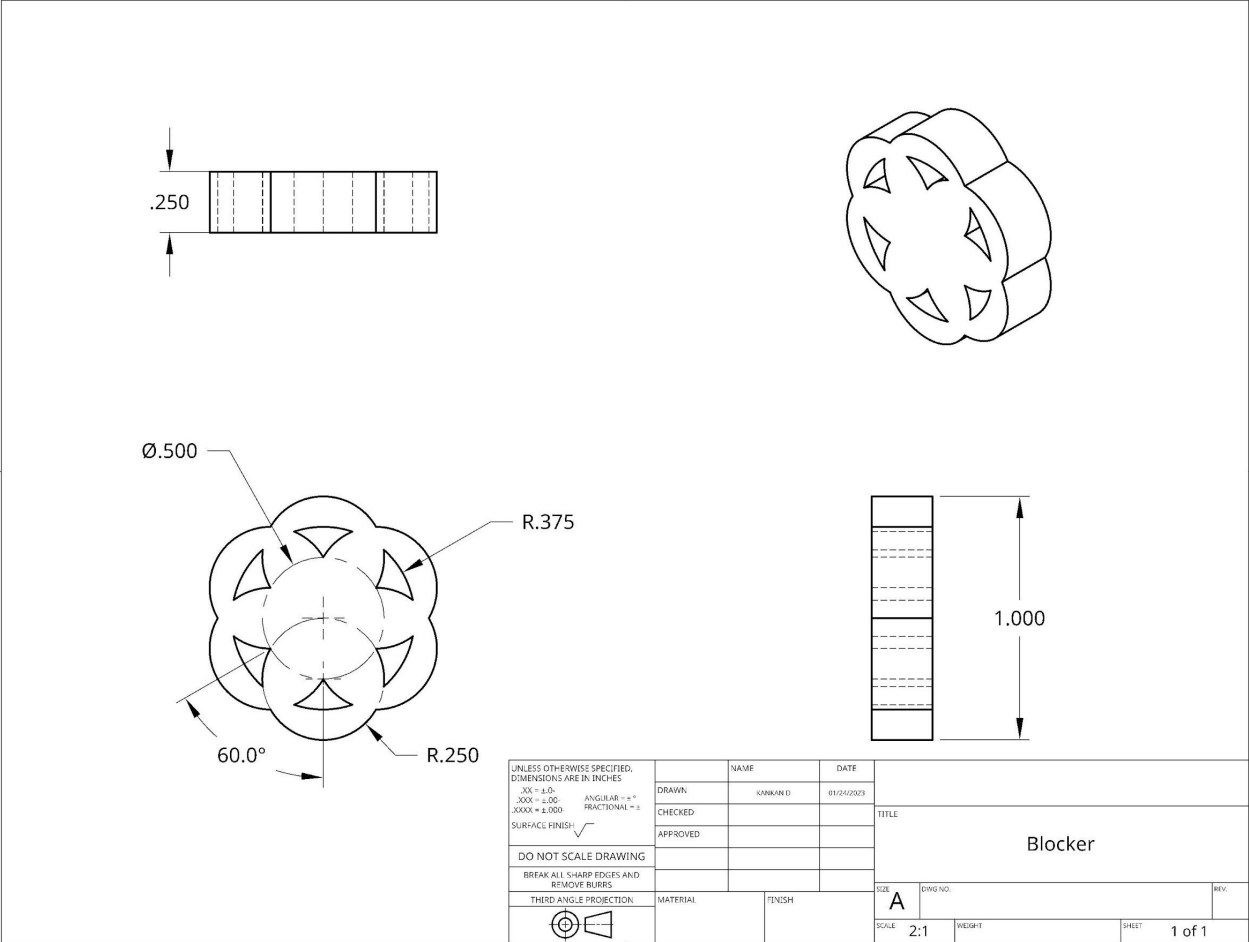
Technical Drawings

Research & Design Ideas

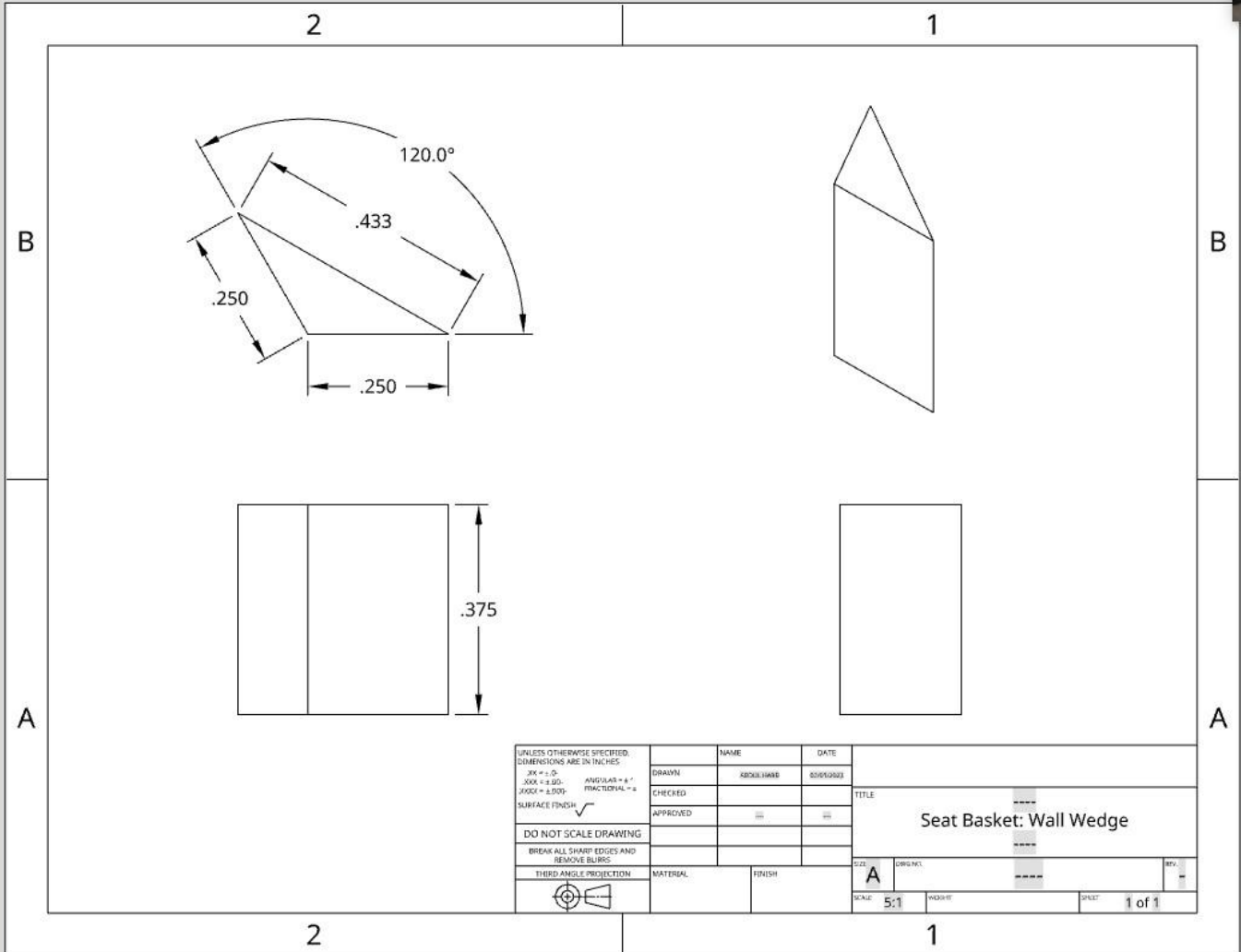
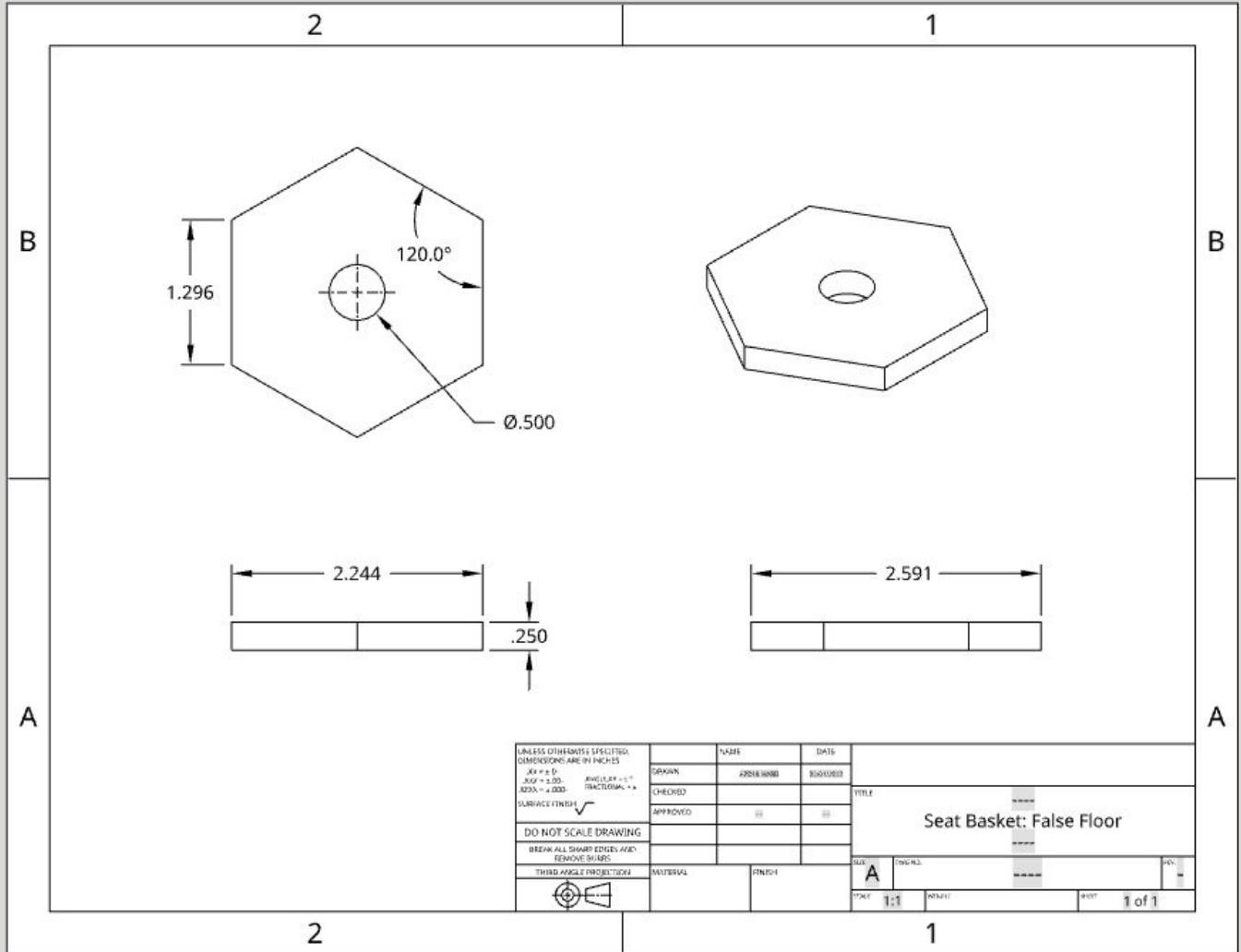


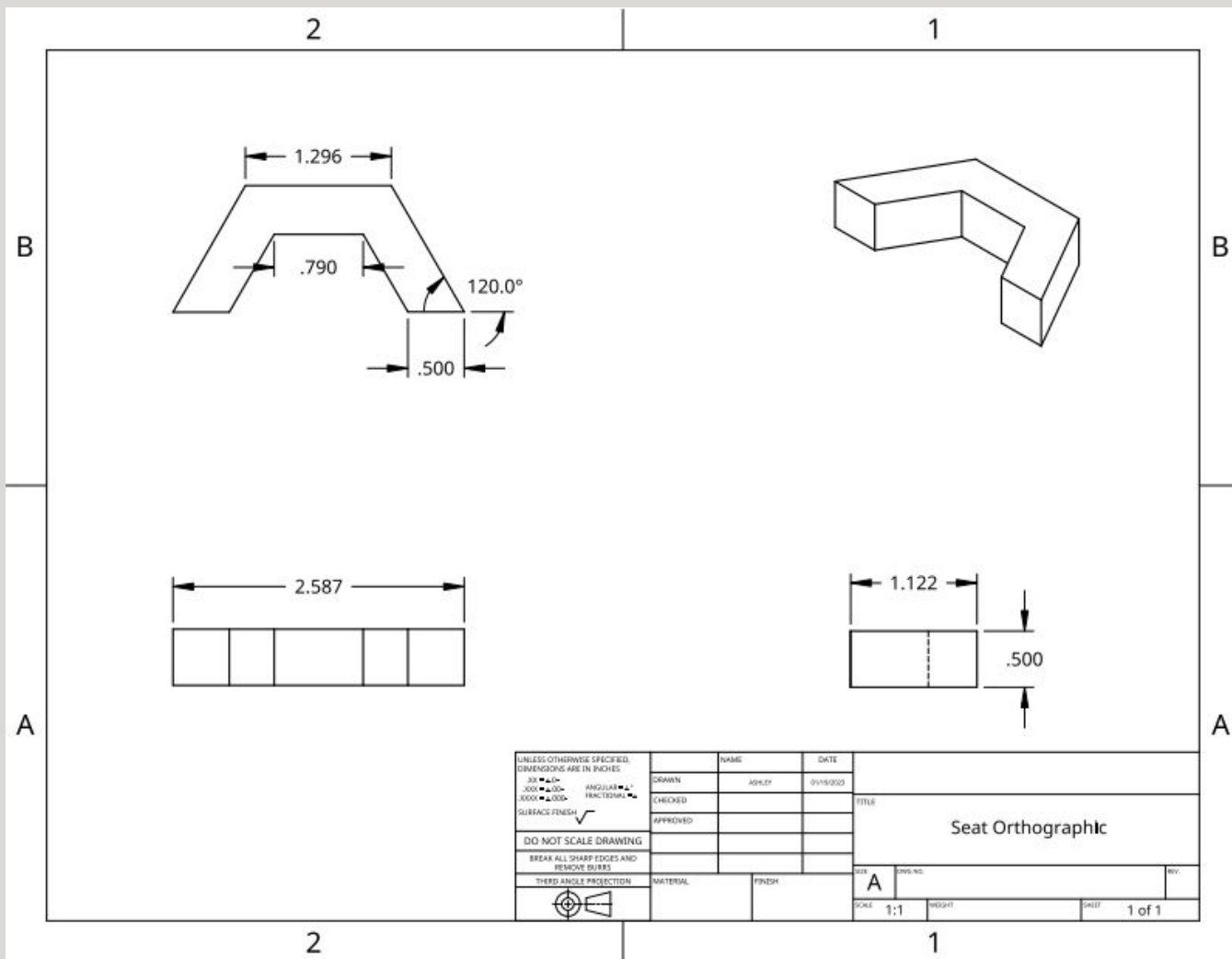
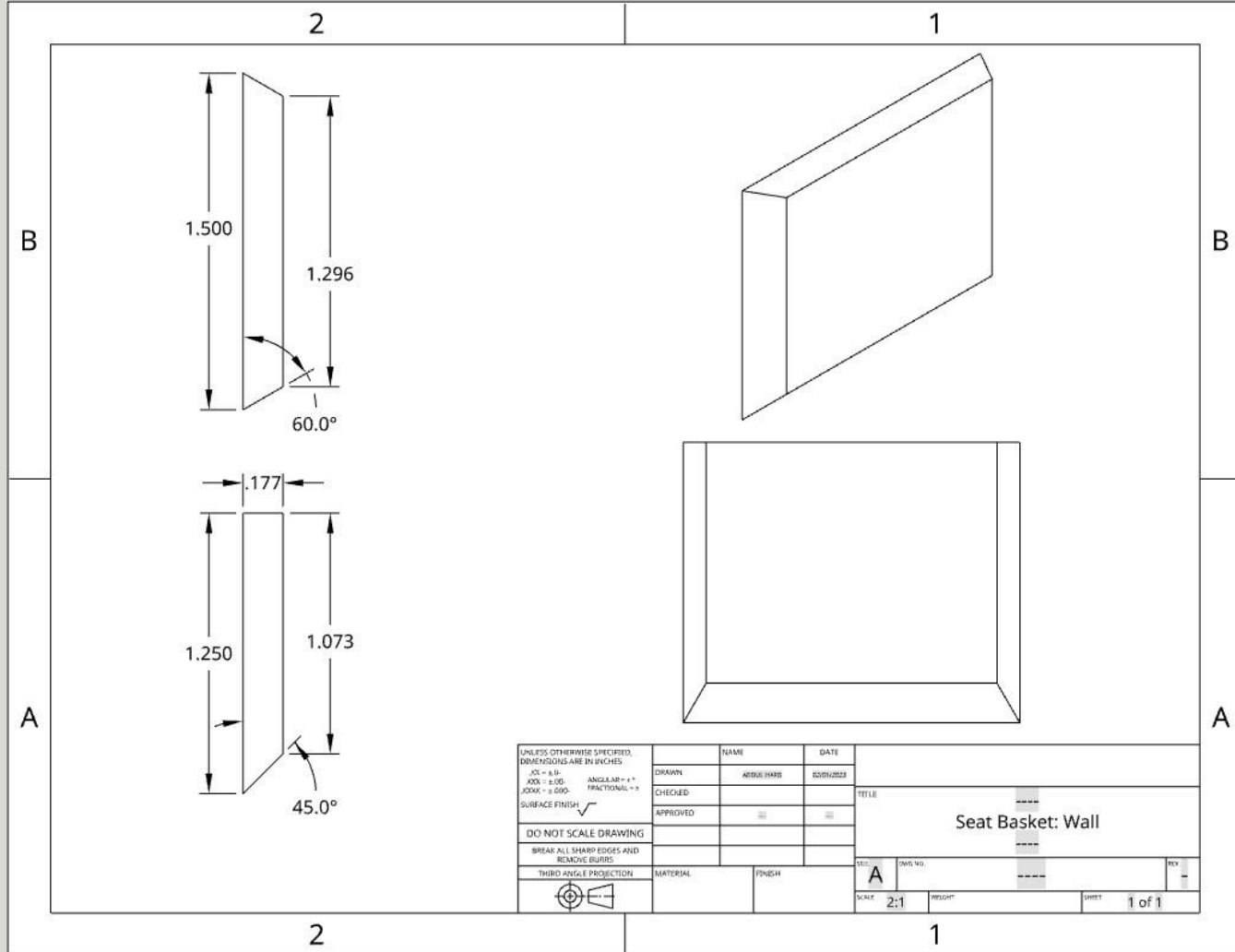


