Project: Submarine

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11/21/2025

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Cover Memo

a.Design Intent

The design intent for this project was completely aesthetic. The design and intent was to recreate a Green Toys Submarine in as much detail as possible to ensure aesthetics were maintained with the copy. To ensure this happened measurements were continuously taken with calipers and simplifications were documented (see section b.).

b. Simplifications Made

For Each Part:
Ribs will be omitted. The main reason for this is the complex shape of the ribs, and since they are internal features, their existence is not important. Any connectors will be simplified to rough shapes instead of precise modeling. The reason for this is the complex shape is unneeded and a simple placement is enough to make the aesthetics match.

Bottom Hull:
The logo and text on the very bottom will not be included, as they are not important features. The overall bottom surface will be completely flat rather than having the continuous curve of the original. This change is to make the modeling process easier and to ensure that, if 3D printed, the model can sit flat on a table without tipping.

Top Hull:
The overall shape will be simplified into three parts to make the component easier to produce. These three parts will follow the details outlined in the dimension+overview.pdf document.

Propeller:
The only feature being simplified on the propeller is the blade shape, it will be roughly similar to the actual blade. The inability to measure precisely is why modeling to exact is not possible. Also the overall size will be significantly larger.

Top Cap:
The logo will not be included, as it's not a defining feature of the toy and doesn't affect its recognizability as a submarine. The hand railing on top will be simplified as well. Specifically, the railing ends will be straight rather than curved, and the overall curvature of the railing will be approximate. These changes are being made because the railing isn't a primary feature, and replicating it exactly would be unnecessarily complex.

c.Difficulties Encountered

The largest difficulty was the inability to model the back of the hull into a small circle. The shape of both the top and bottom hull were approximate, as close as I could get with my measurements, because of this I was unable to make it taper to a small circle. Instead of making it a small circle I made it a larger circle and increased the size of the propellor to fit. The aesthetics are kept the same and in my opinion it looks better to have a larger propeller.

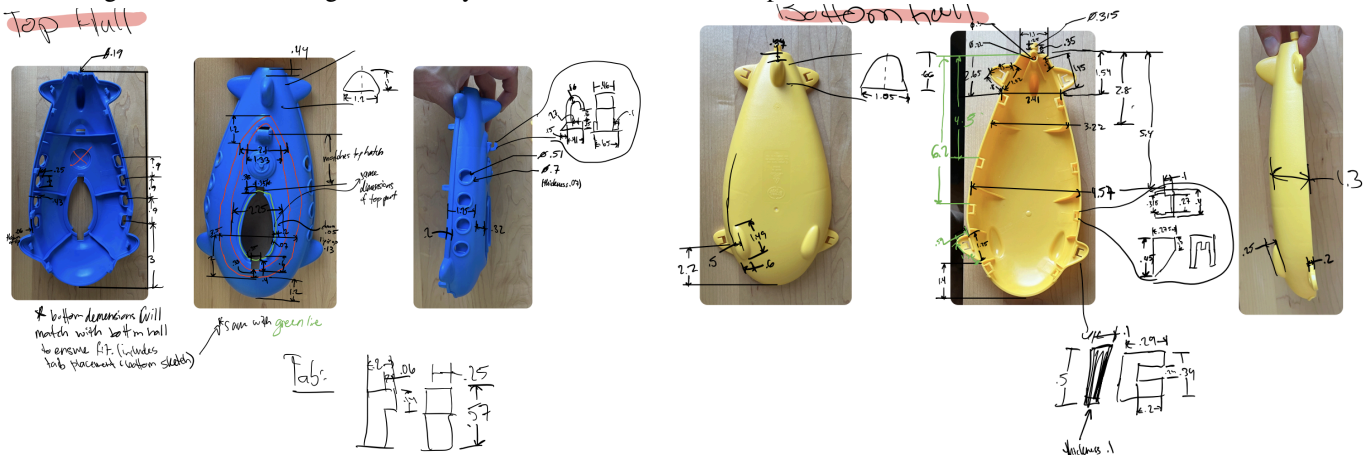
Images of Original Device

Assembled Imaged

Image below is taken from Green Toys Submarine product page (greentoys.com).