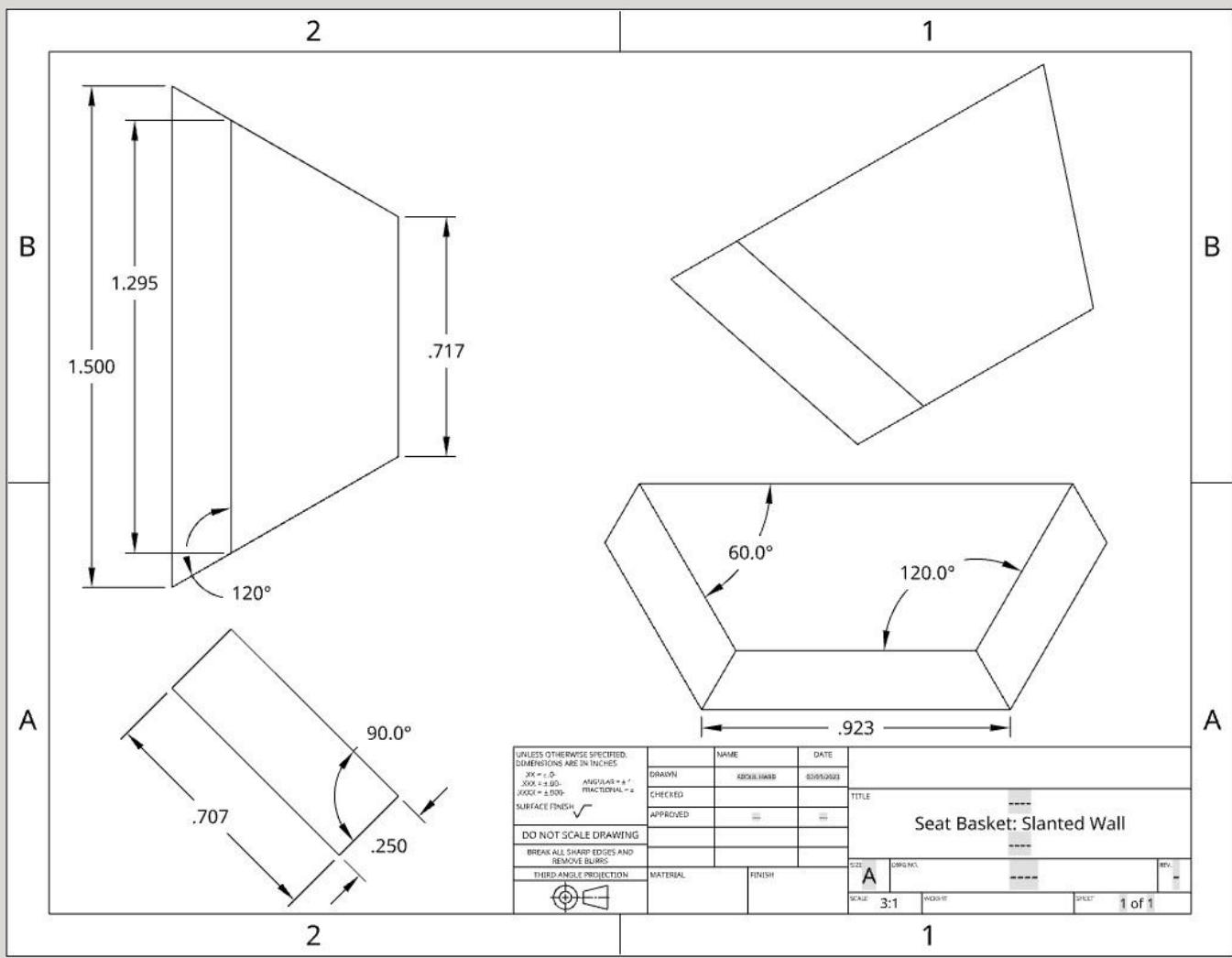
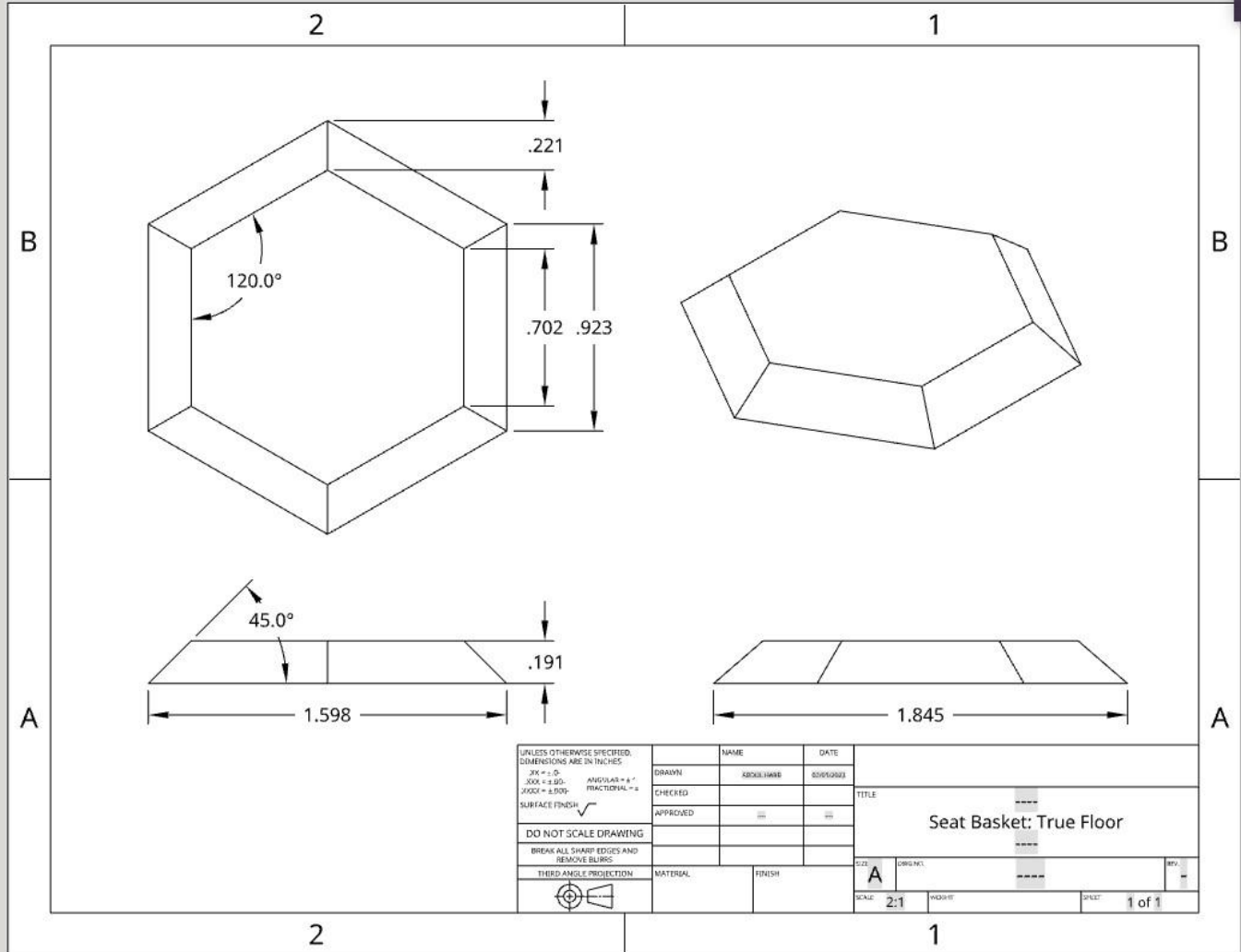


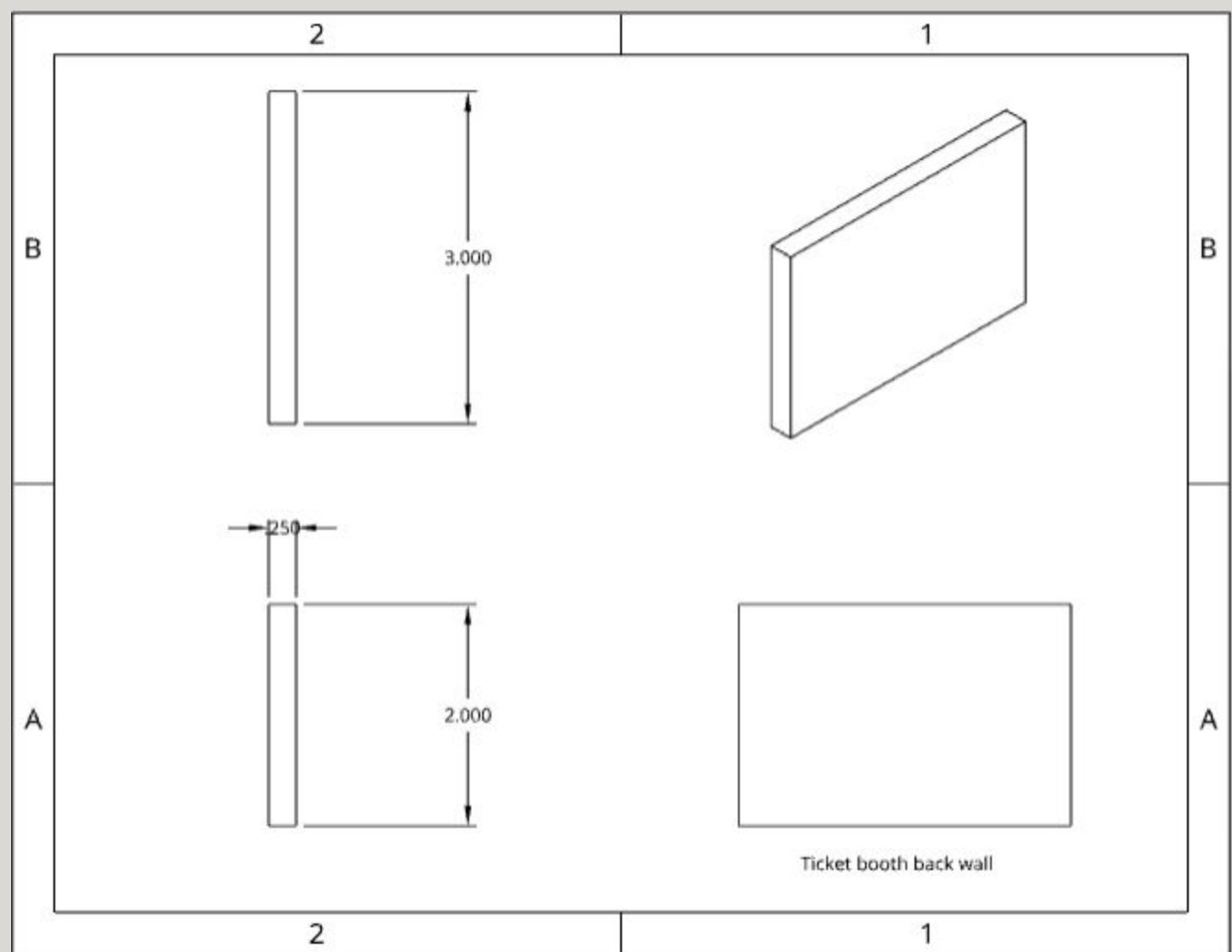
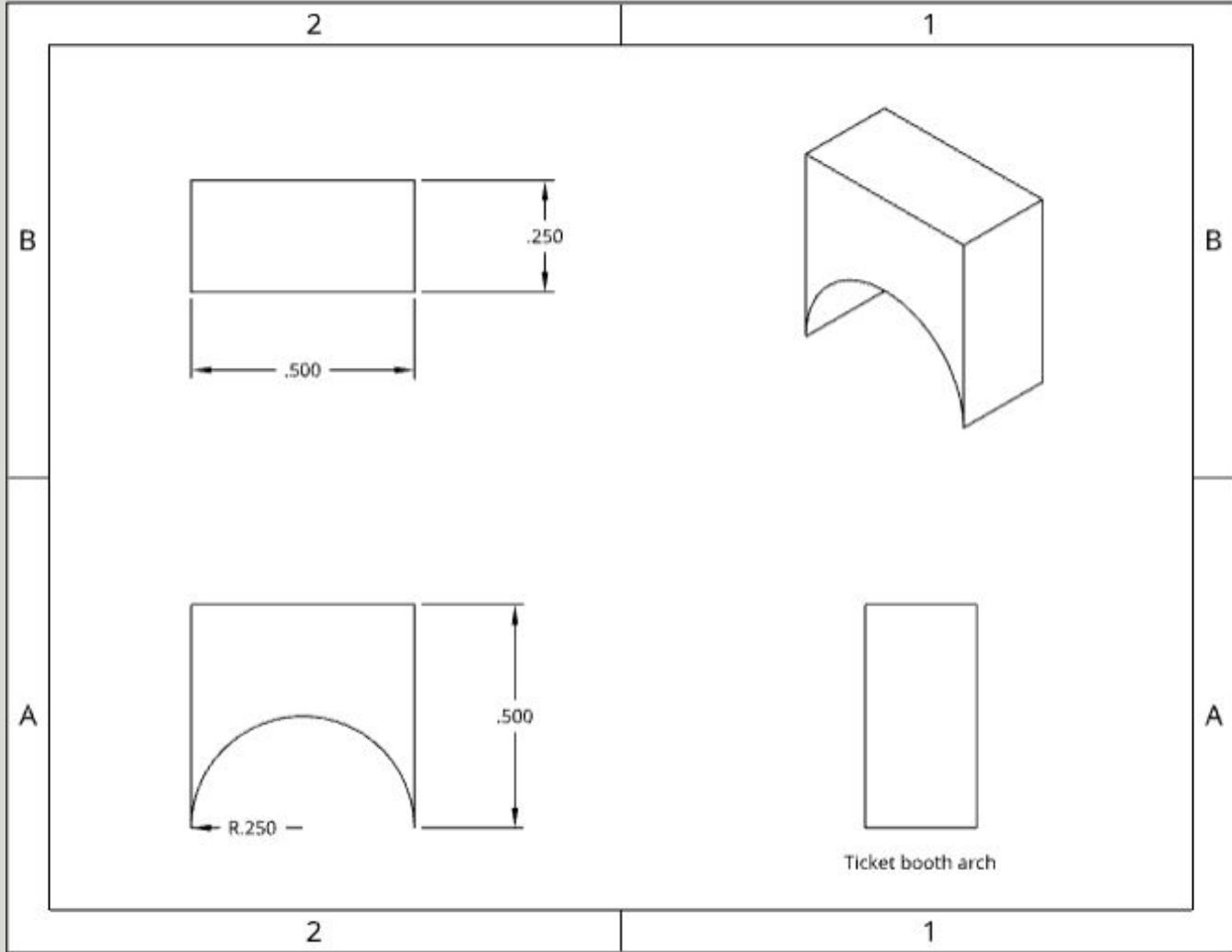


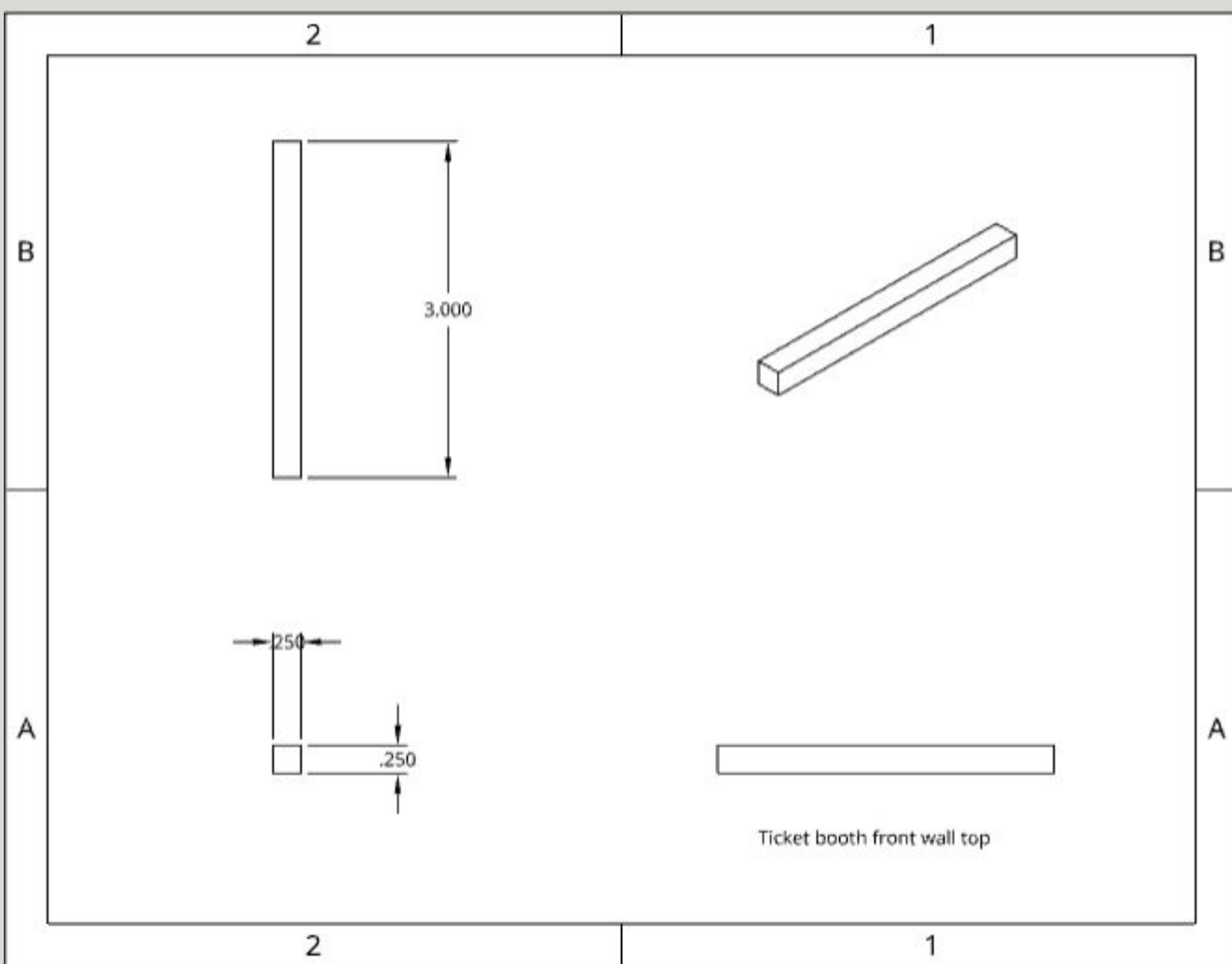
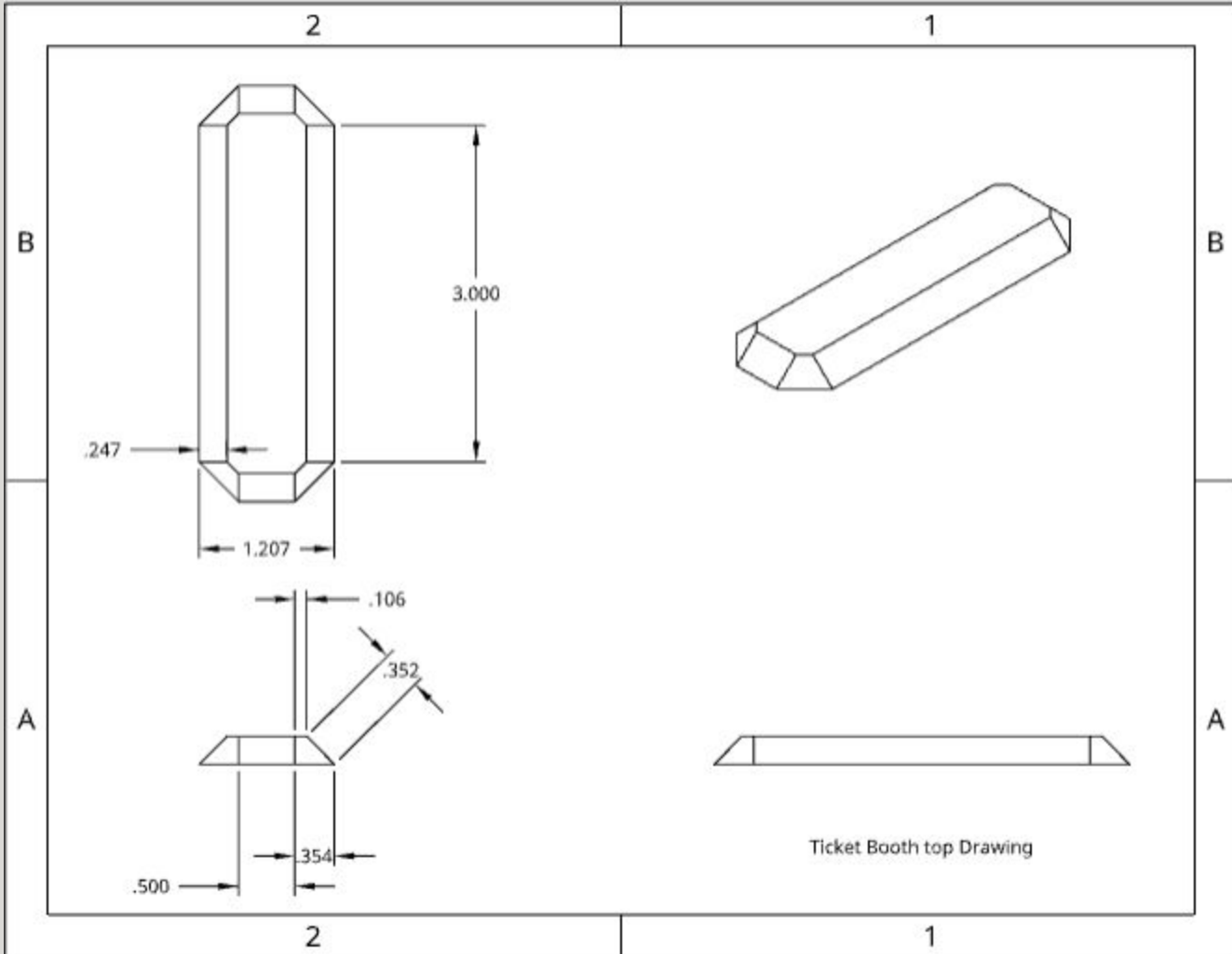
Designed By Kaniesa

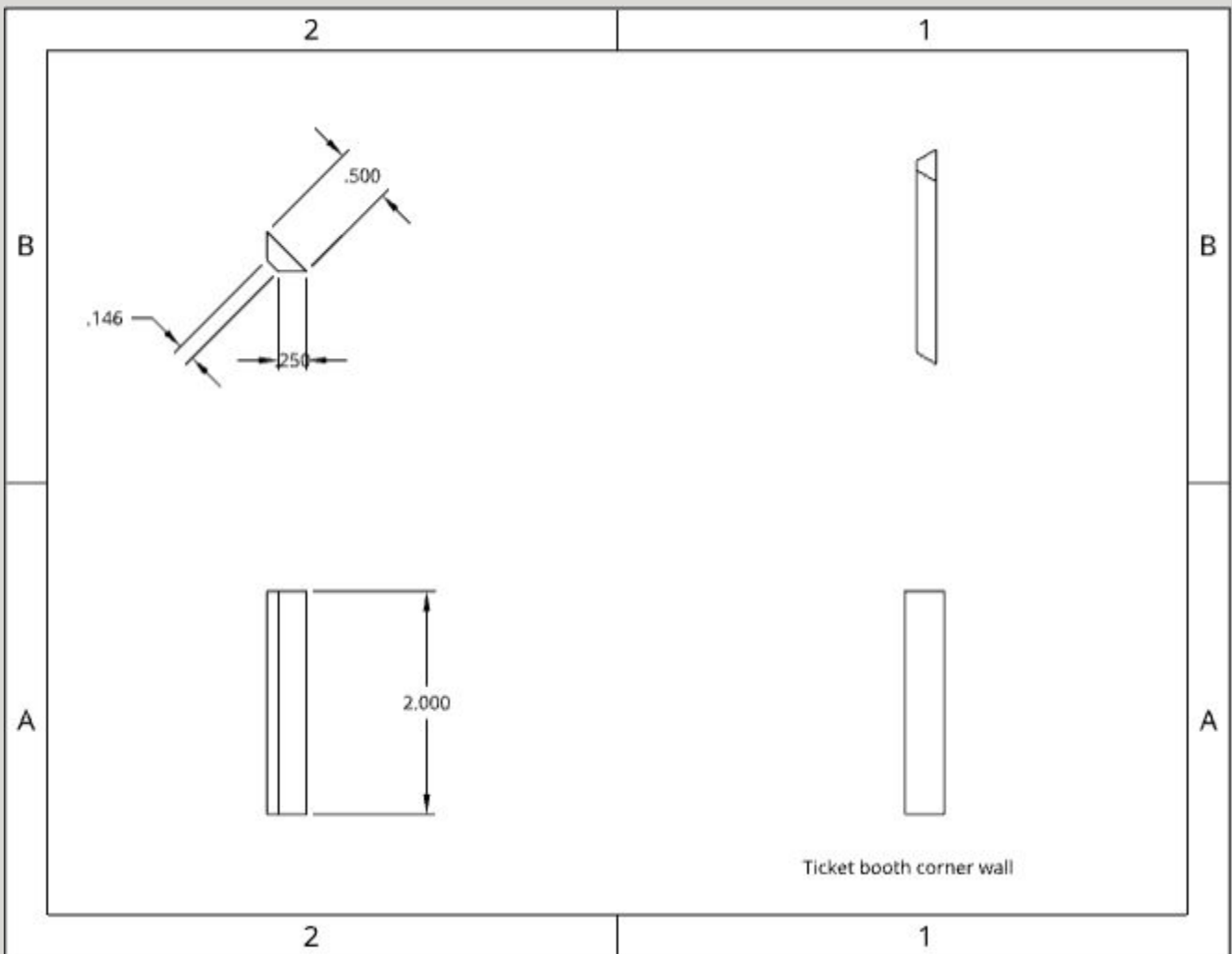
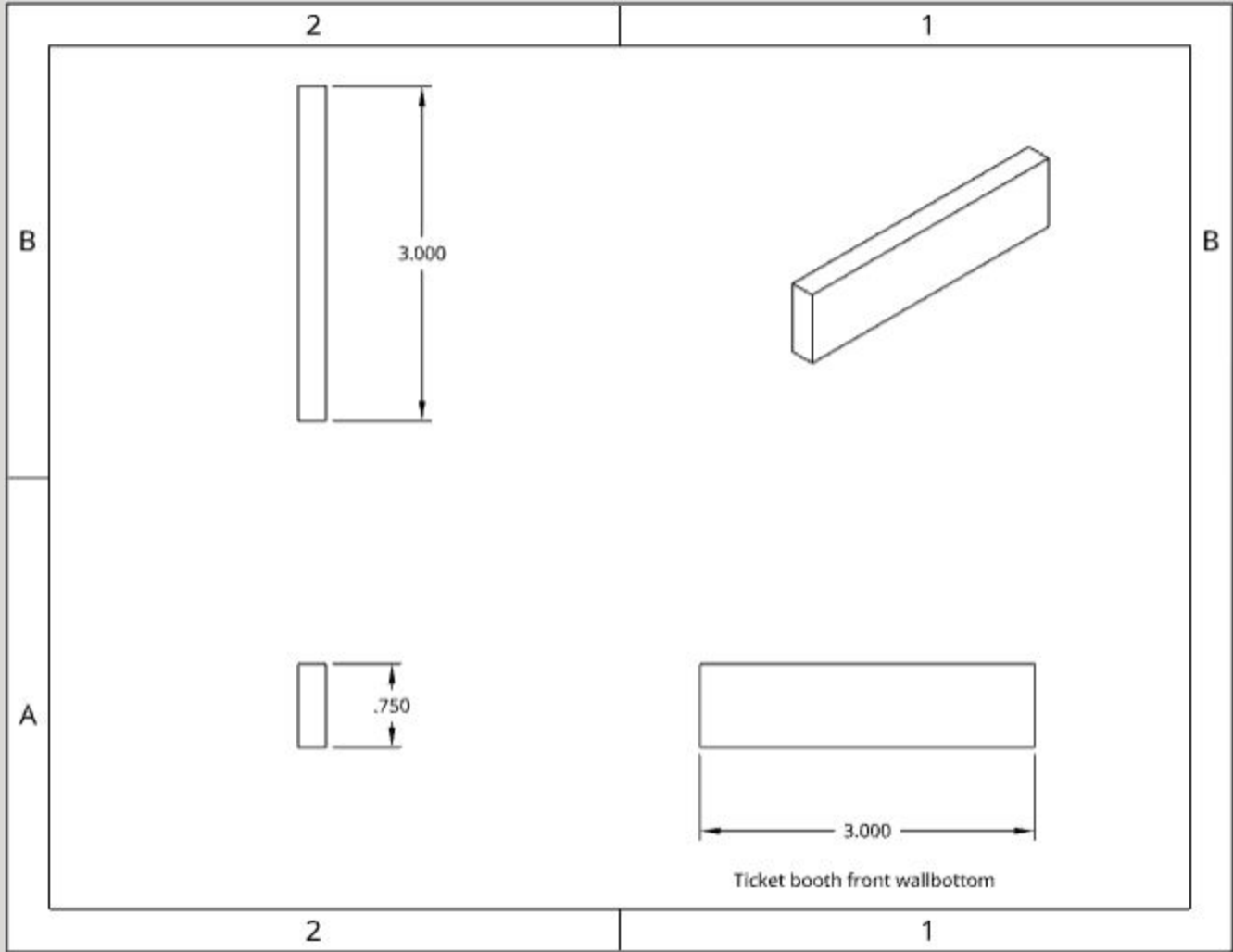


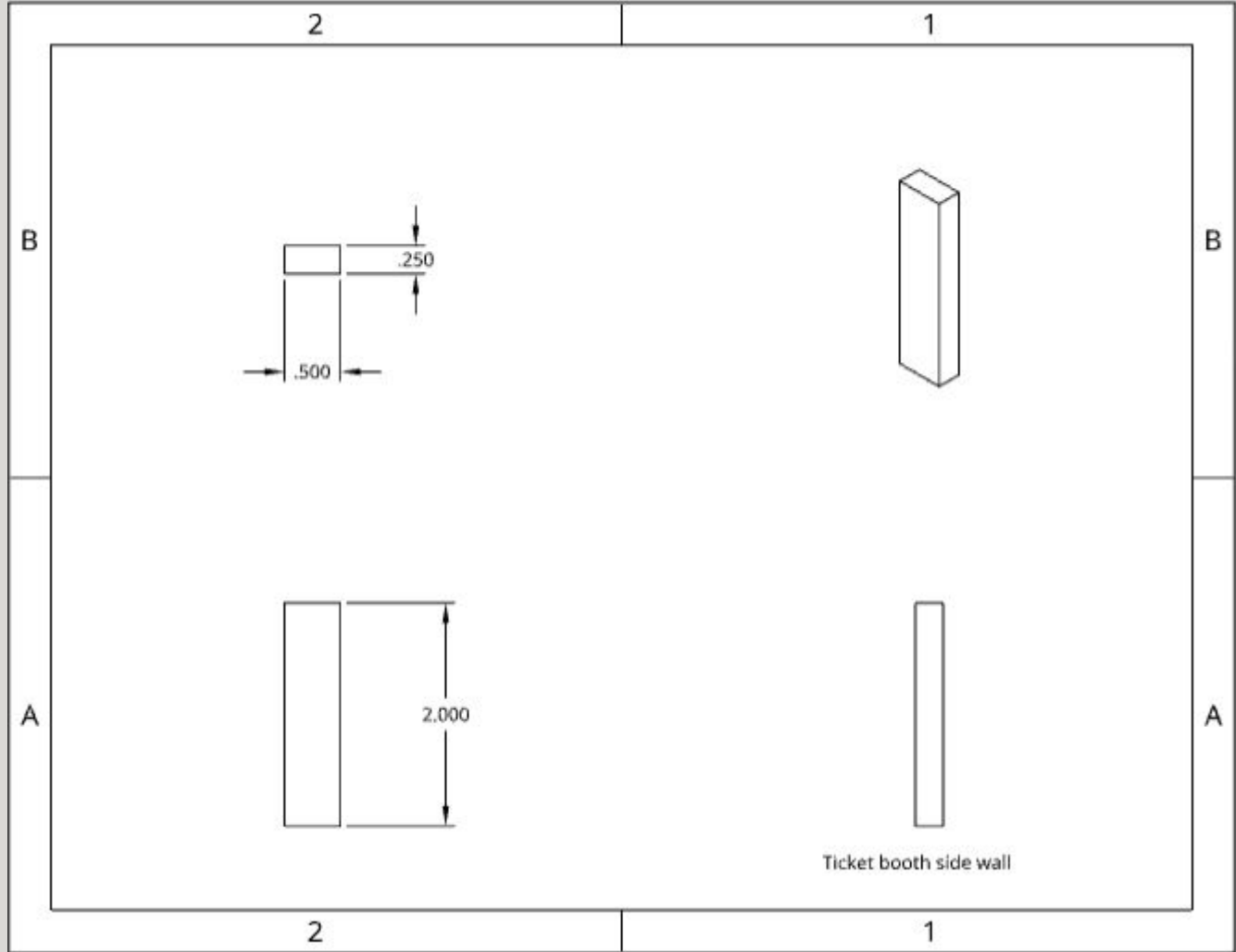




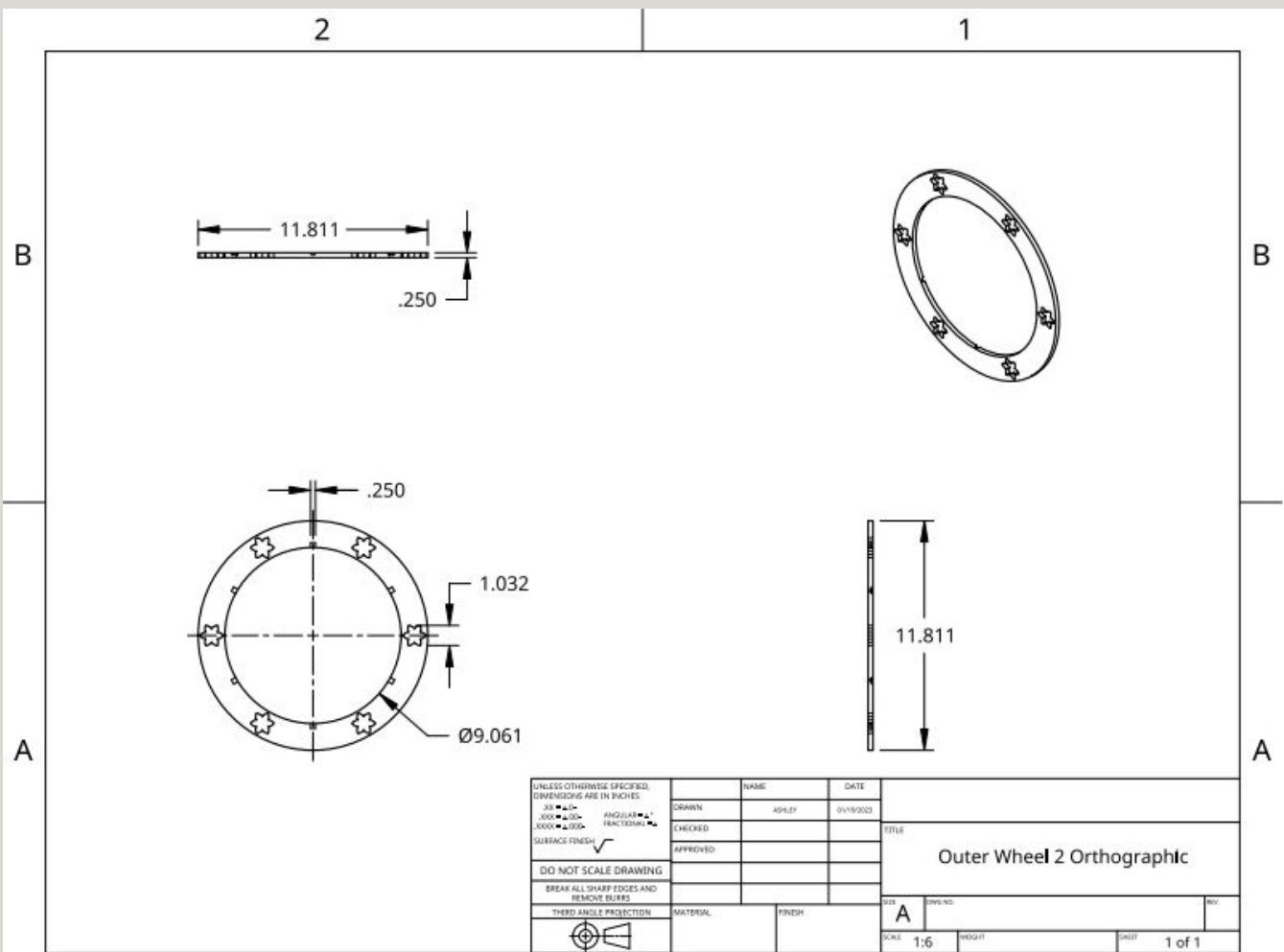
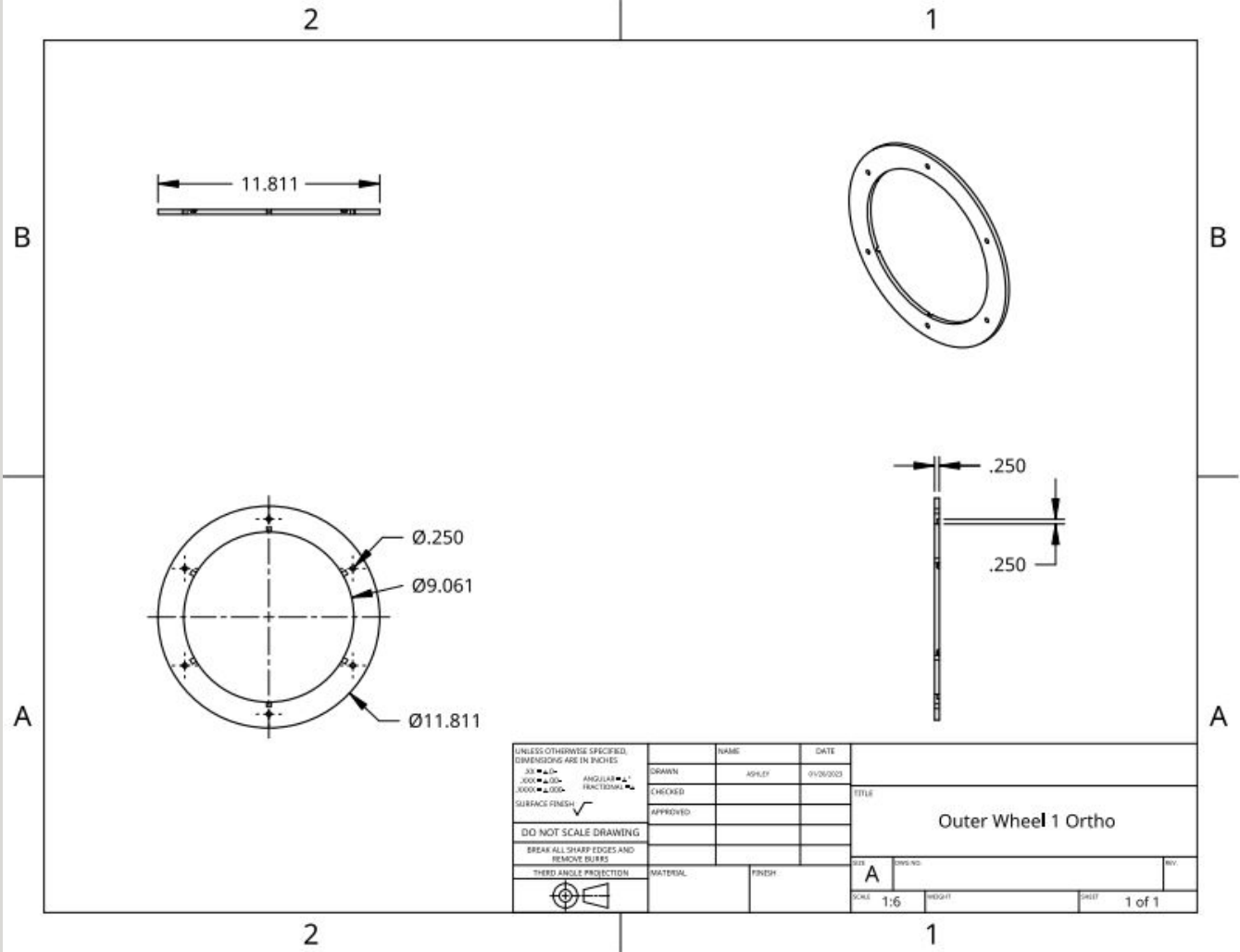


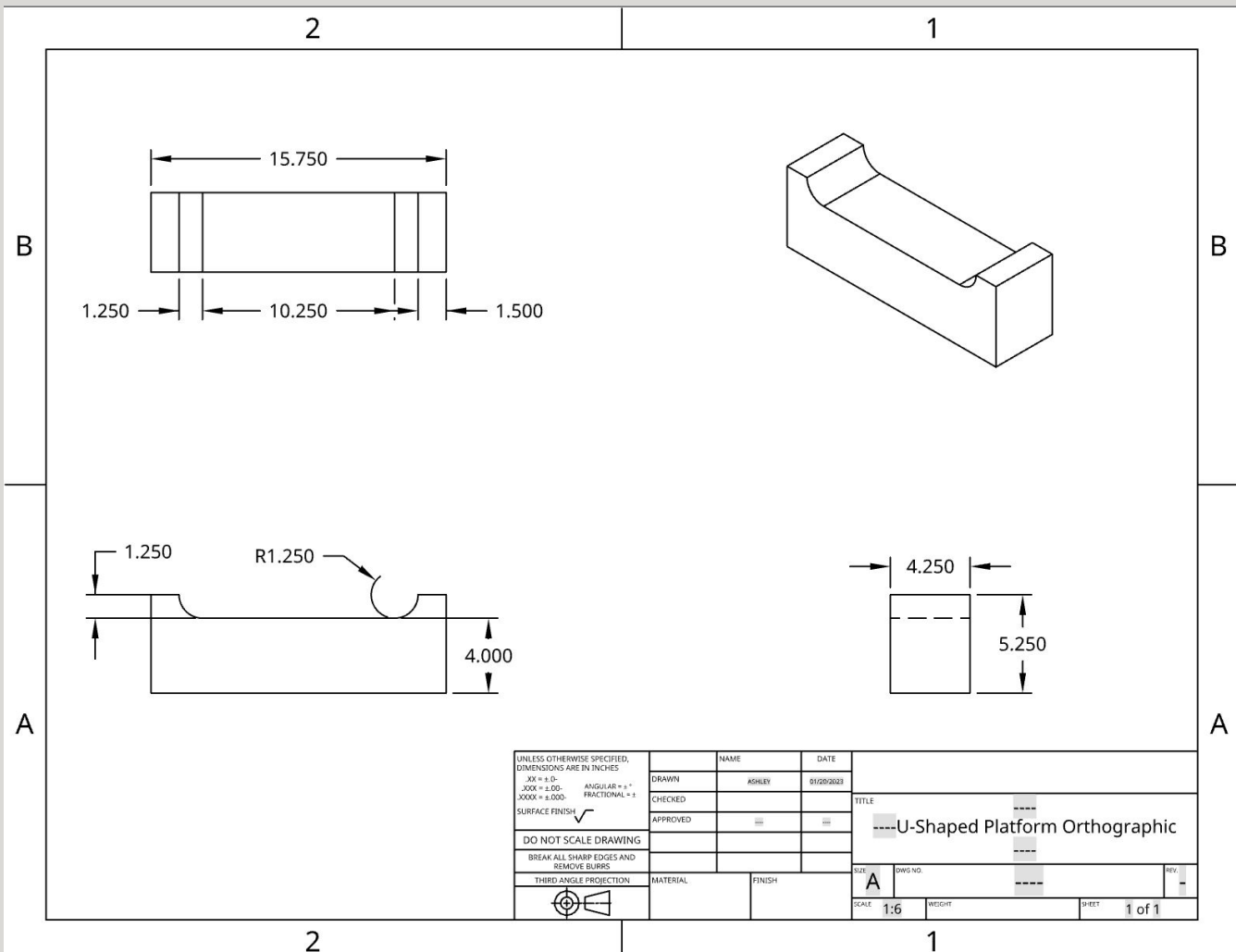
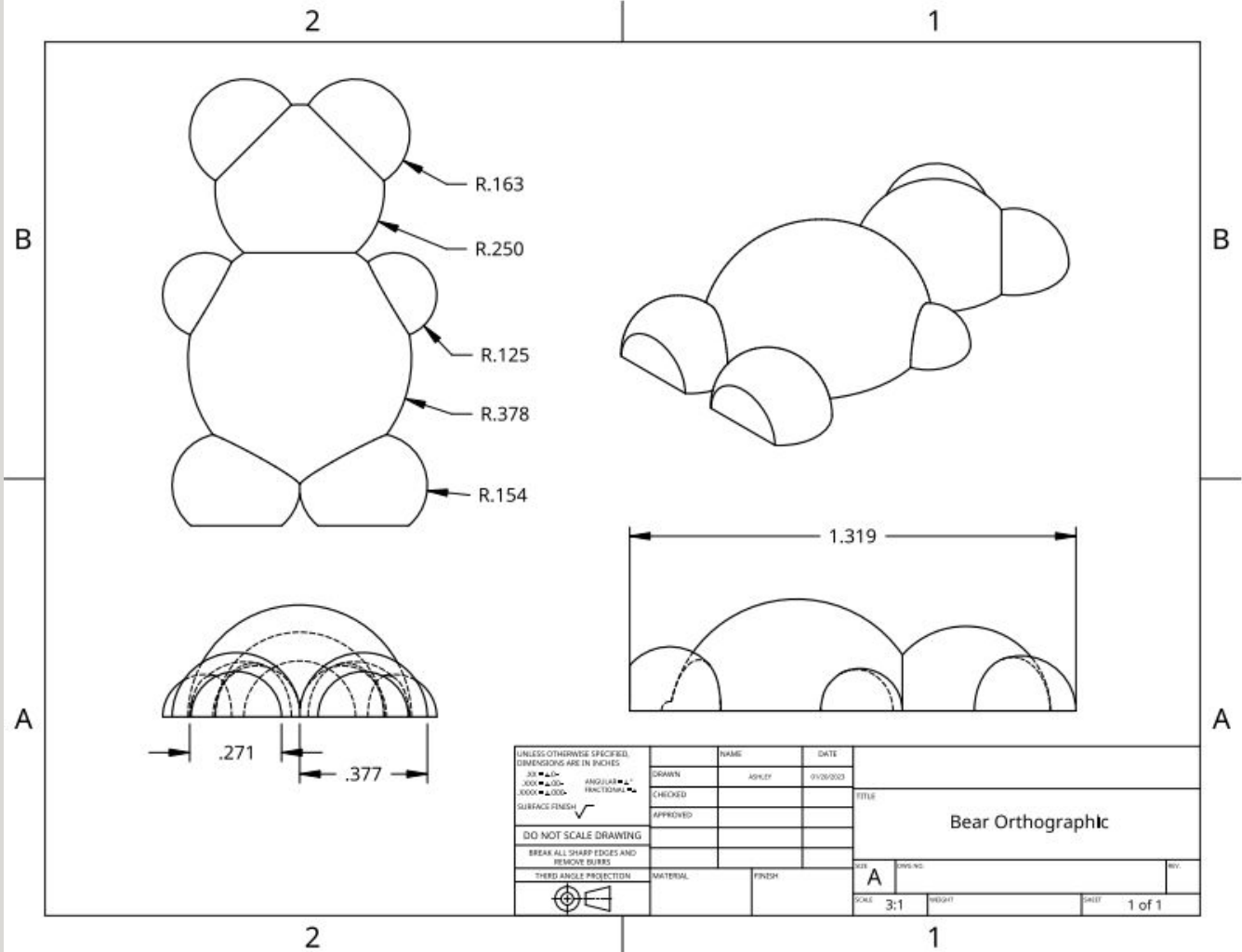