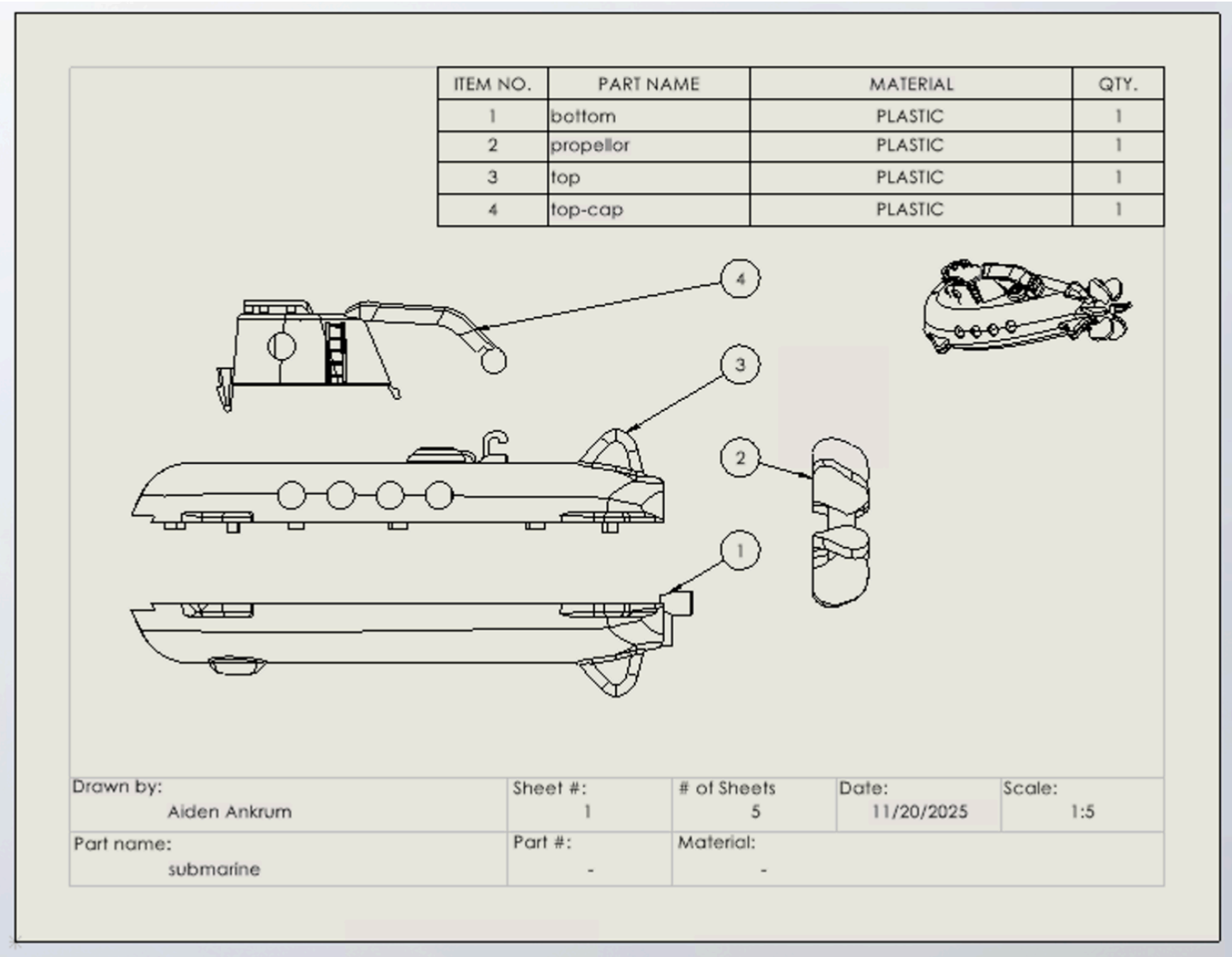
Dimensions and Images of Each Part

Images were taken during disassembly, see dimensions+overview.pdf for more.



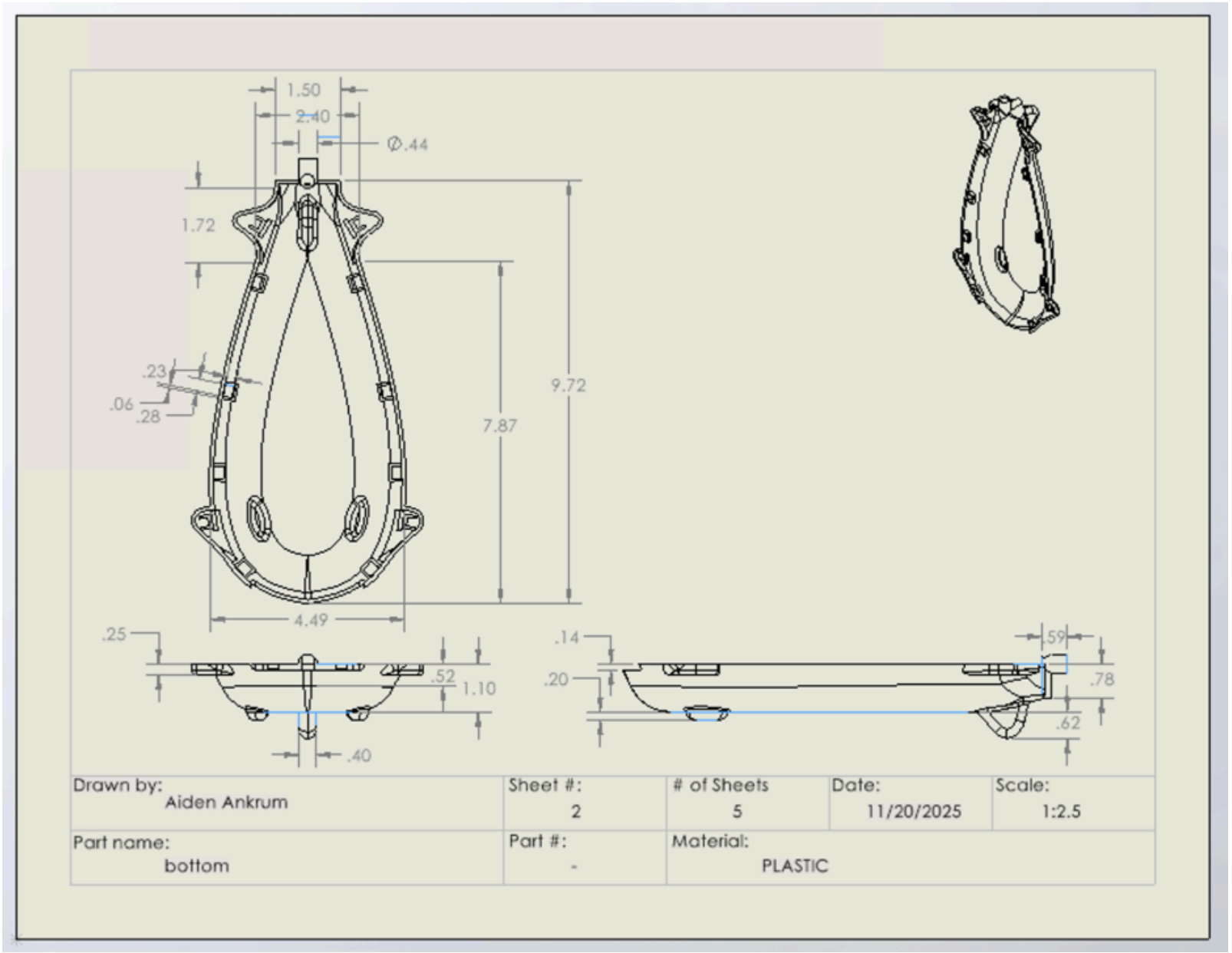
Assembly Drawing

Assembly View:

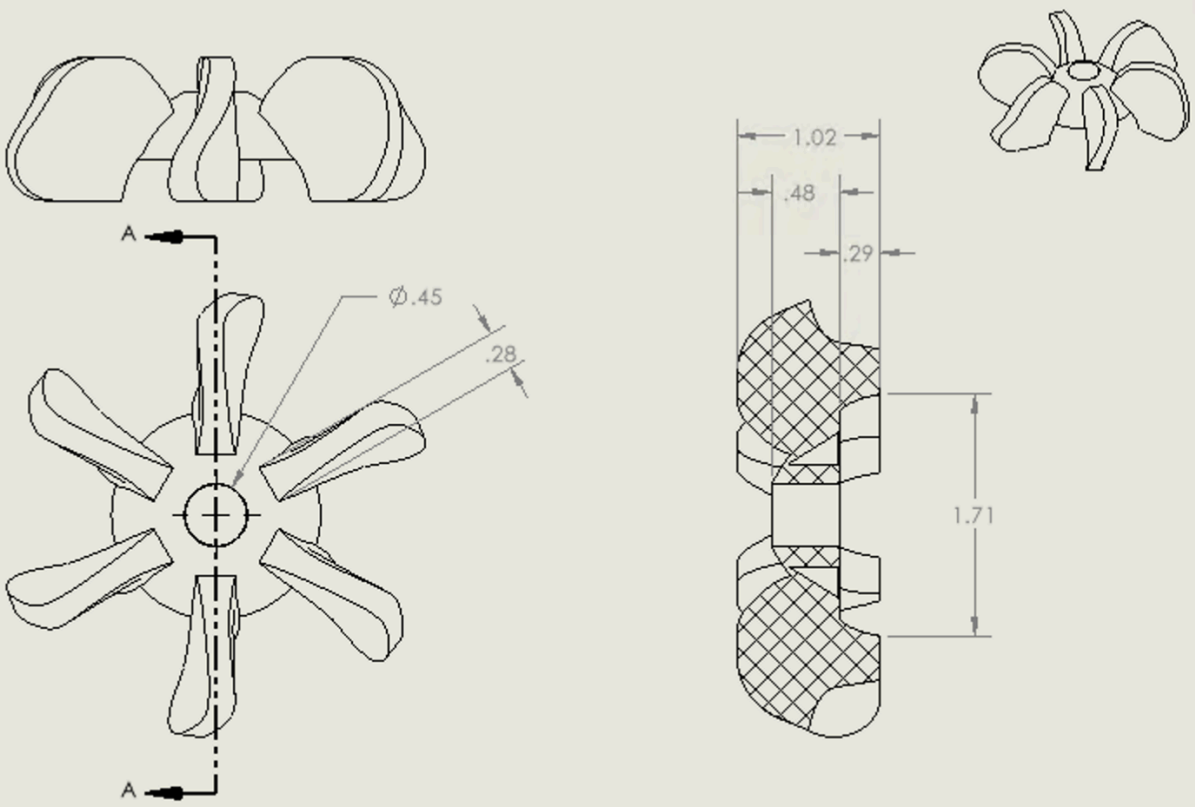


Engineering Drawings

bottom



propellor

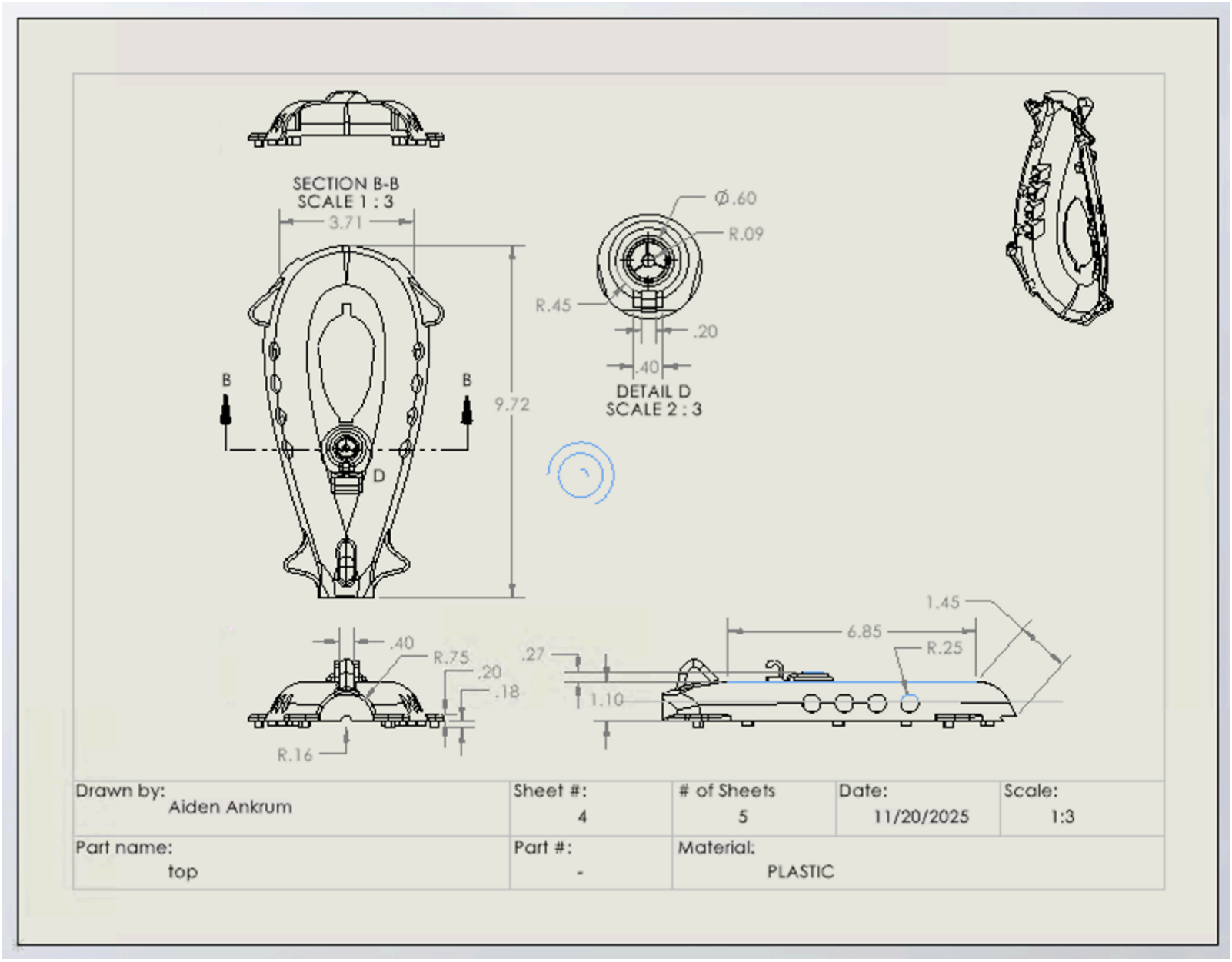


NOTE: BLADES ARE SPACED EVENLY APART

SECTION A-A
SCALE 1 : 1

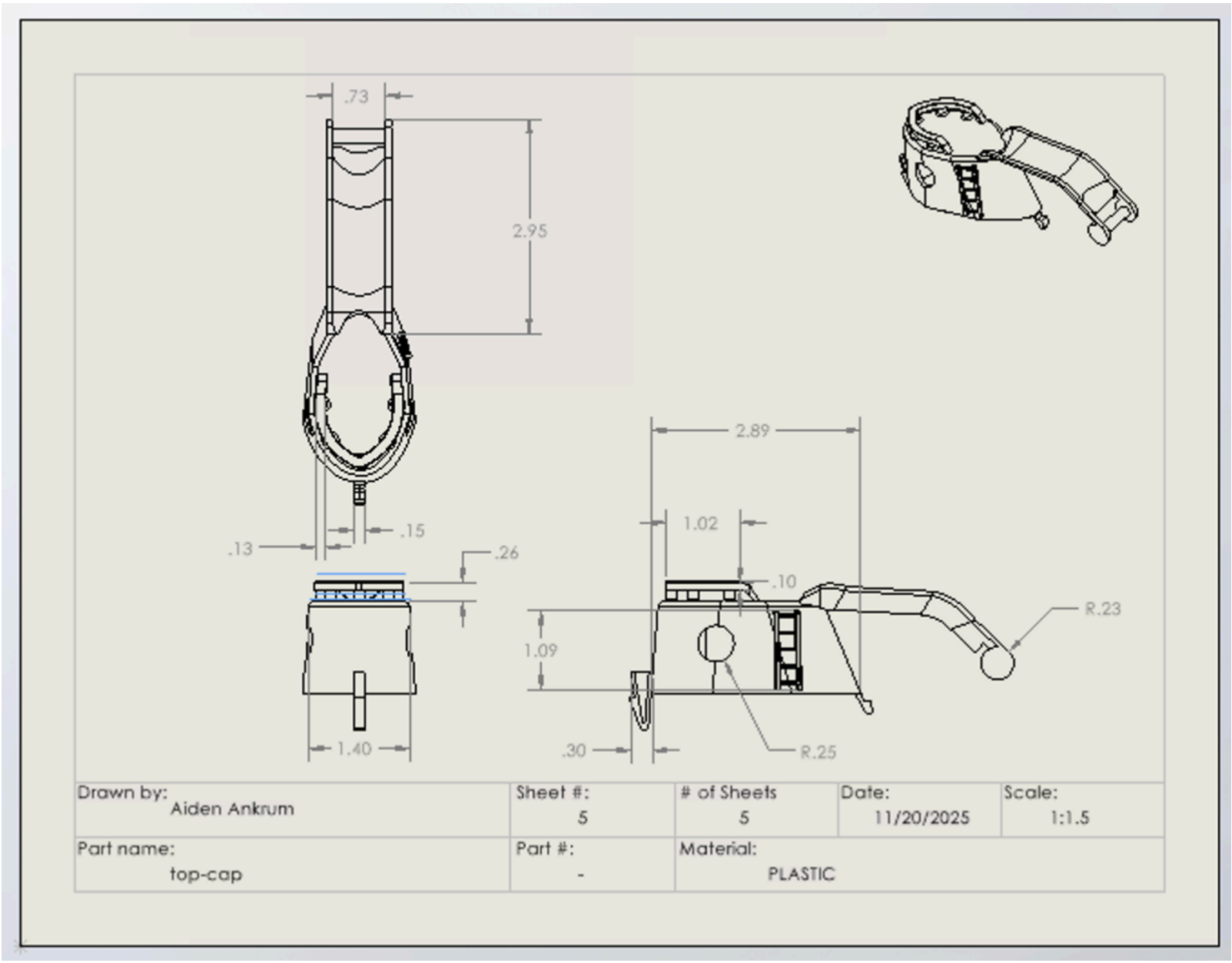
Drawn by: Aiden Ankrum	Sheet #: 3	# of Sheets 5	Date: 11/20/2025	Scale: 1:2.5
Part name: propellor	Part #: -	Material: PLASTIC		