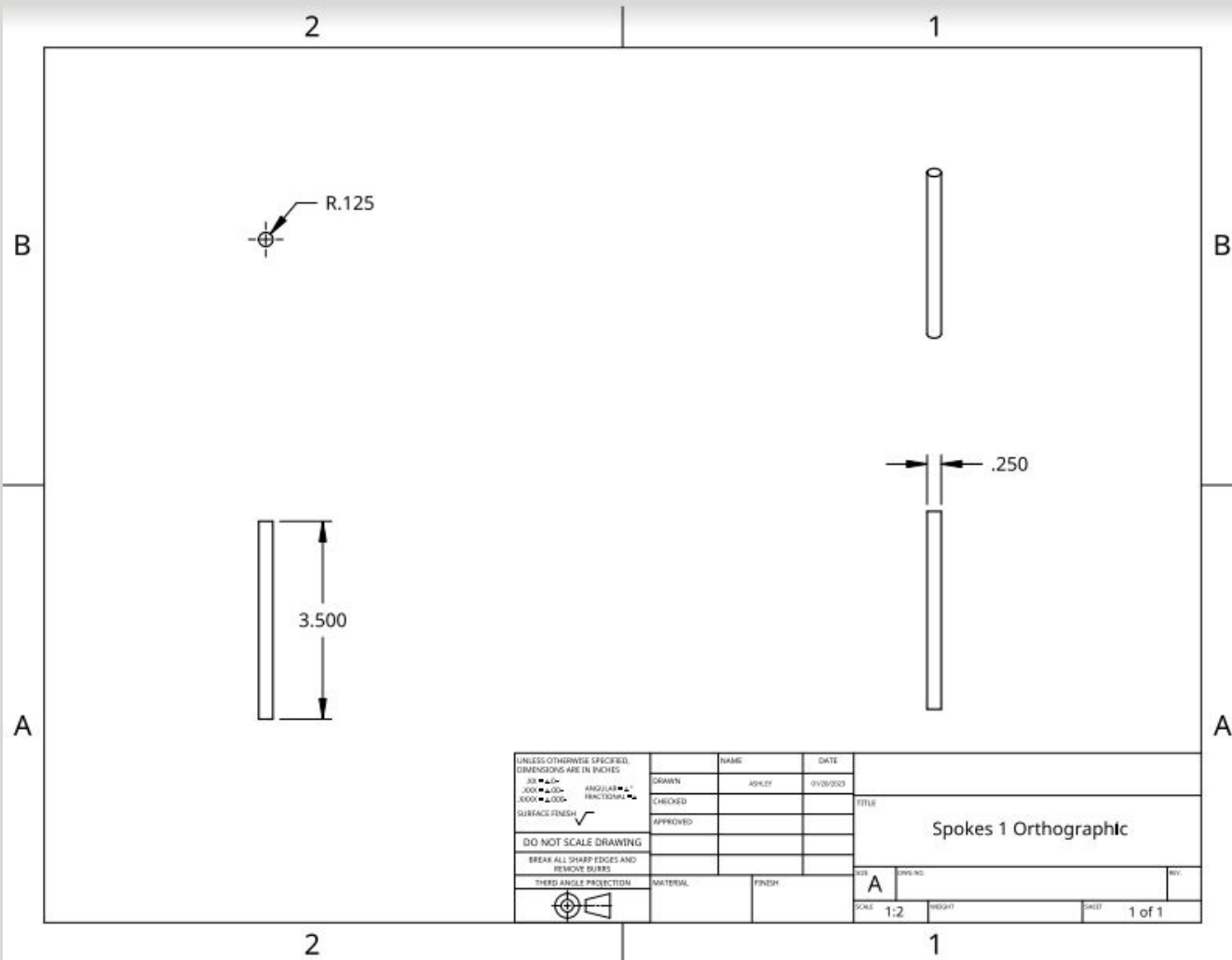
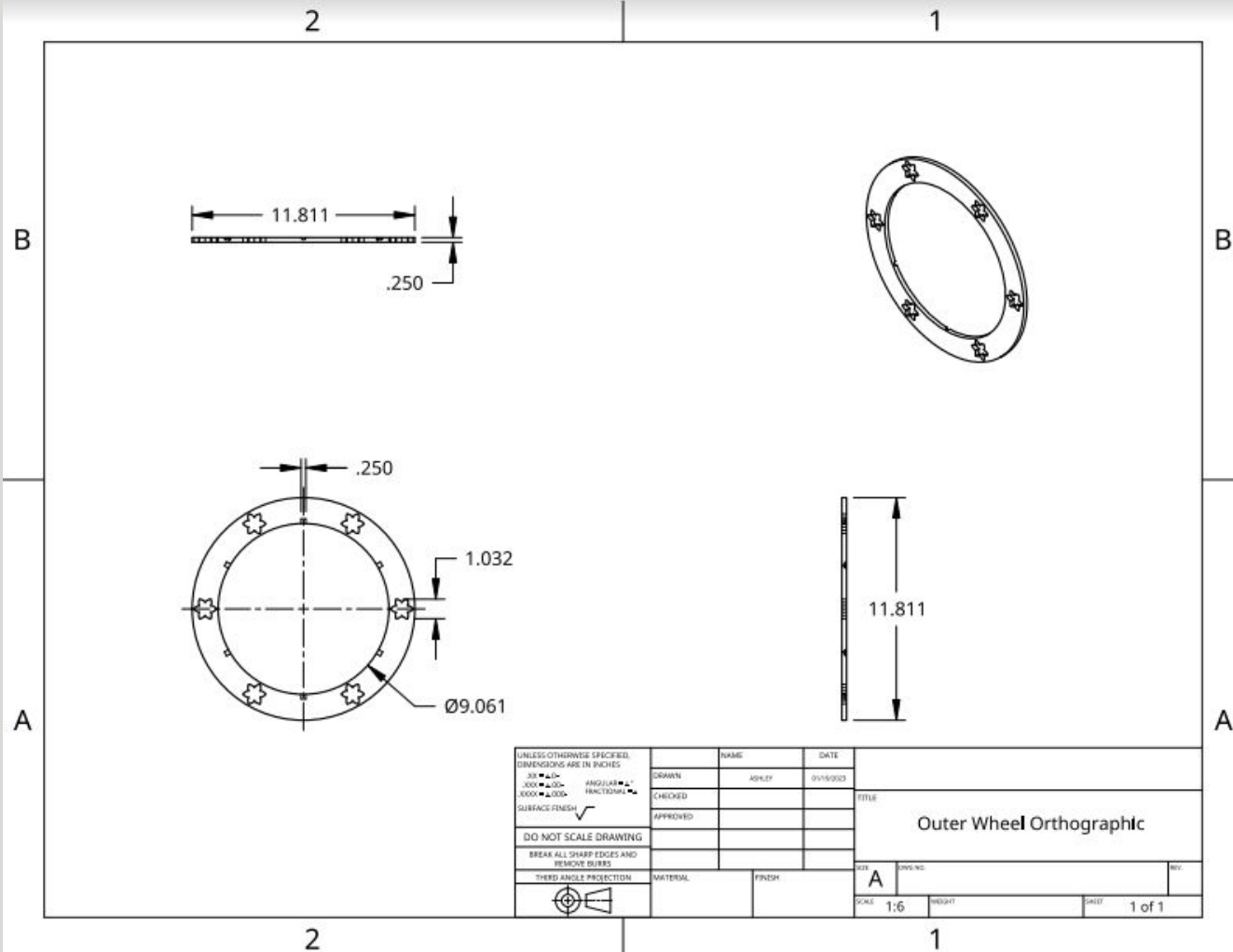


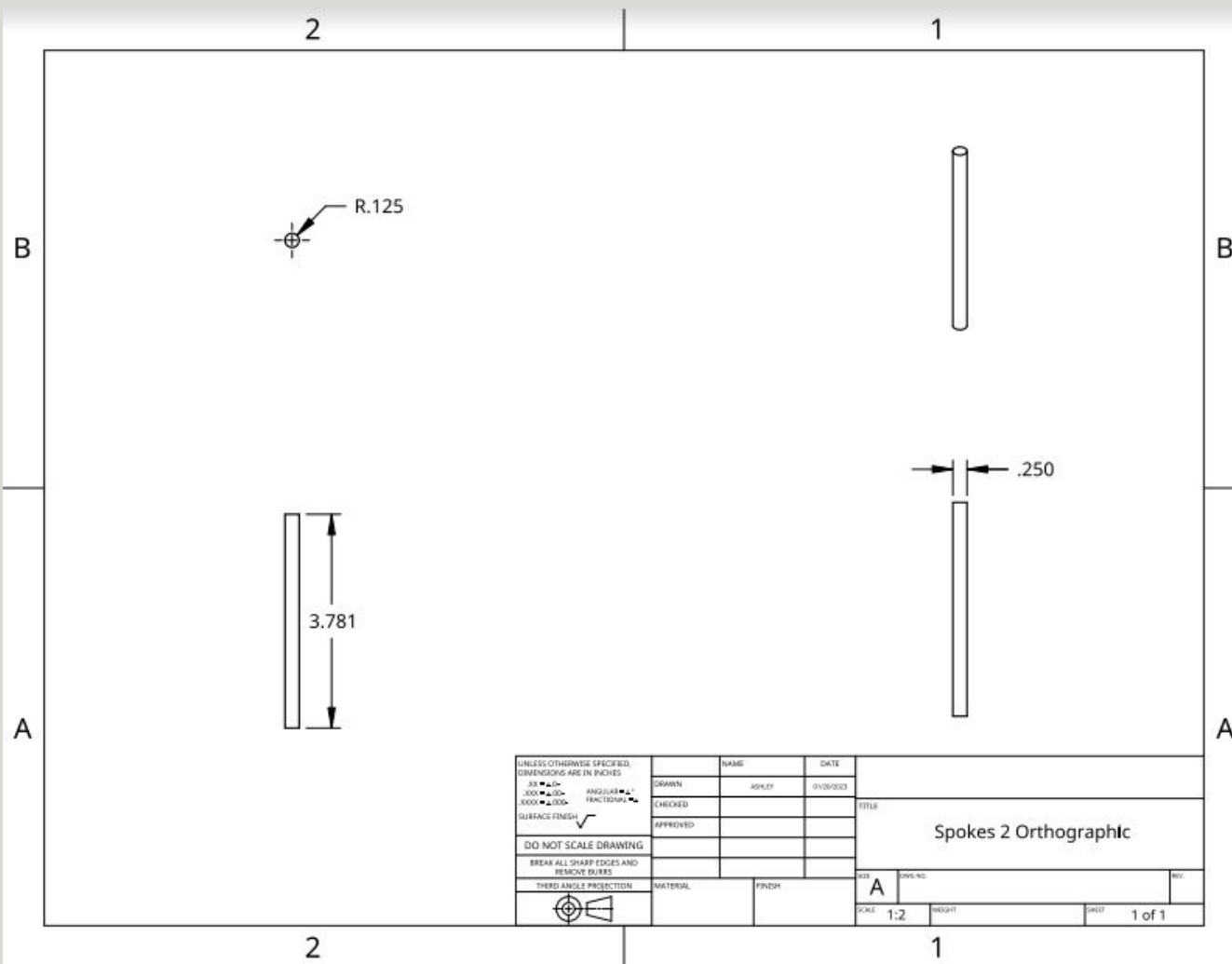
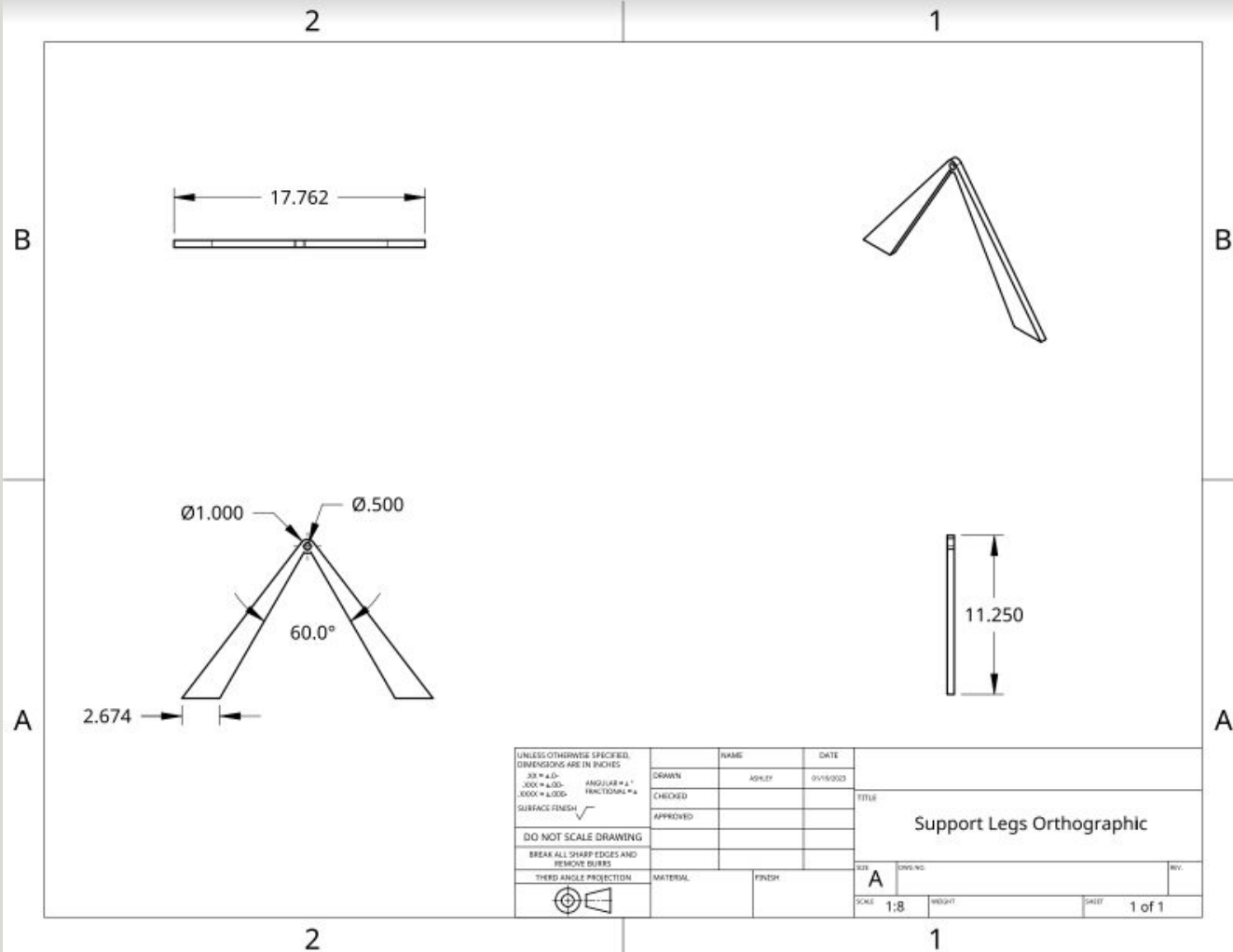