top



Drawn by: Aiden Ankrum	Sheet #: 4	# of Sheets 5	Date: 11/20/2025	Scale: 1:3
Part name: top	Part #: -	Material: PLASTIC		

top-cap



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Part name: top-cap	Part #: -	Material: PLASTIC		

Part Images

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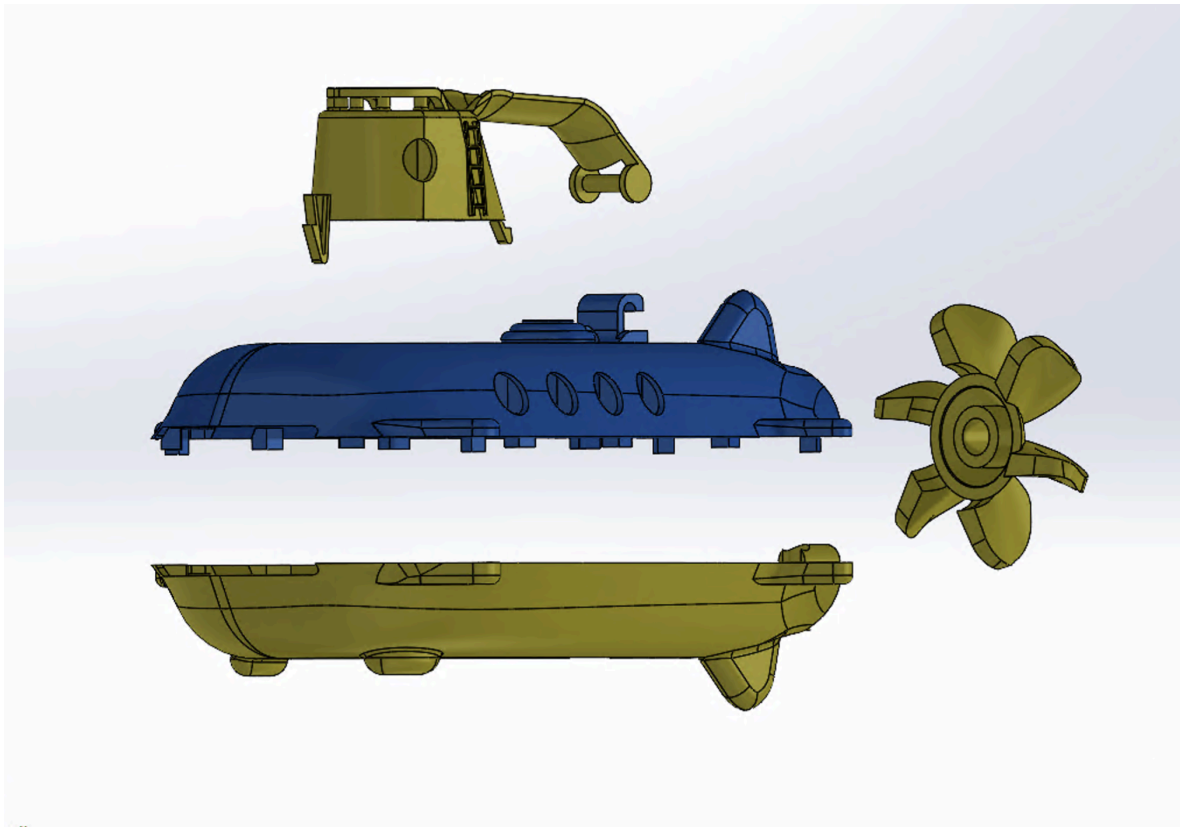

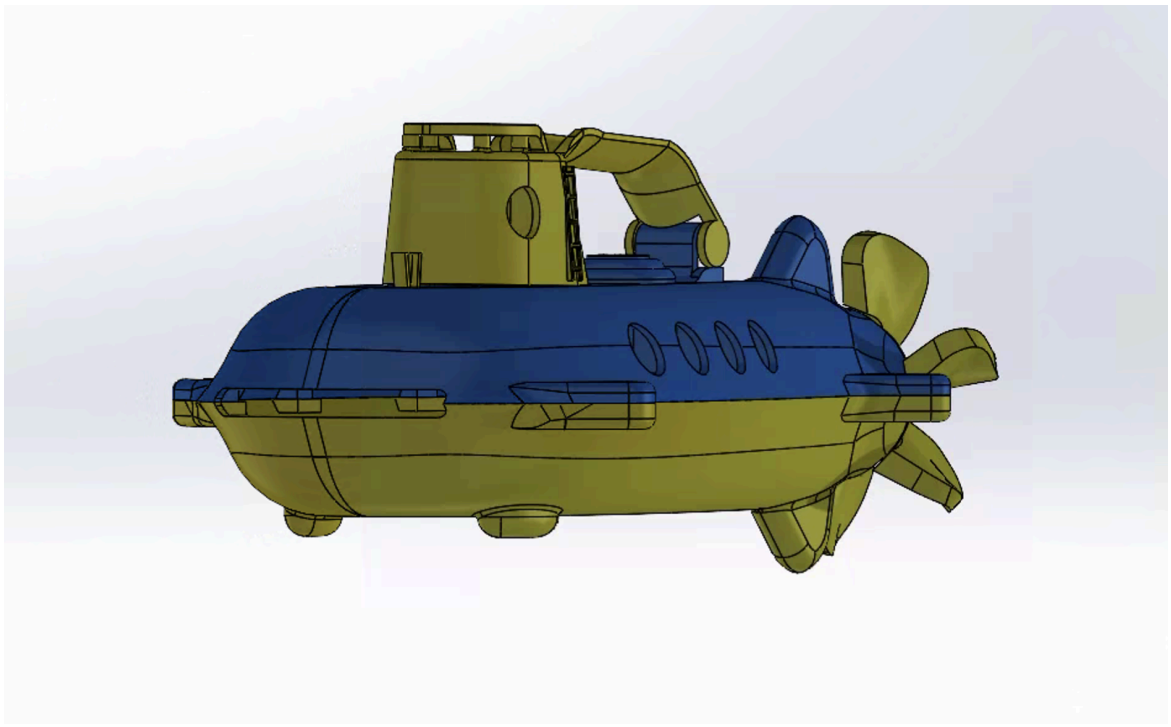

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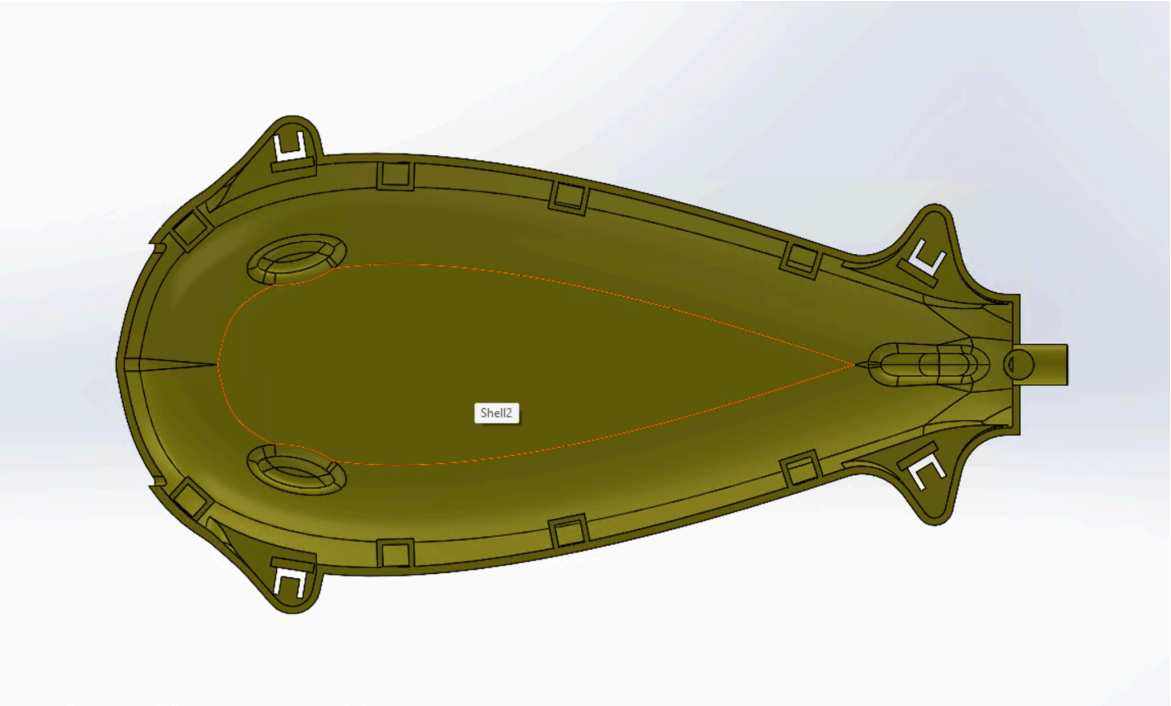