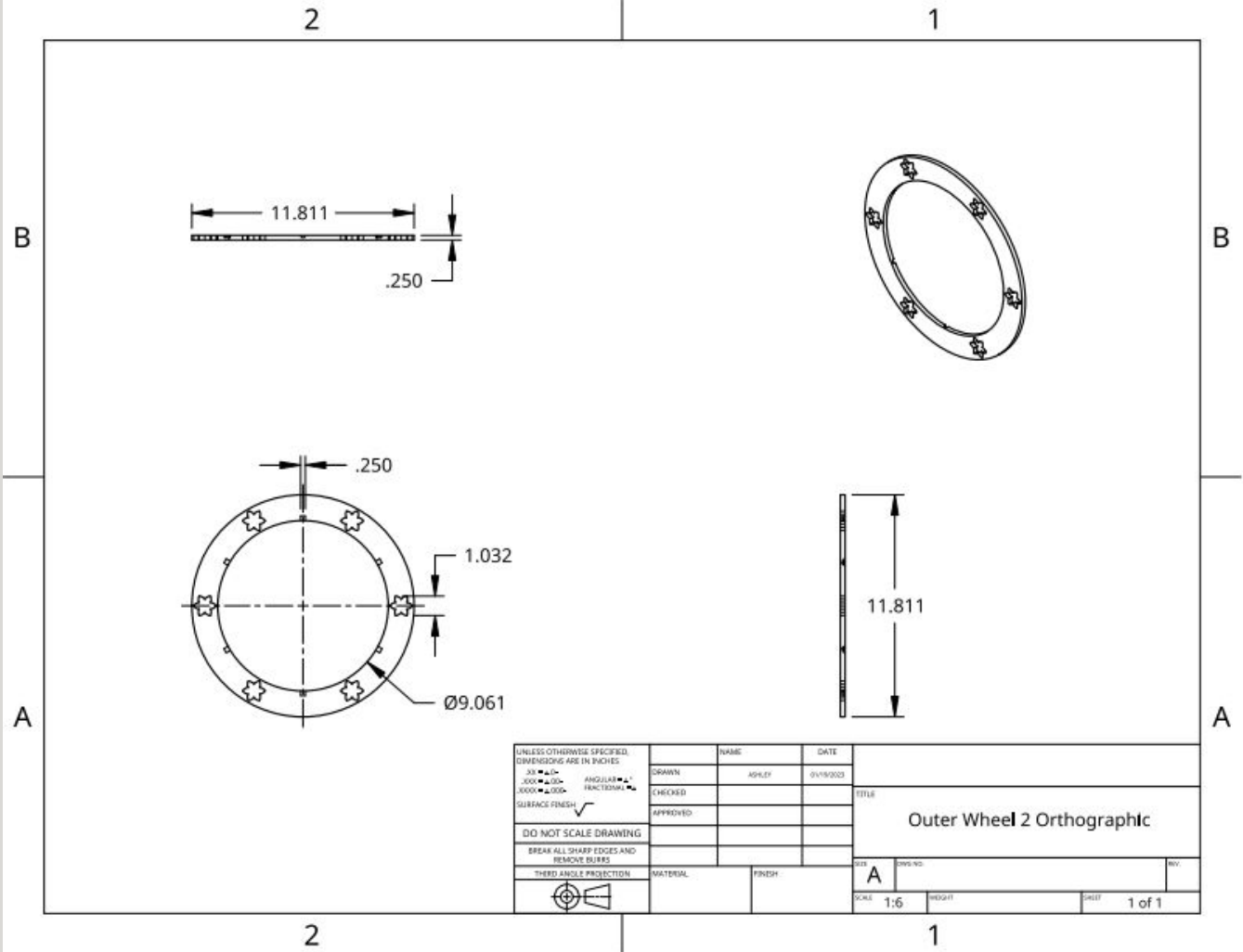
Designed By Luke





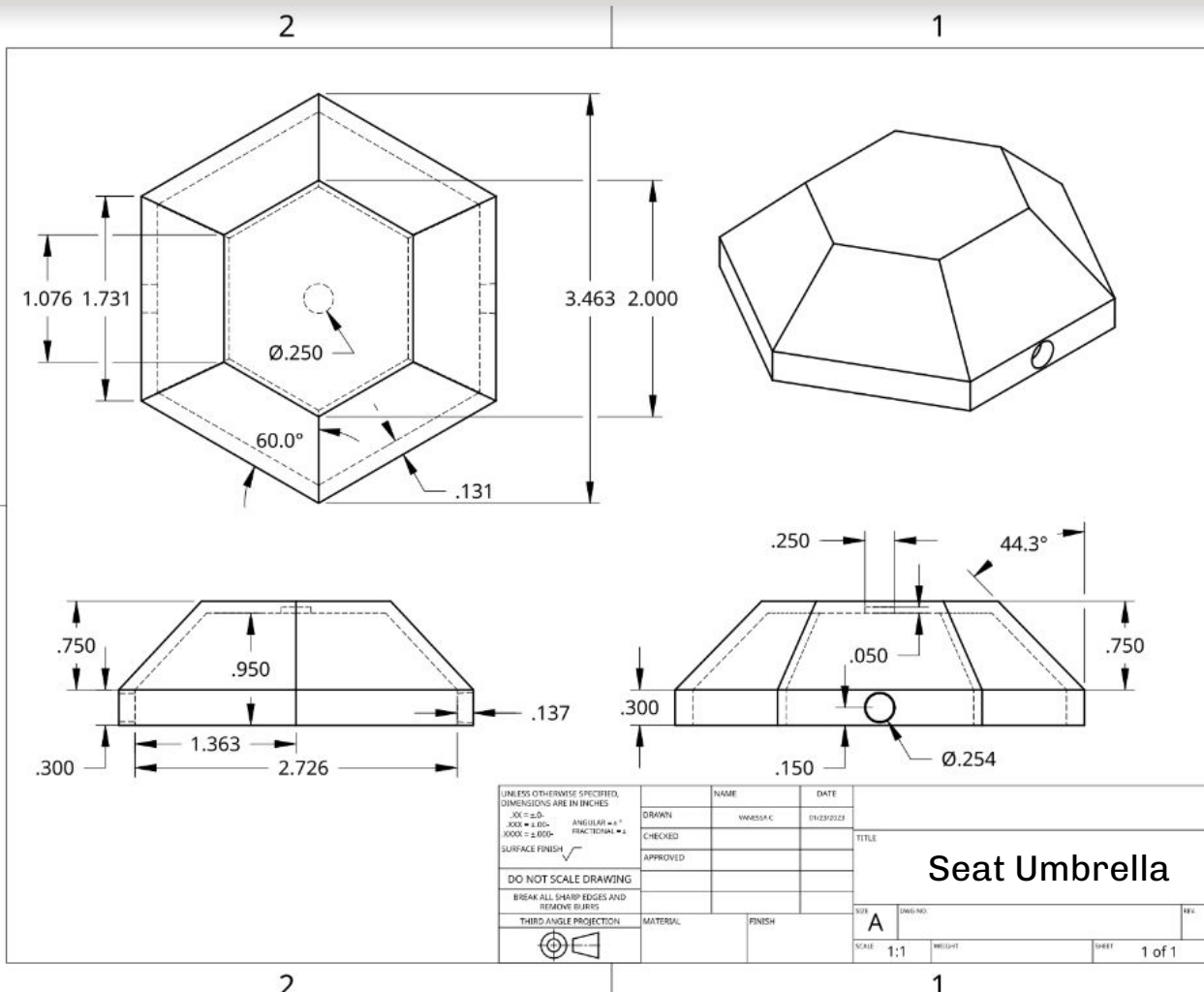
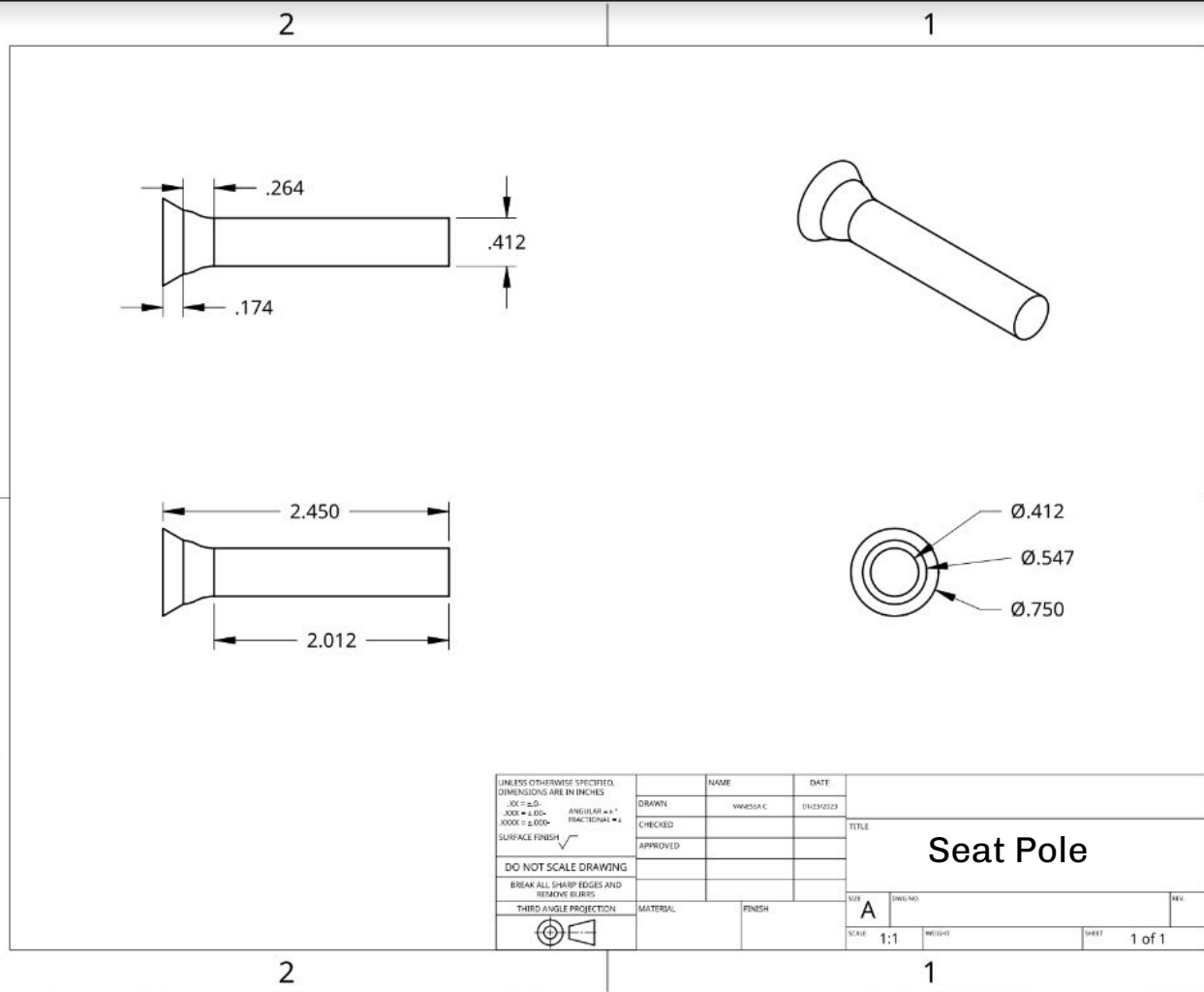


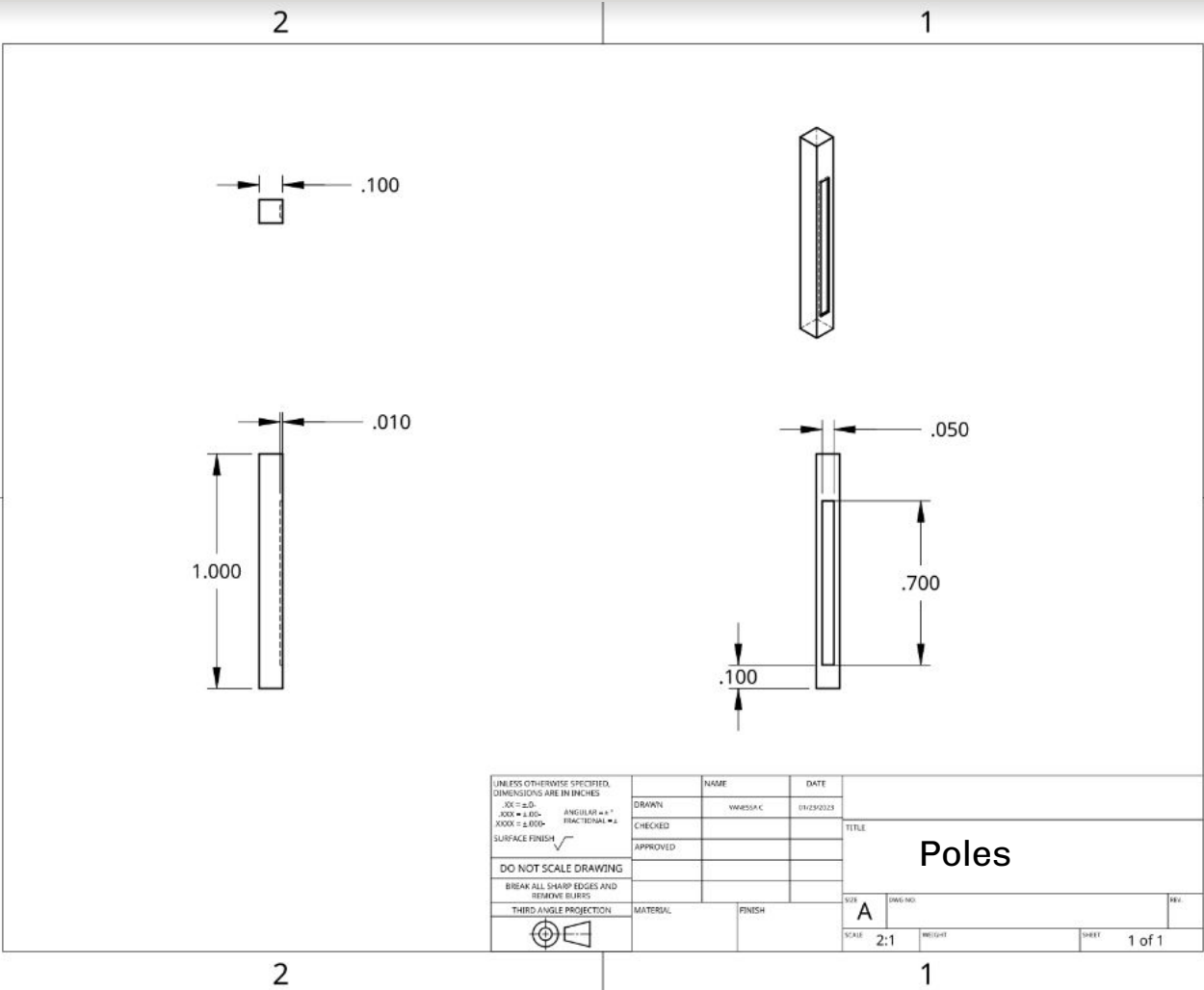
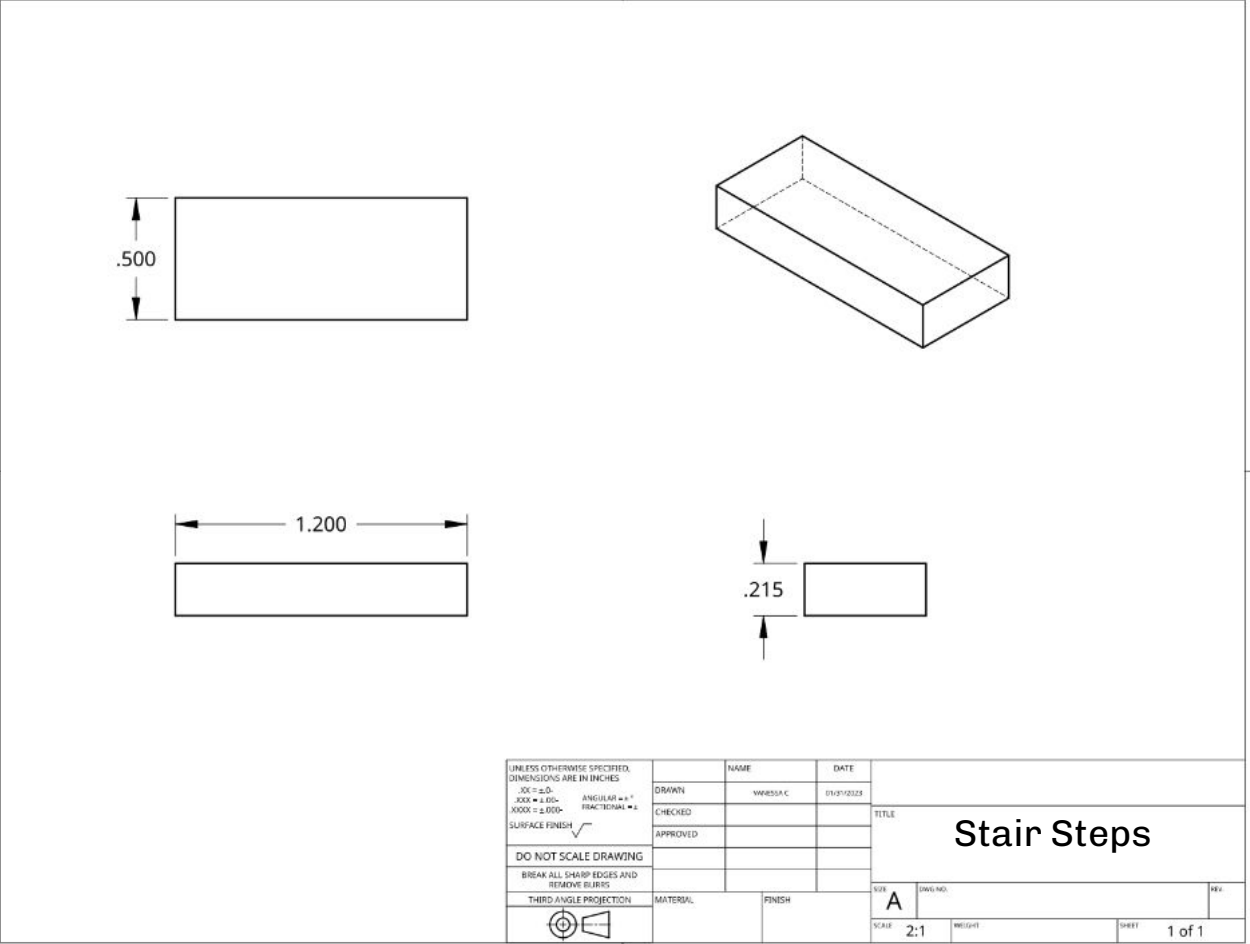


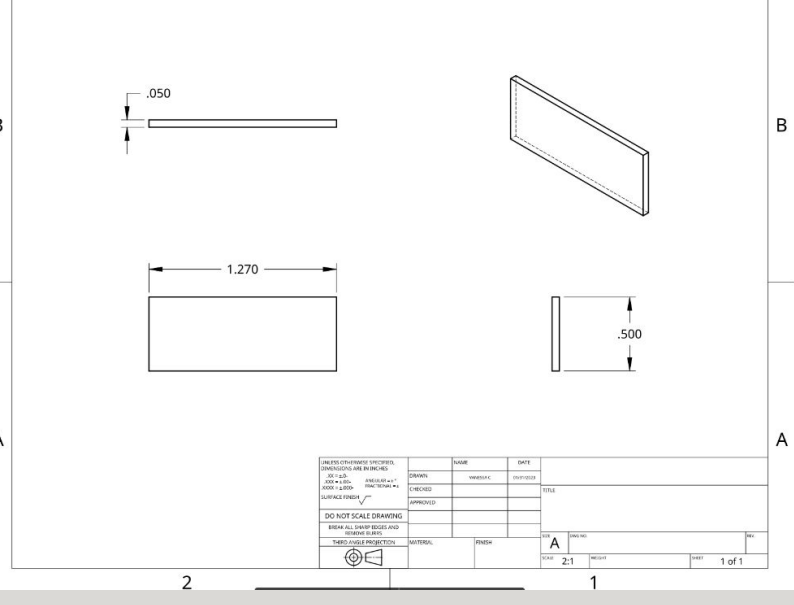
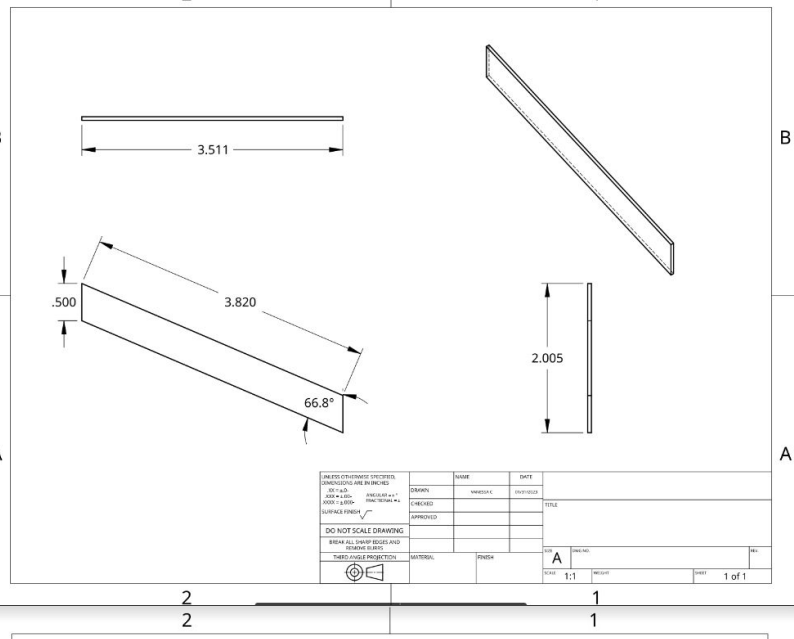
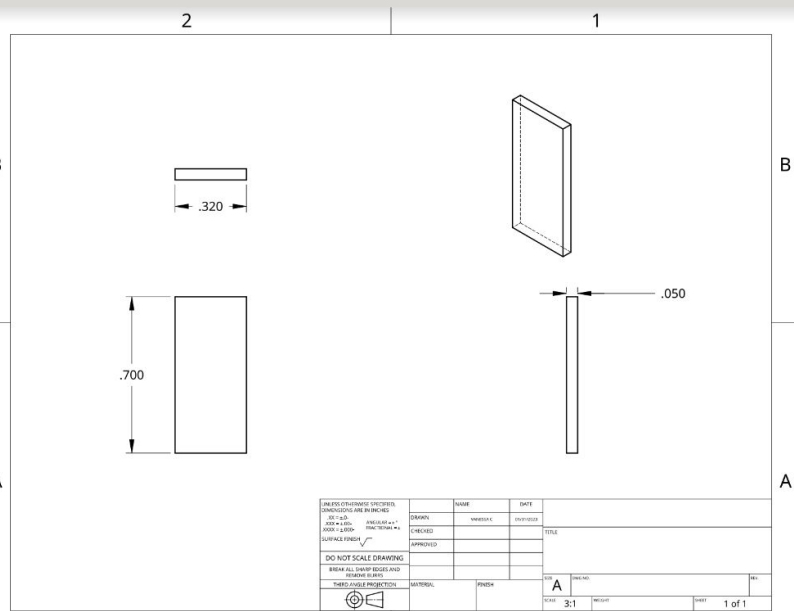


Designed By Ashley

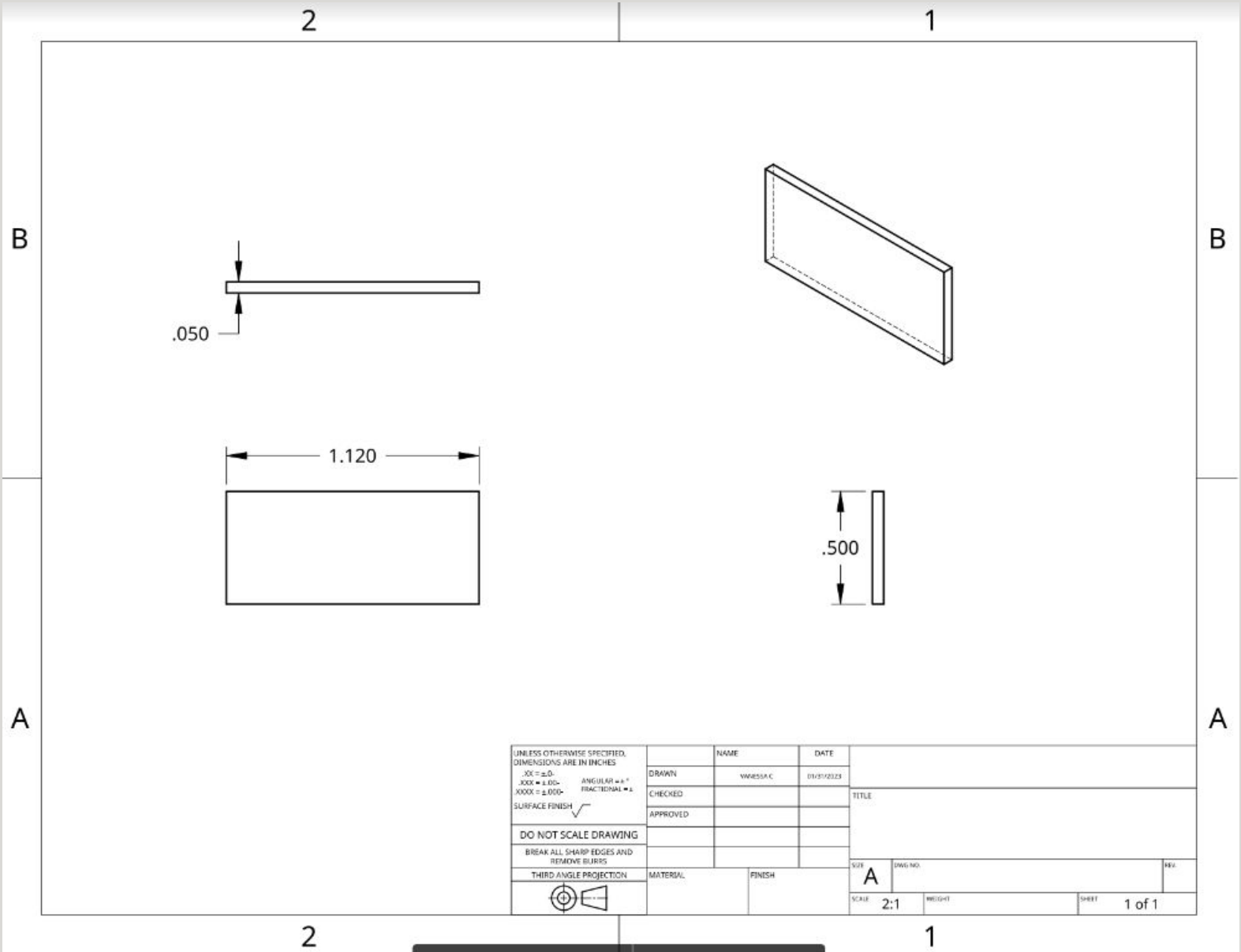
Designed By Vanessa



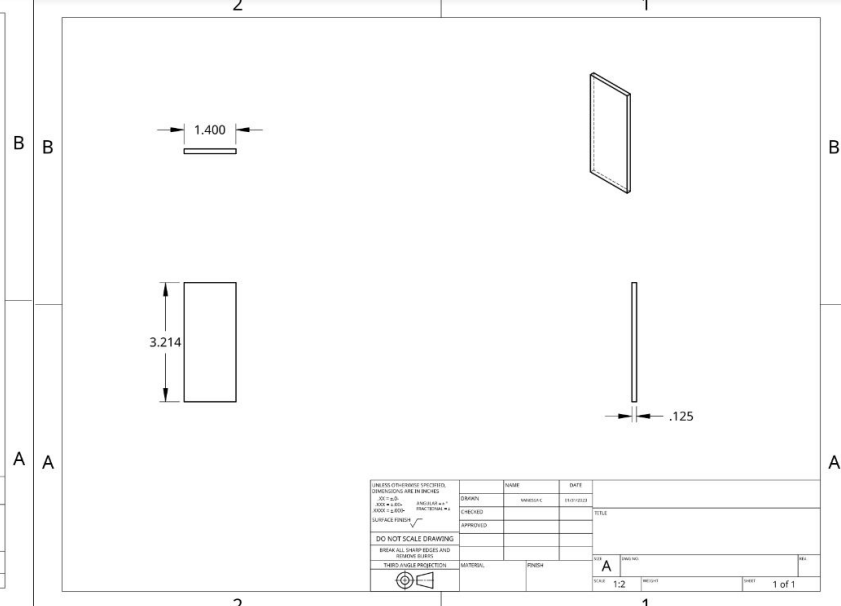
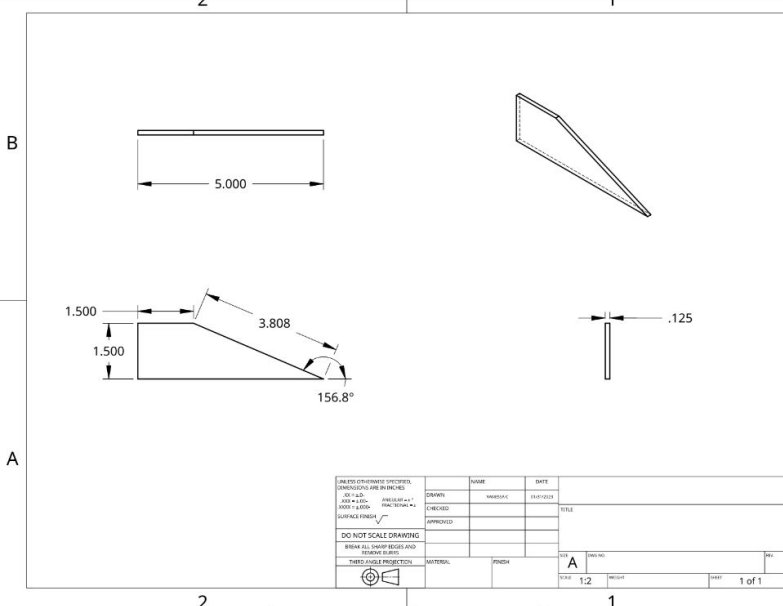
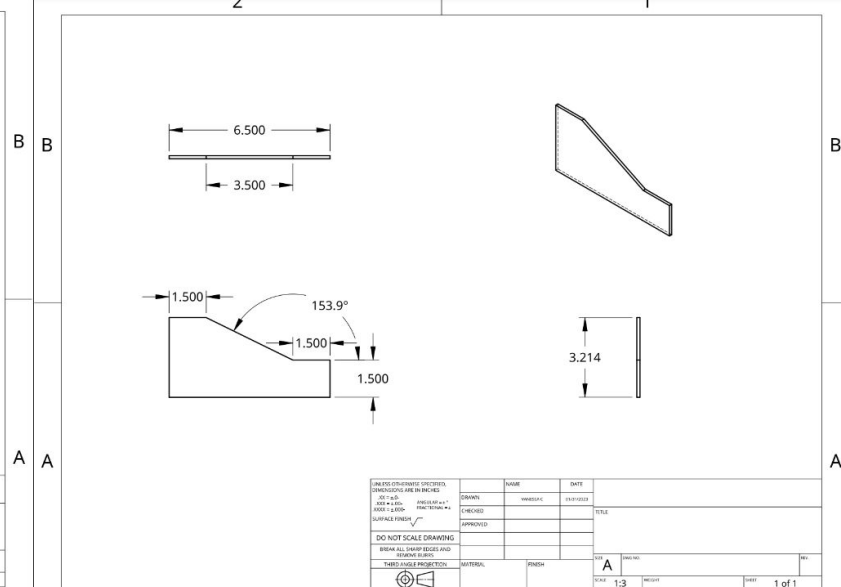
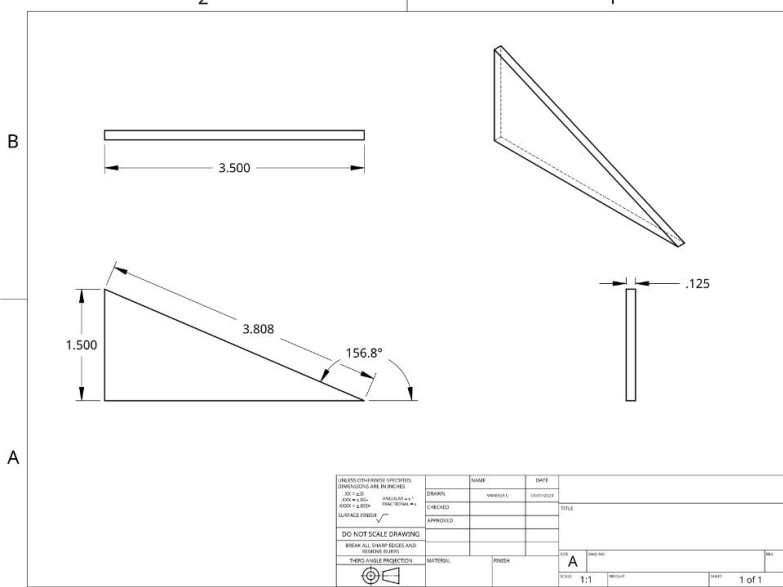
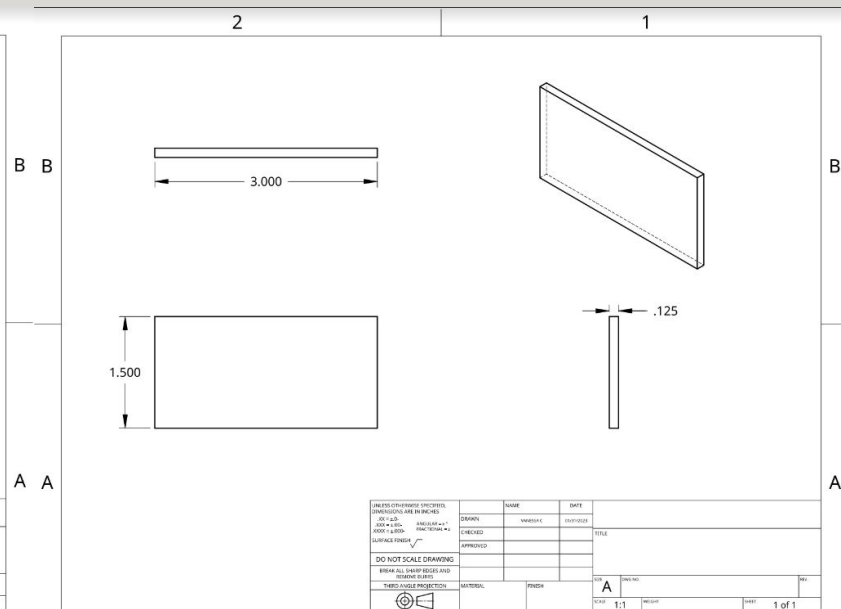
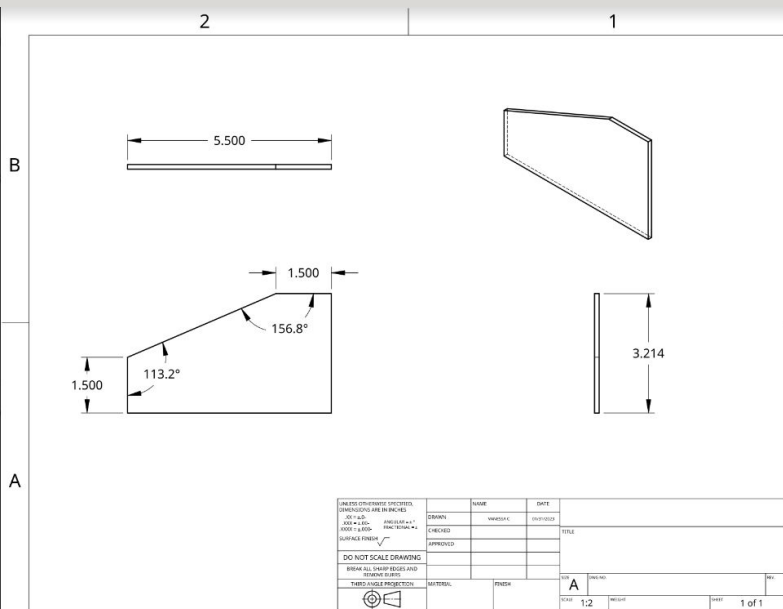




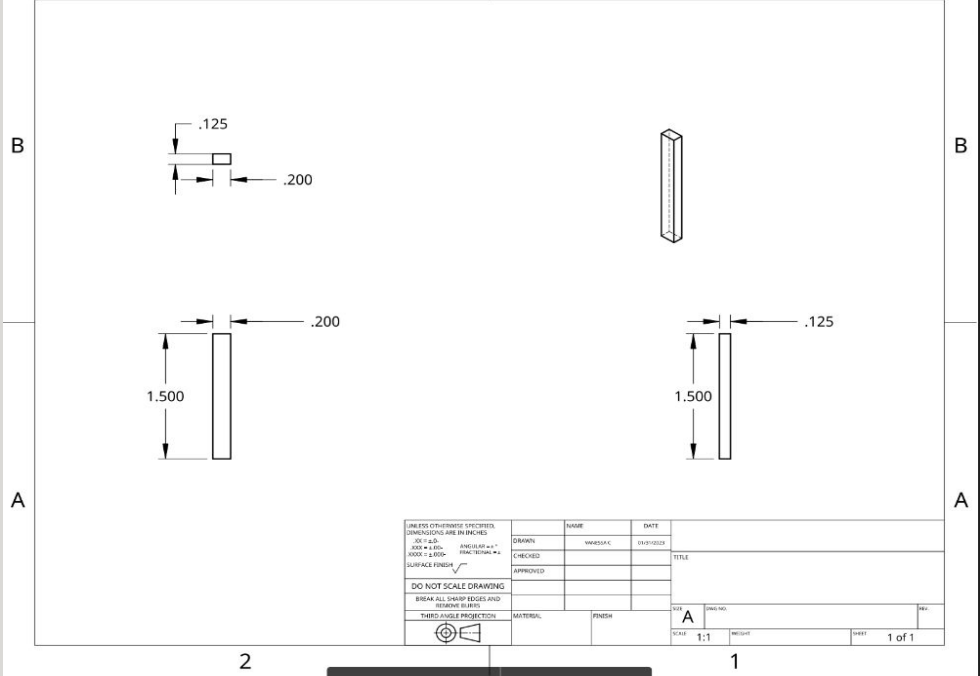
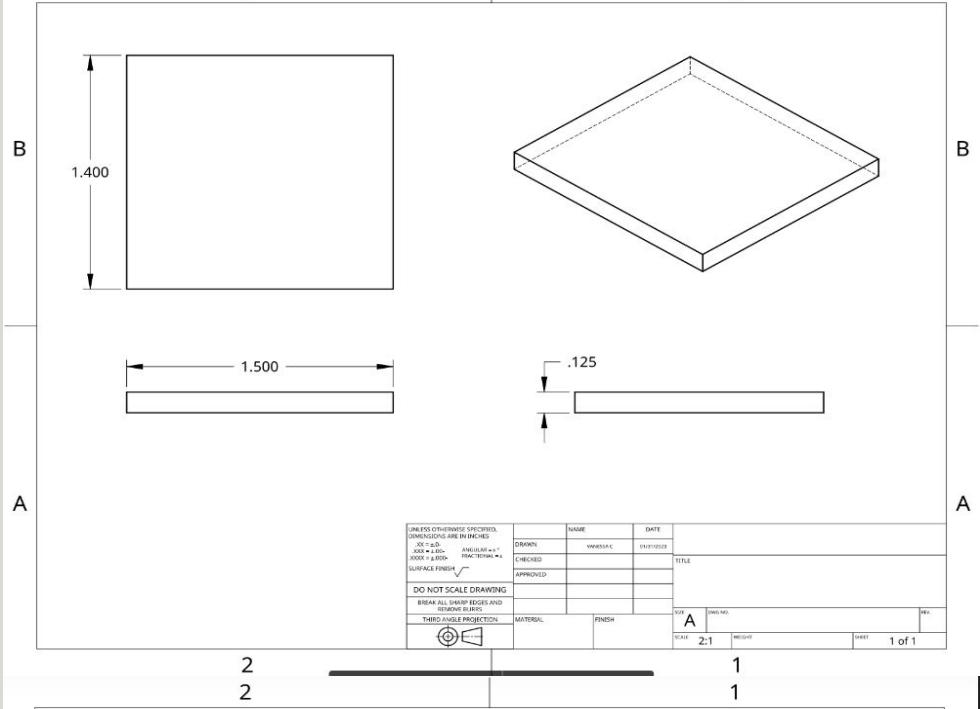
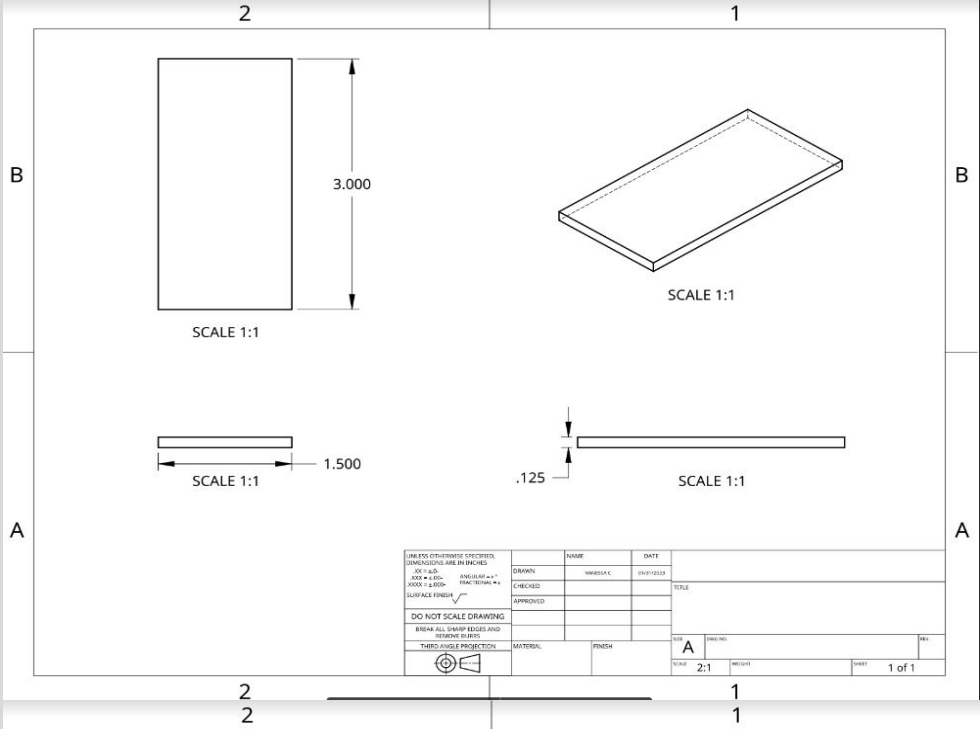
Stair Glass



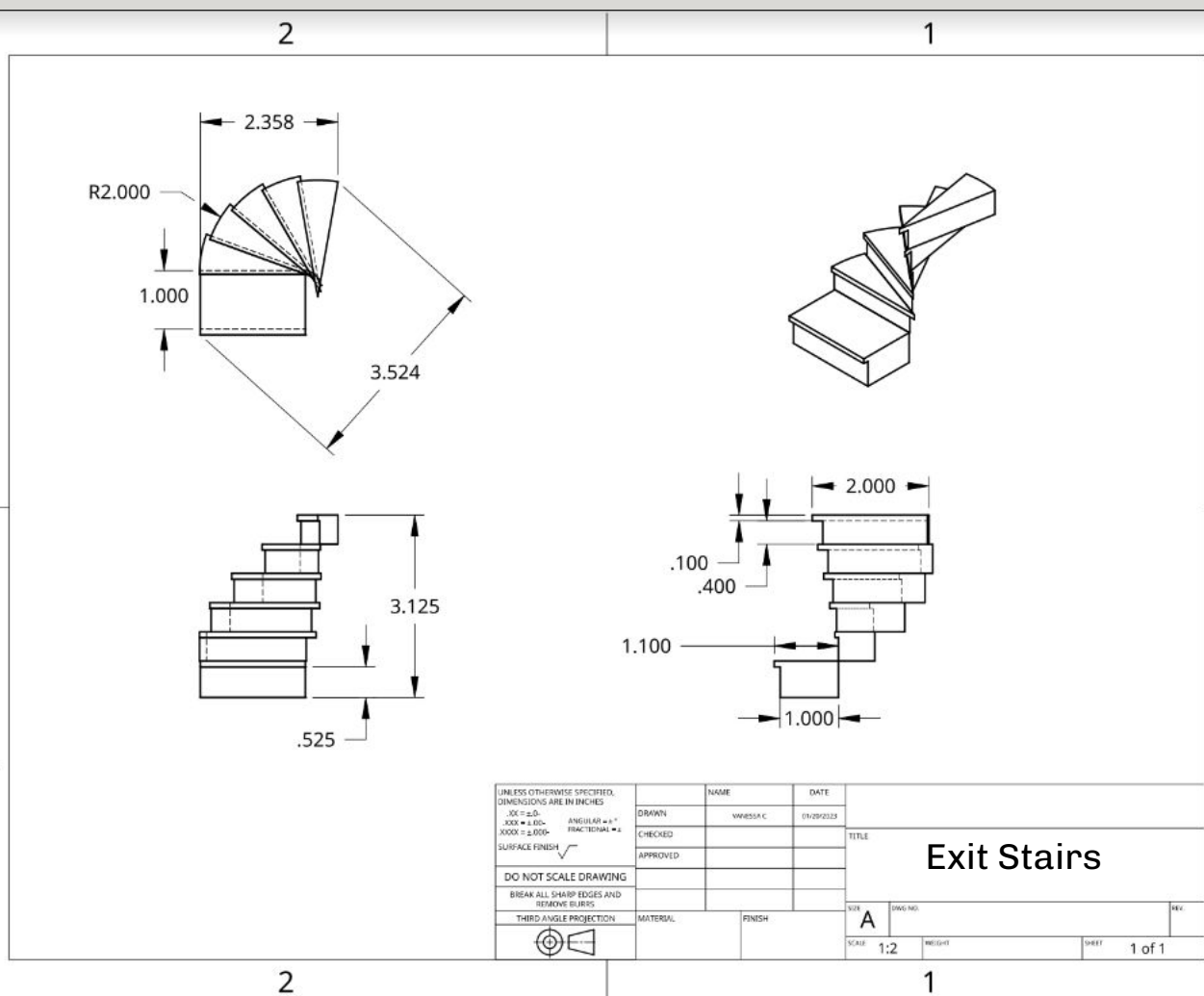
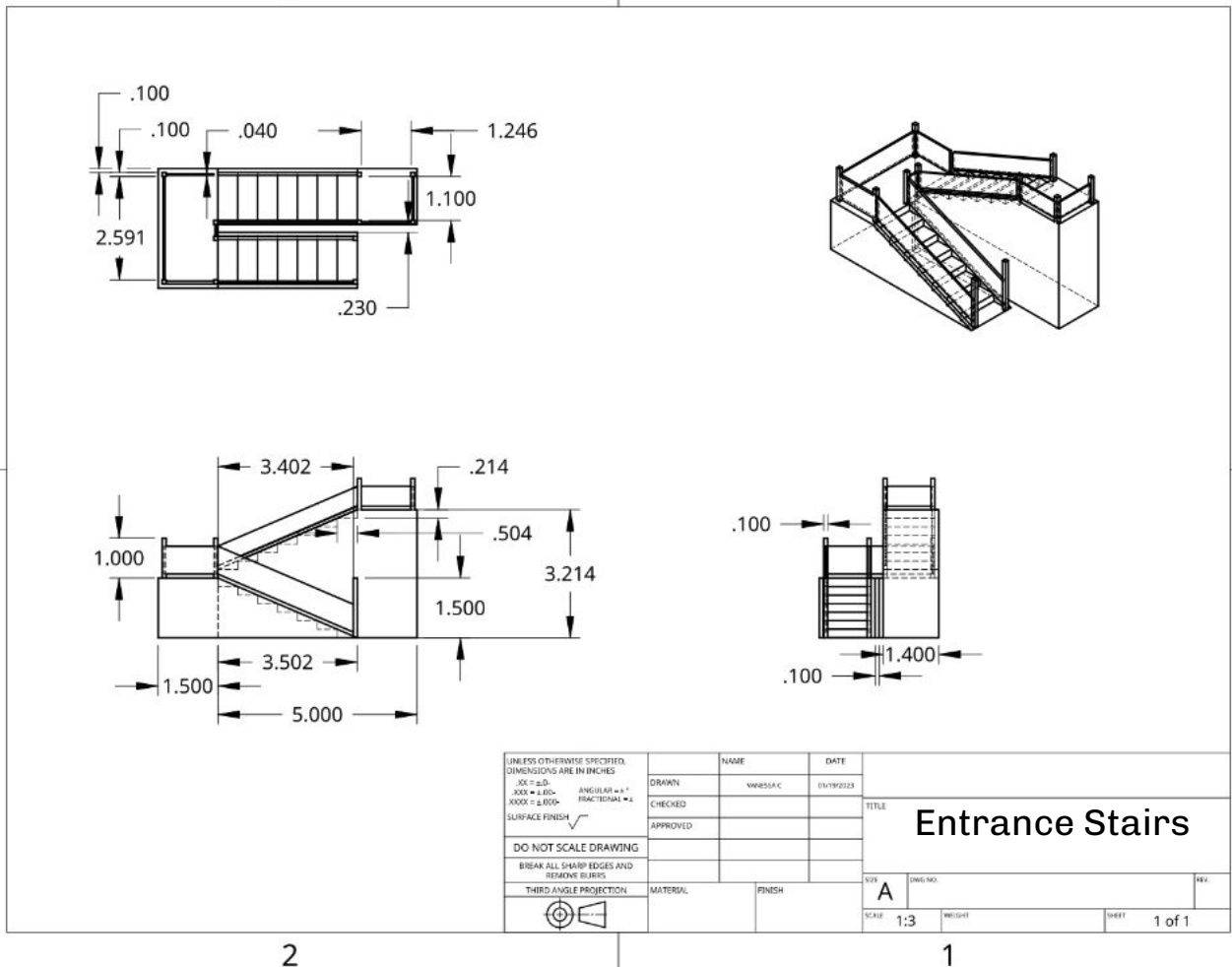
Stair Base