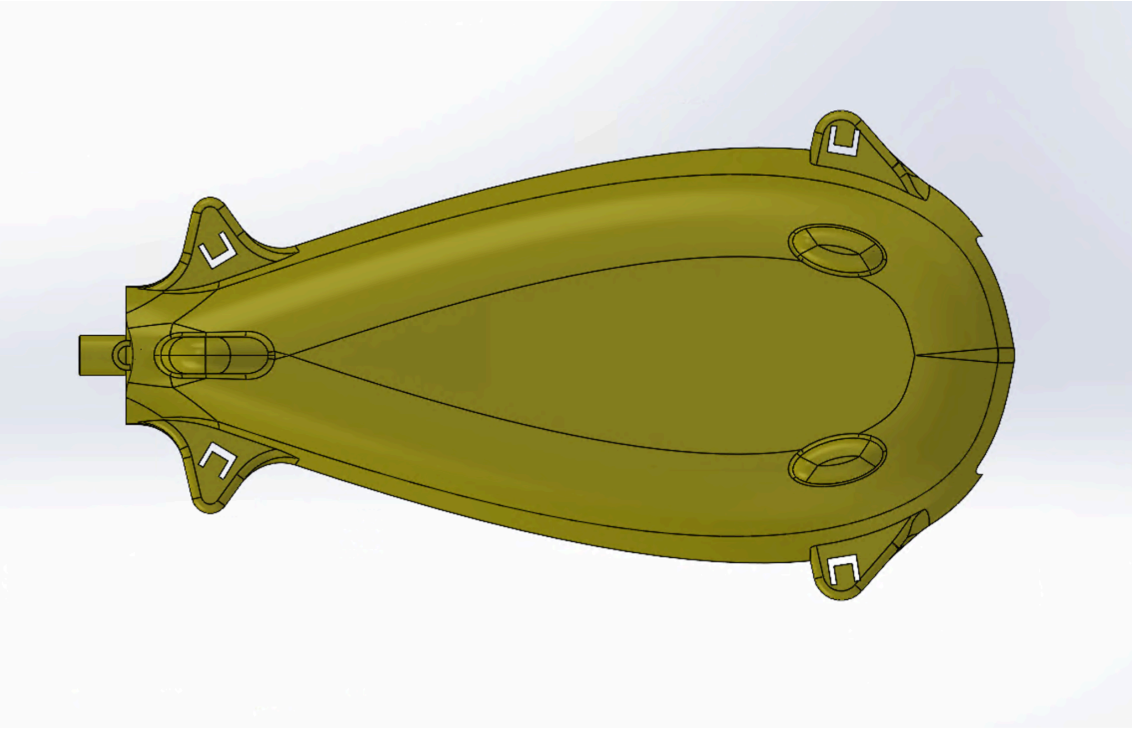

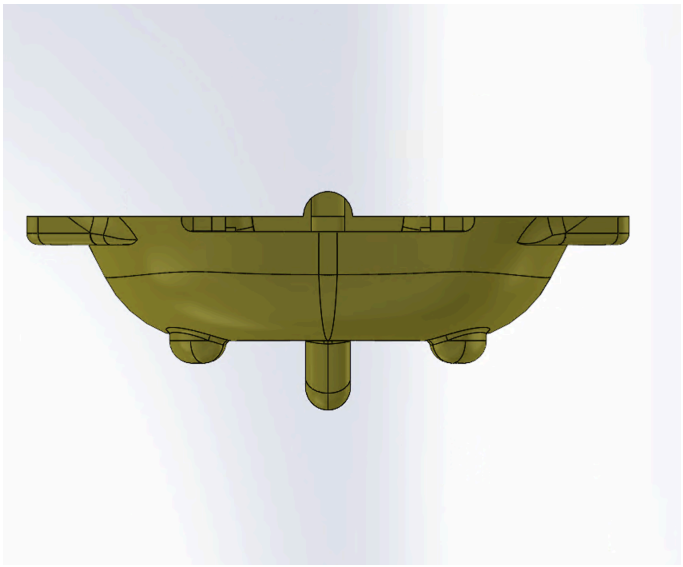

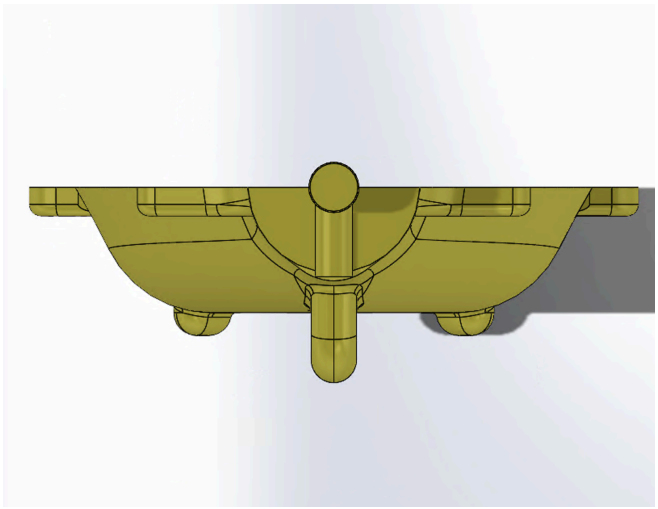

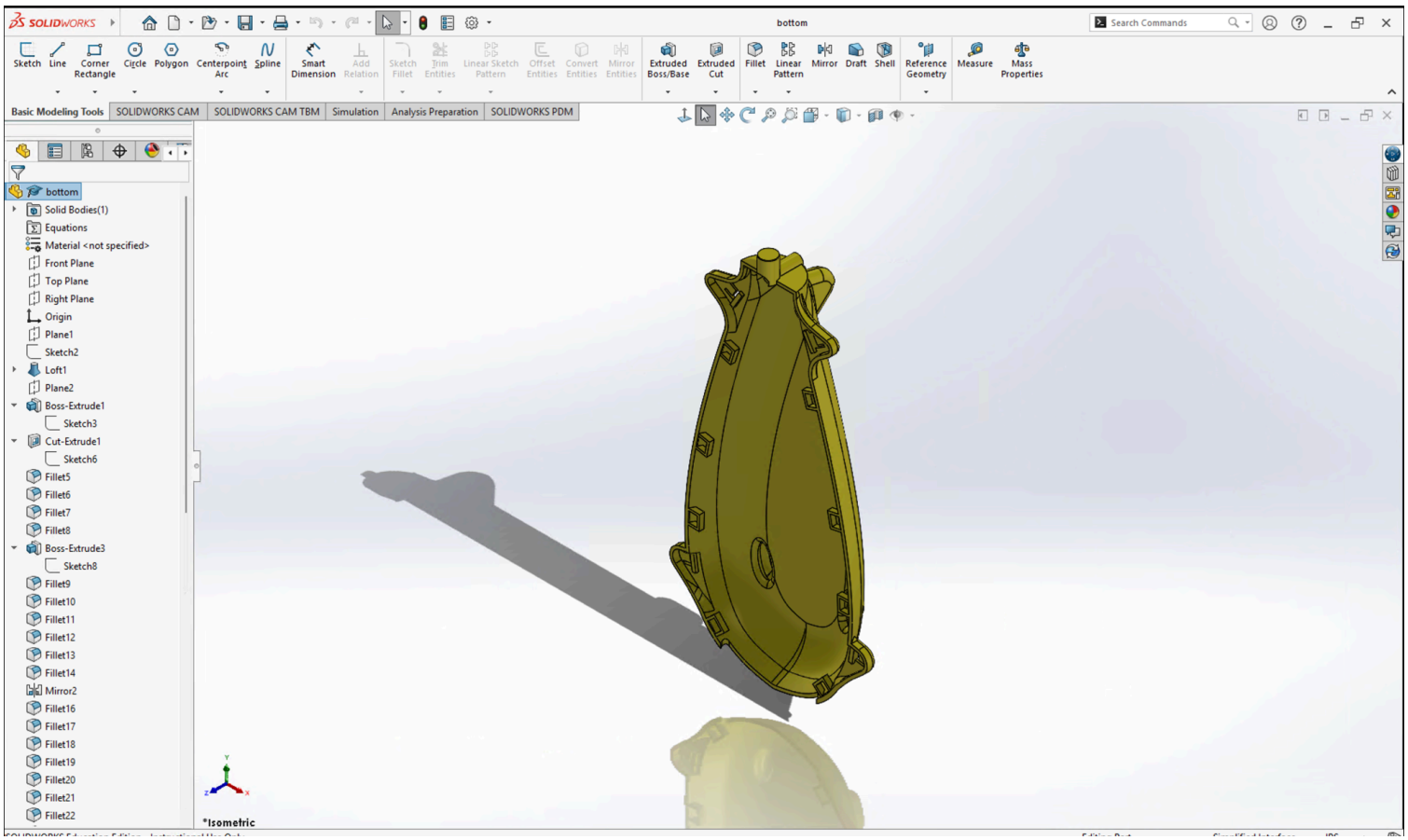
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