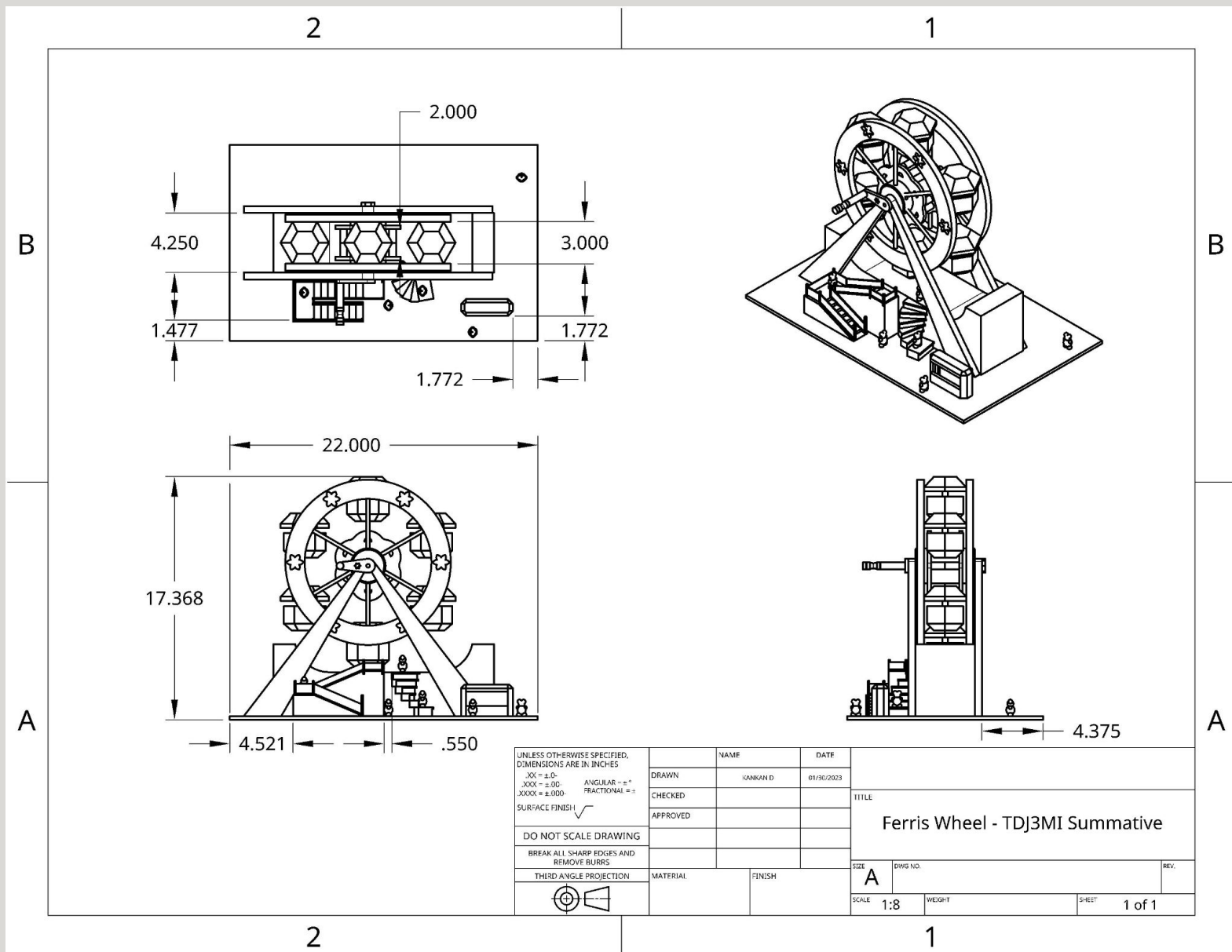


Stair Base



Designed By Vanessa





Assembly Drawing

Note : The Bears are decorative and locations of them do not affect the project

Materials & Tools

Tools & Materials I

Here are the tools & materials used :

3D Printer

Used to print the seats, the ticket booth, the spindle gear. (1) 1.75mm PLA 3D Printer Filament, Black, 1 Kg spool (2.2 lbs)

Laser Cutter

Used to cut out the inner/outer wheels, support legs, etc. TriPLY 5.0mm Thick 48-inch x 48-inch Cedar/Poplar Underlayment (1)

Wood Planks

Used to build to the base. 4-5 planks to total a height of 4 inches and width of 15.75 Inches

Wooden Dowels

$\frac{1}{2}$ and $\frac{1}{4}$ Inch Alexandria Moulding Hardwood Dowels
22 & 42 Inches of length (respectively)

Styrofoam

Used as the base and to create the stairs.

Play Dough

(1) Box of play dough the create the U-shaped portion of the platform

Tools & Materials II

Here are the tools & materials used :

Tin Snips

Used at first when cutting 0.25 inch dowels

Hack Saw

Used later on to cut dowels, especially the 0.5 inch ones.

Hand Drill

Used to drill holes in the dowels, namely for the crank handle and center dowel.

Bench Vise + Clamp

Bench vise used to clamp down the dowels when they were being drilled. C-Clamp used to hold glued pieces.

Jigsaw + Sander

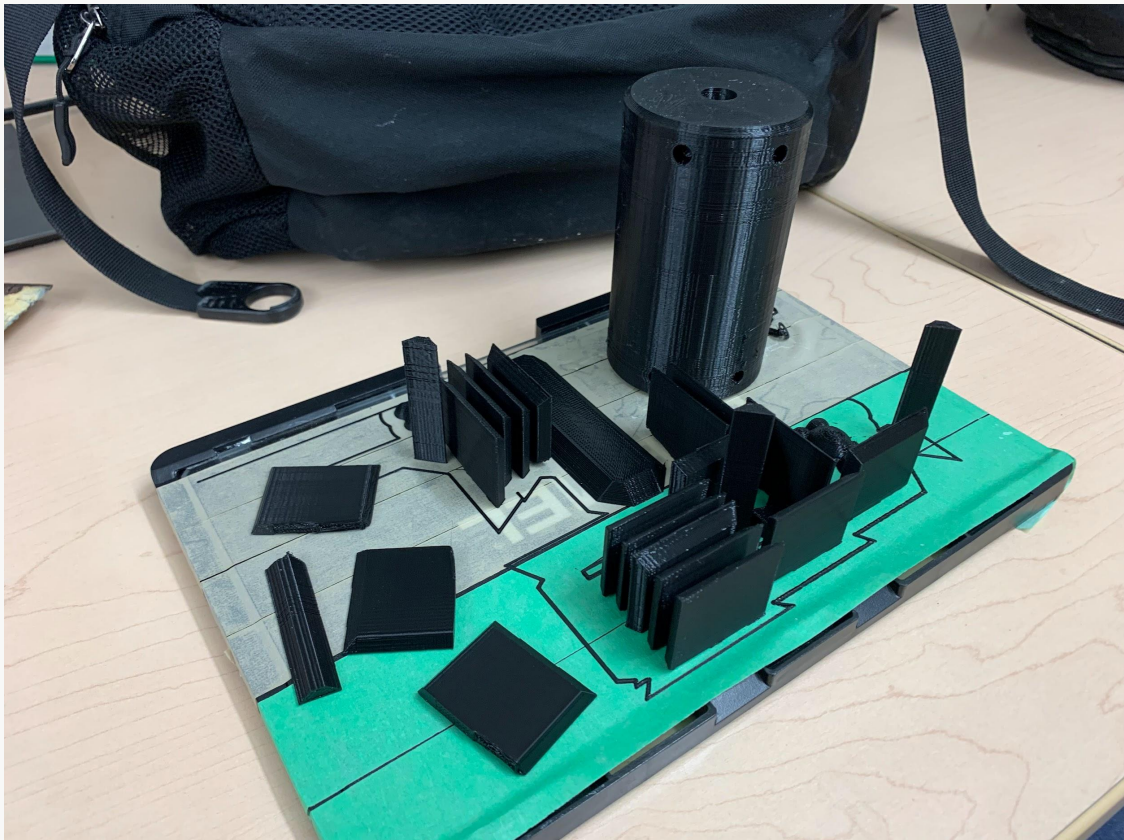
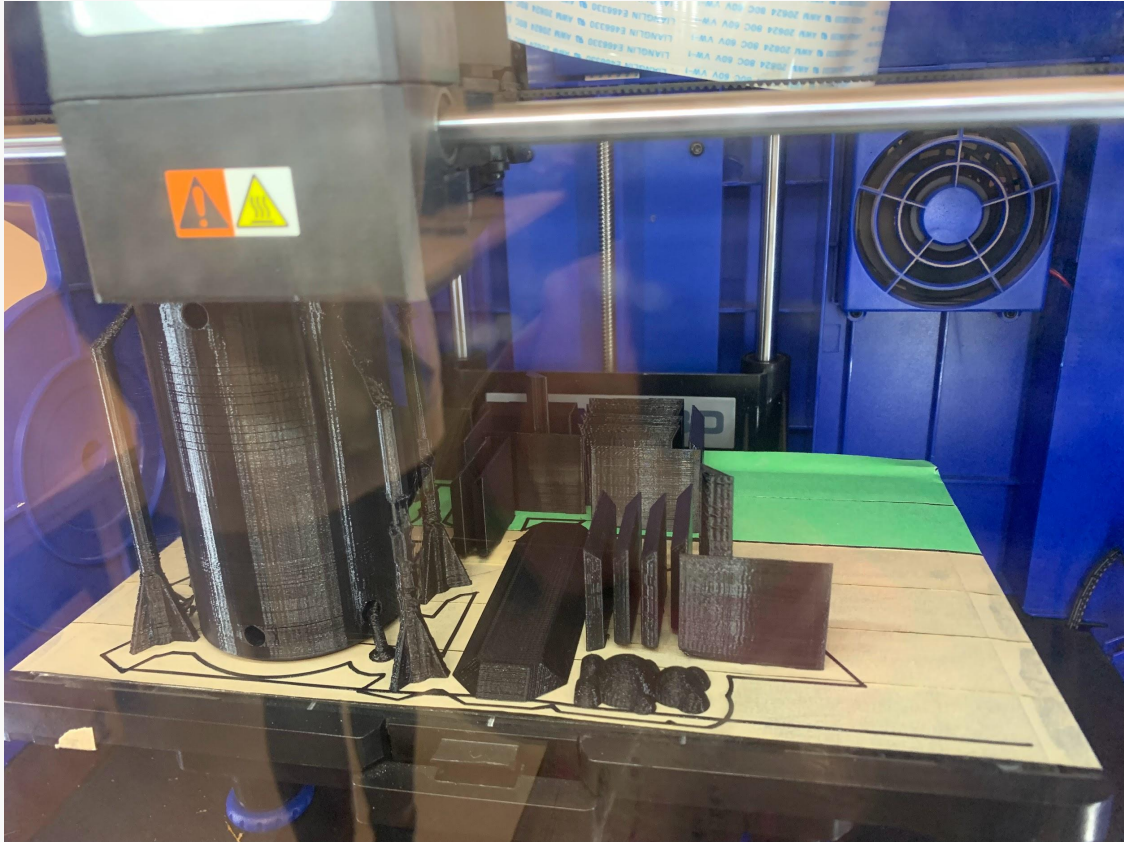
Jigsaw used to cut wooden planks to make platform
Sander used to finish our parts & add carving to handle

Glue

→ Hot Glue
→ Wood Glue
Used to join the pieces of the project together

Prototype Construction Sequence

3D Printing



Laser Cutting



Cutting Dowels



Ashley and I had cut the dowels for the spokes, center dowel, dowel connectors, and crank handle. At first we used tin snips, but noticed the cutting was messy. We switch to using a hacksaw afterwards.



Sanding

After cutting, we also had to sand the dowels to make sure they were smooth & exactly the right size.



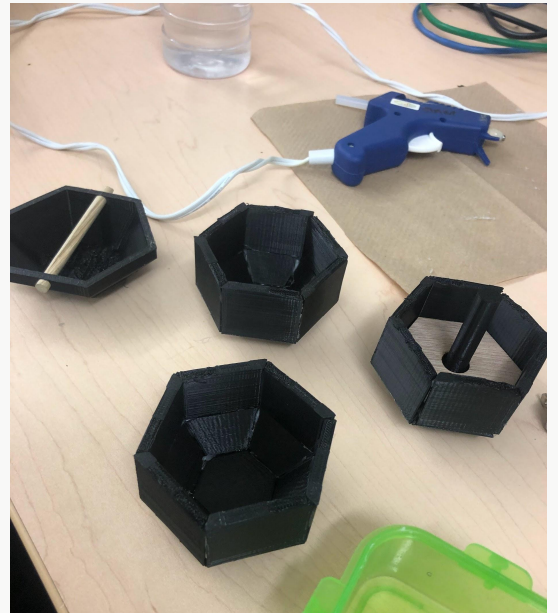
The dowel connectors had to fit perfectly between the crank body & handle/center dowel

As shown on the right, sanding was also used to add the decorative carvings on the crank handle

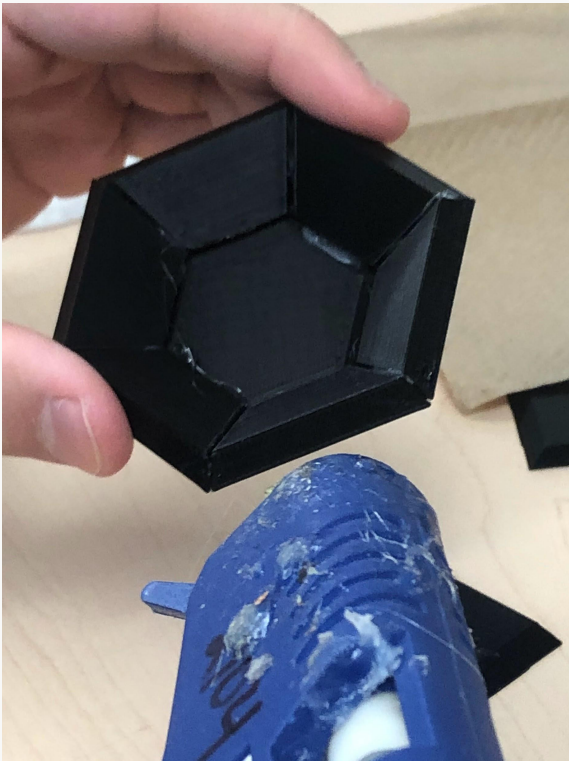


Gluing

Some of the laser cut pieces had to be stacked in order to reach the required thickness. We used wood glue to join them together and clamps to hold it in place as shown on the left.



The 3D printed seat parts were glued together using a hot glue gun.



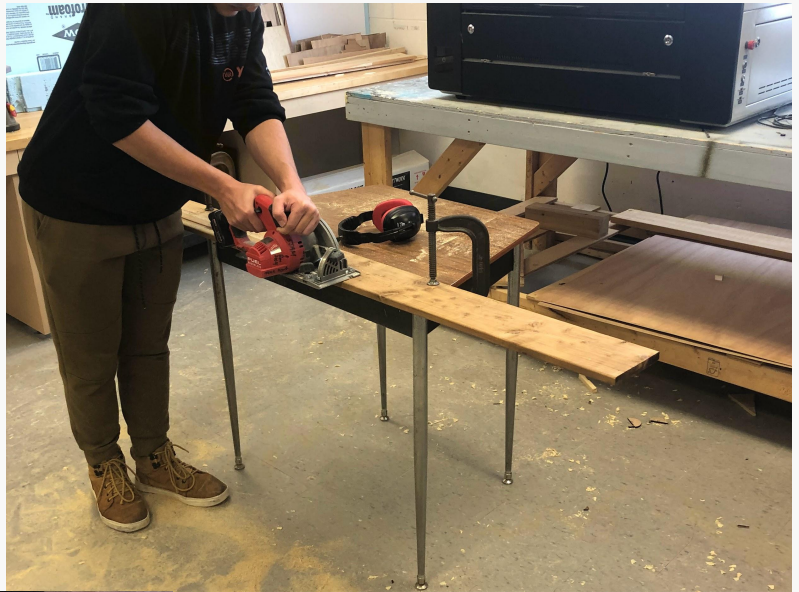
Making the Stairs

Vanessa made the stairs using styrofoam. She drew the shapes, cut them and then glued them all together.



Making the Platform

Abdul used the jigsaw to make the platform. He had bought and cut the wooden planks.

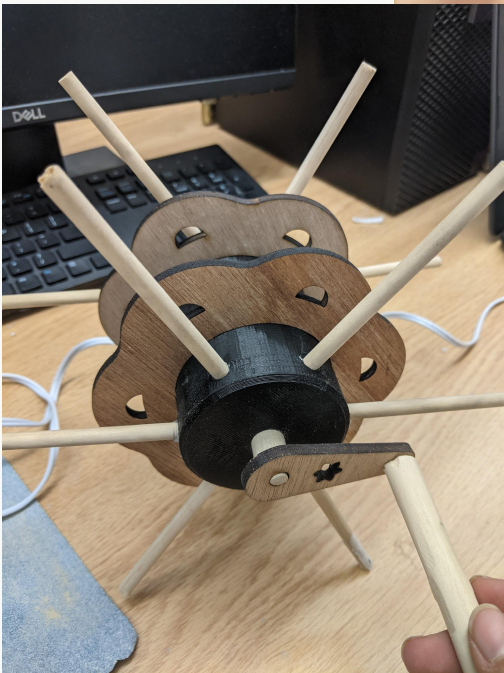
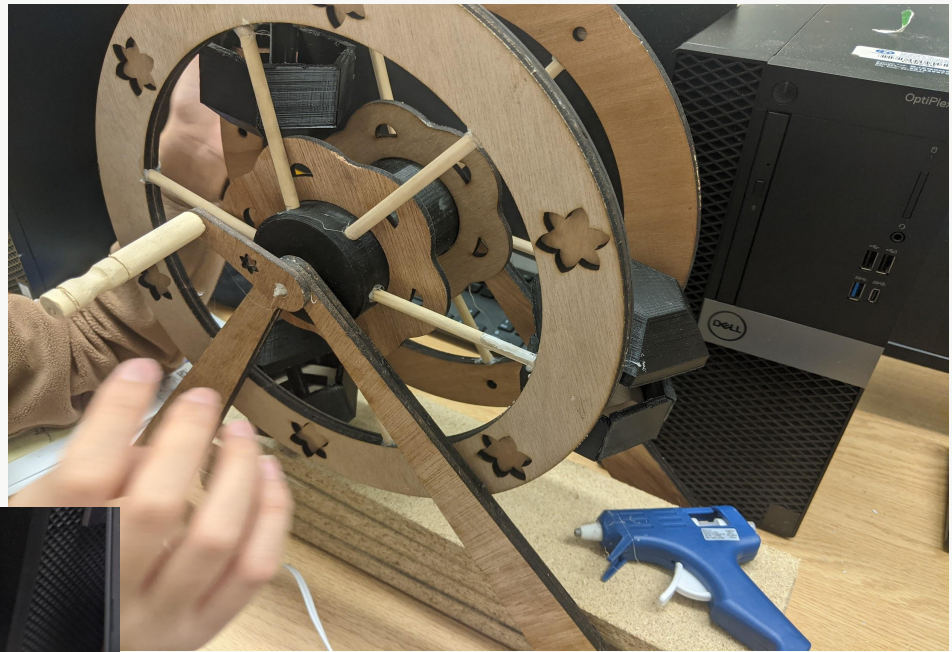


After, the play dough was added for the U-shape of platform

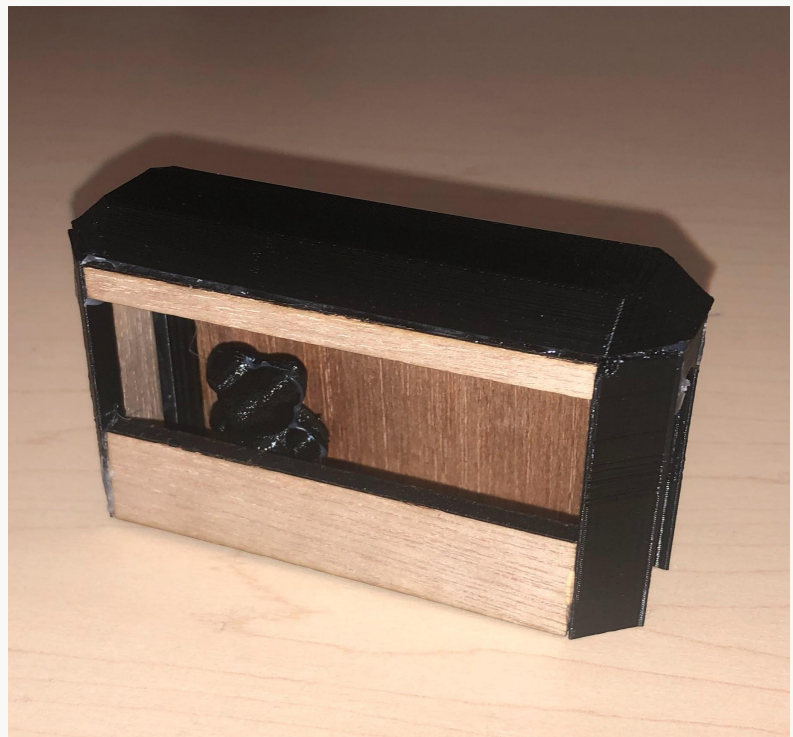


Putting It All Together

We first joined all the center pieces together (see below) before attaching the outer pieces on. (see right)

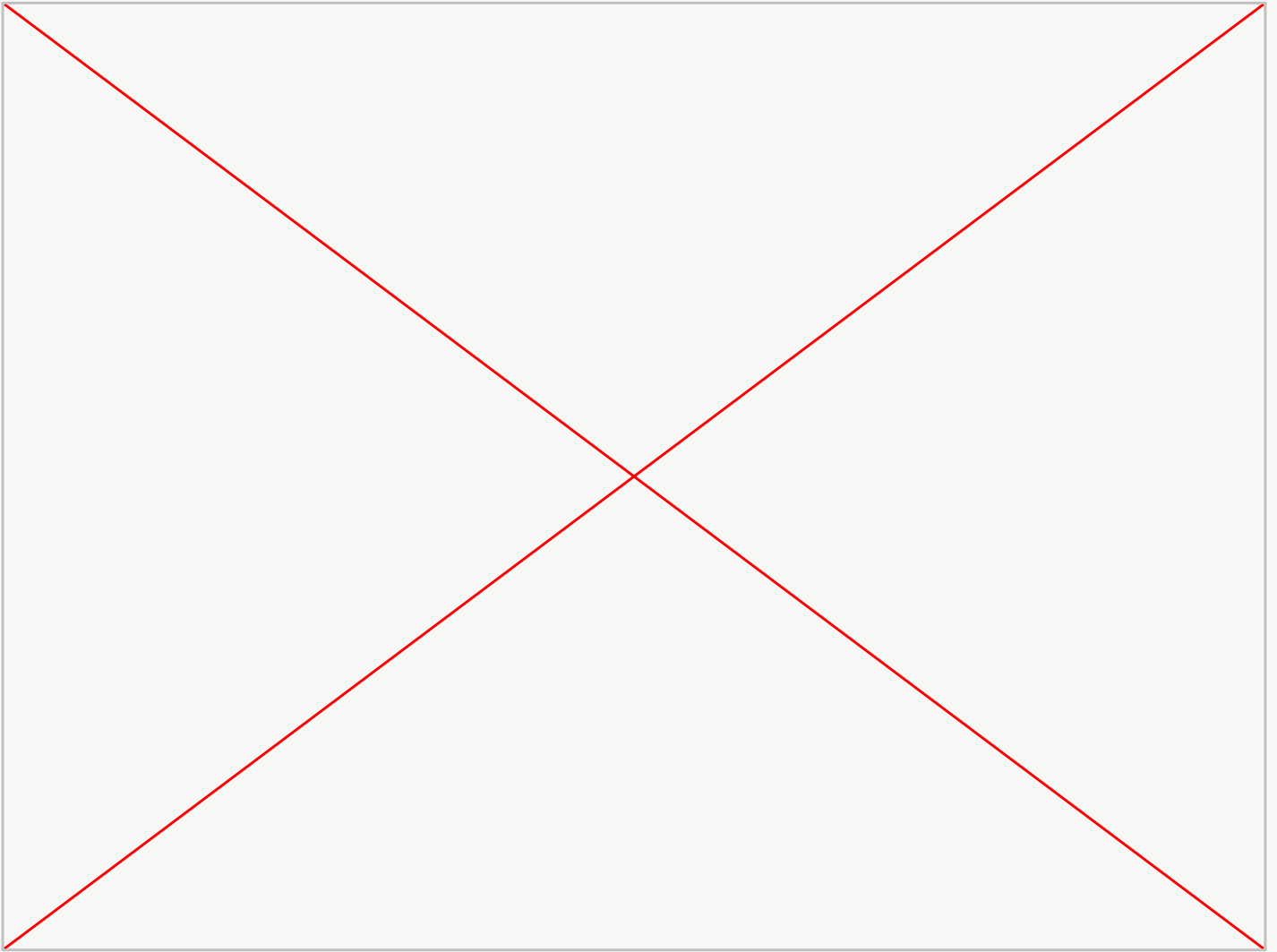


Luke had fully constructed our Ticket Booth →



Prototype Testing

Video Of Prototype Pre-Platform

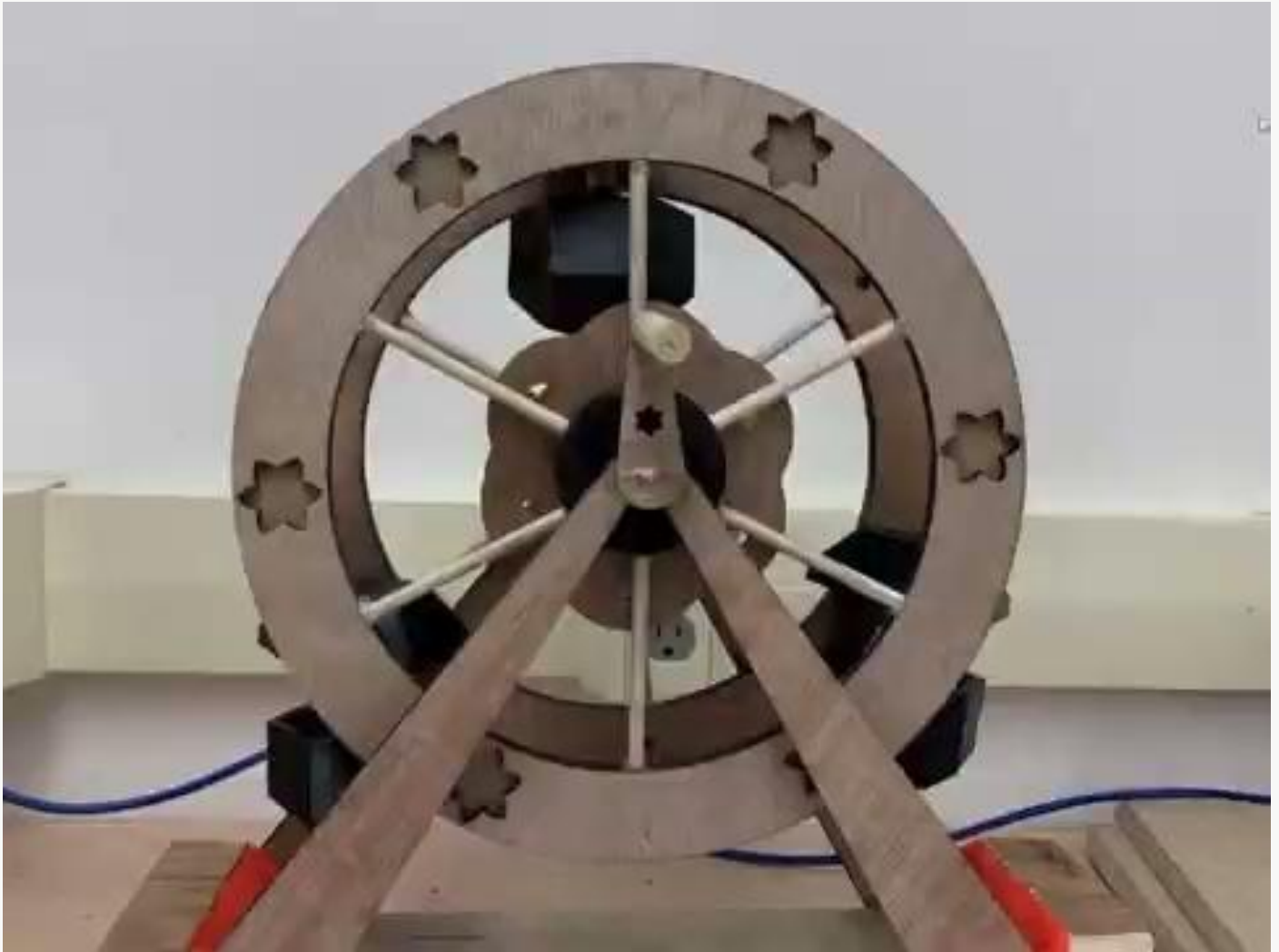


Notes : *This was taken before the platform was added underneath, hence why we're holding on to it. A few edits were made after this, including adjusting the seats. Overall, our first test-run of our prototype was a success!*

LINK :

<https://drive.google.com/file/d/1iza9Hjg6zi8lX-gRM6jG7PasbaX0tICe/view>

Final Prototype Video



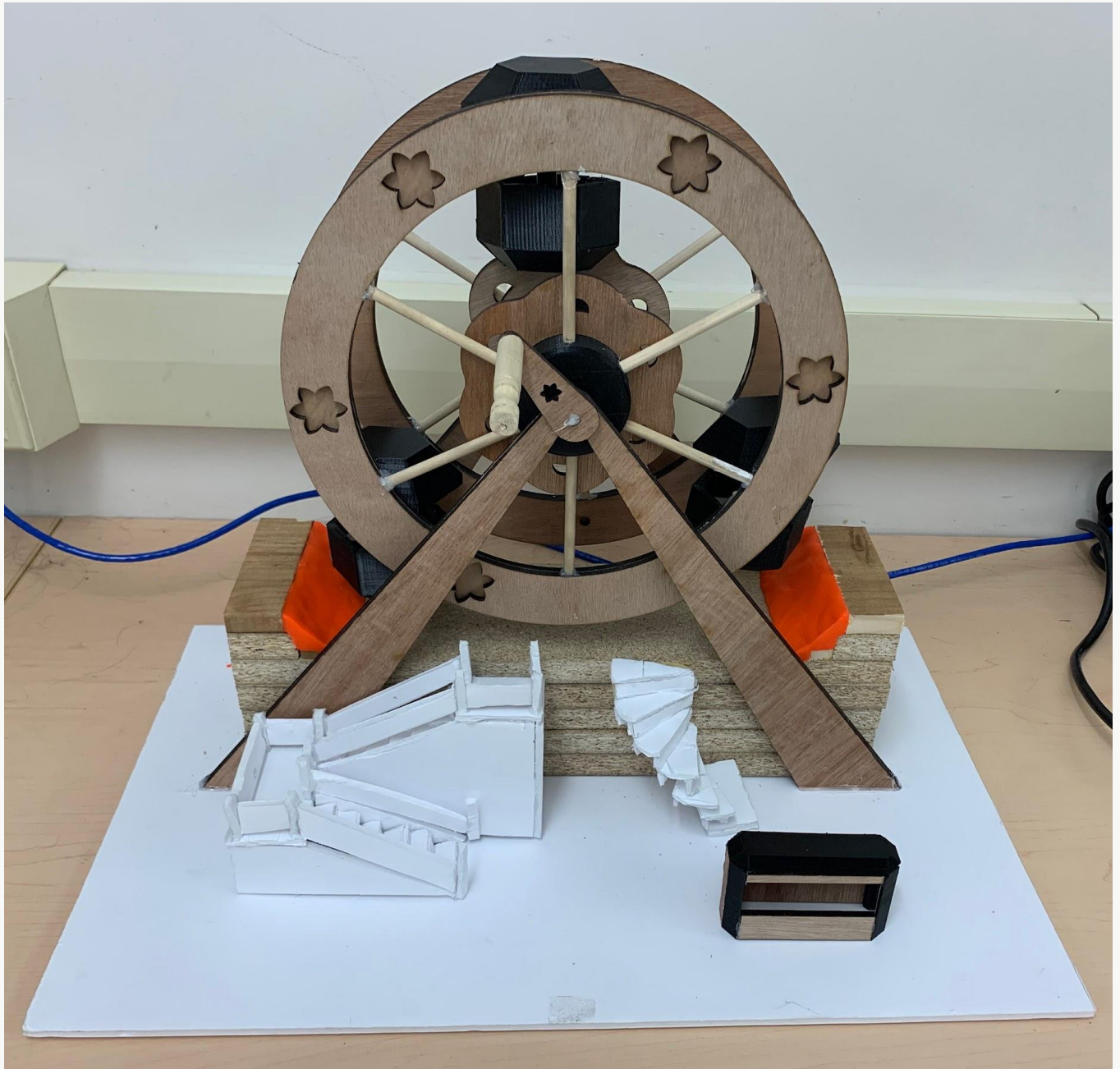
Notes : Here is a stop motion video of our ferris wheel spinning. Without our hands blocking the view of our lovely ferris wheel, it is easy to see the successful function of our very gorgeous creation.

LINK :

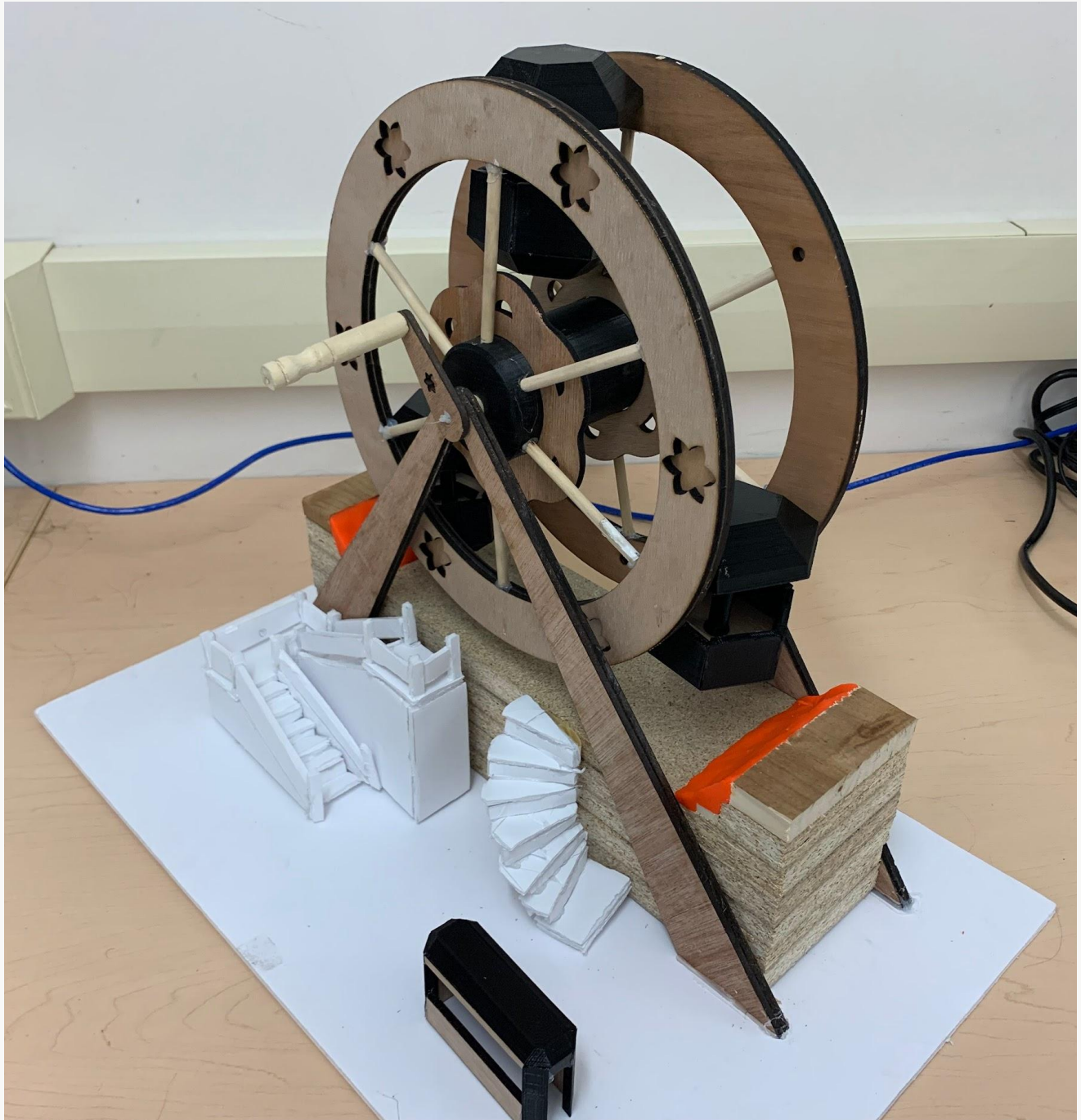
https://drive.google.com/file/d/1j-ihj8iLGr7C2rr1pnLIY45h_8jmBvhS/view?resourcekey

Prototype Results & Concluding Statements

Our Ferris Wheel



Our Ferris Wheel



Conclusion I

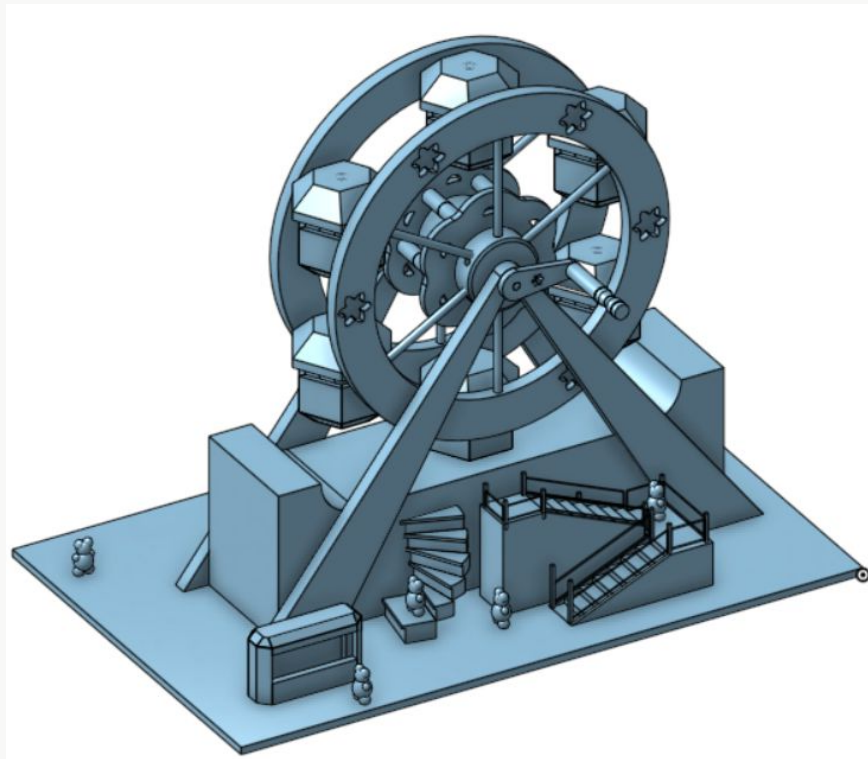
As seen in the pictures and videos, our project was a success! It is fully functional, properly joined and capable of motion. The design process went very well, as our parts were well thought out and we had consulted with each other to ensure no parts would interfere with others. That was especially important because if any parts didn't fit well, there would be a risk of our project not working.

Conclusion II

In regards possible improvements, leaving more time construction would be ideal.

There was a bit of a time crunch to get out ferris wheel built. Had there been more time spent on the construction, I believe we would have been able to improve the appearance of our ferris wheel in terms of aesthetics (e.g painting our ferris wheel to a set colour them). However, overall, building this project was an exciting process, and I'm proud of our success.

Thanks



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End of Report.