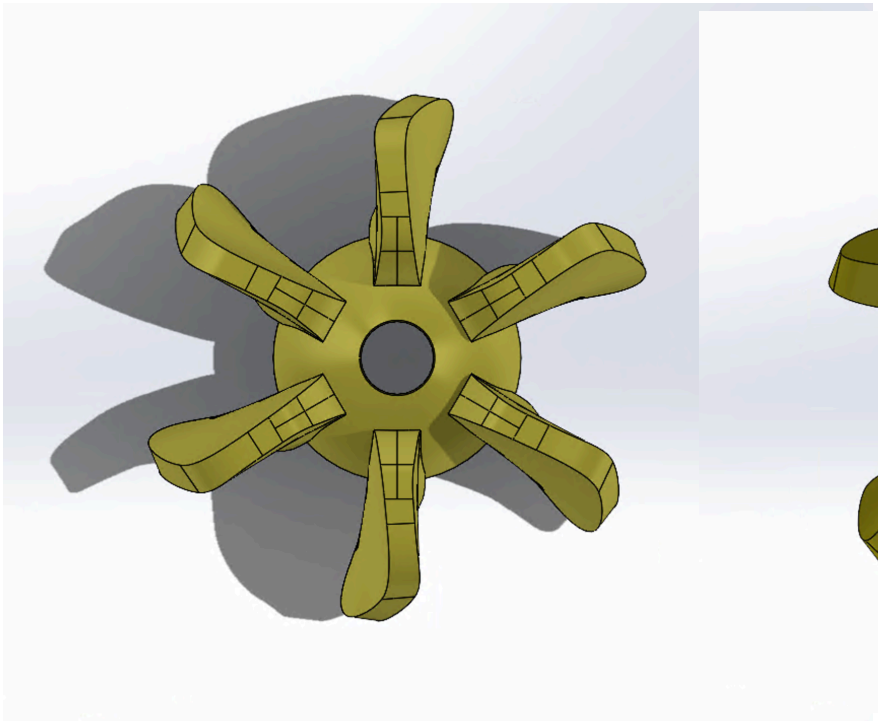
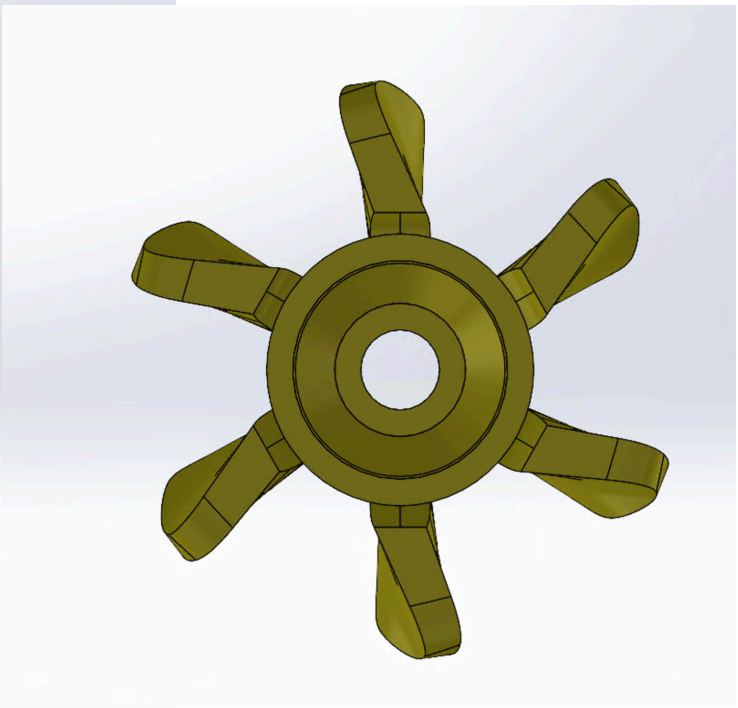
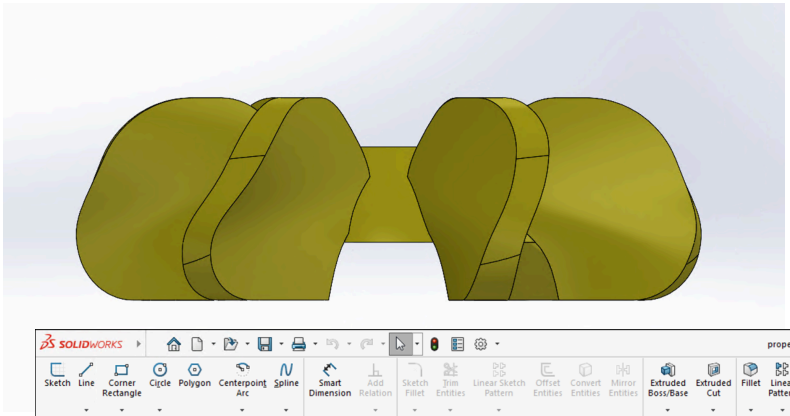
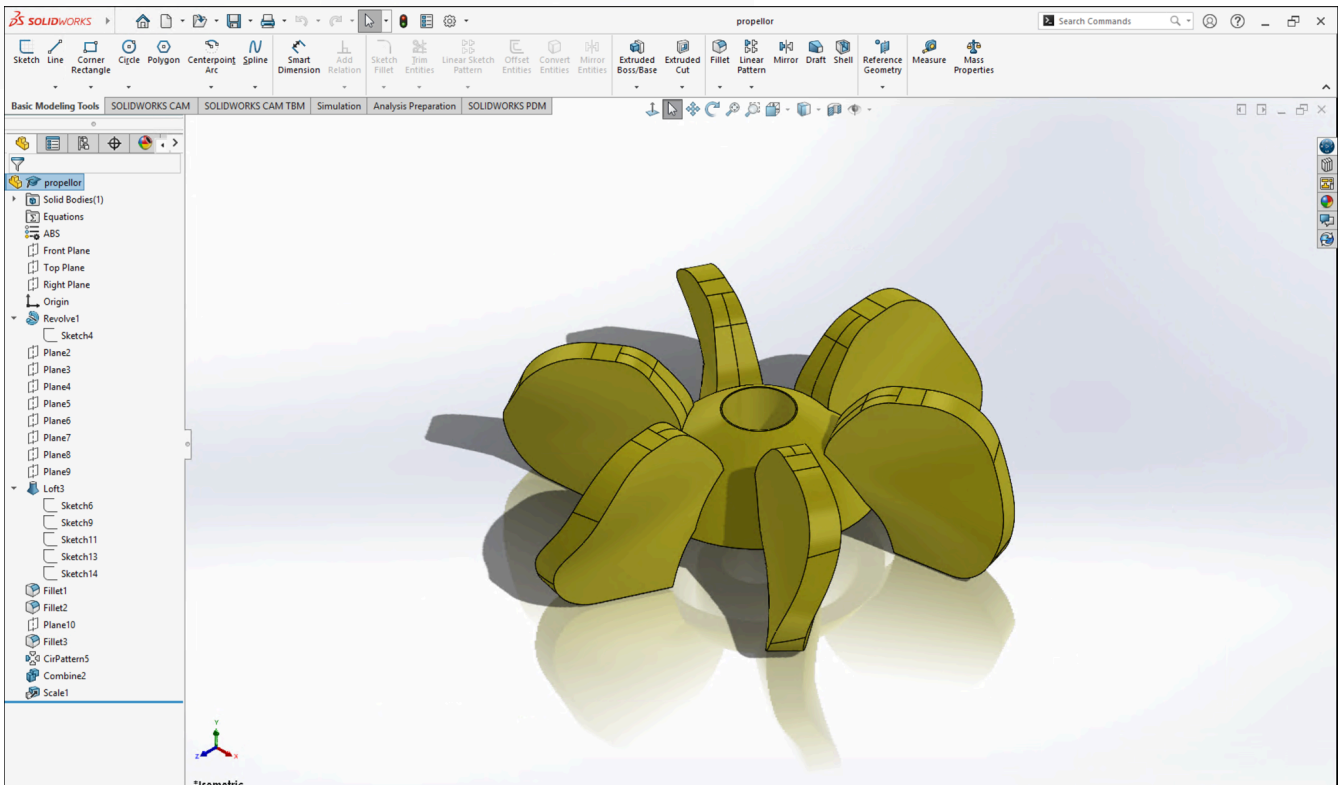
Propellor:





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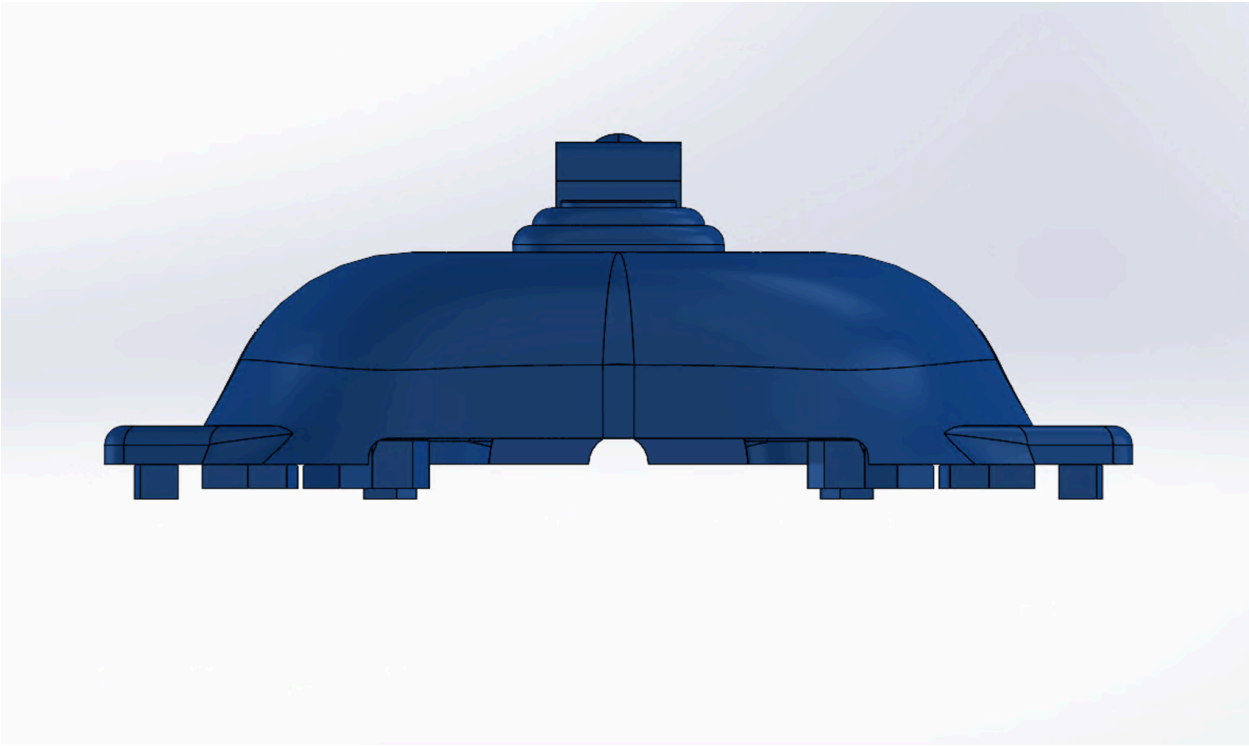

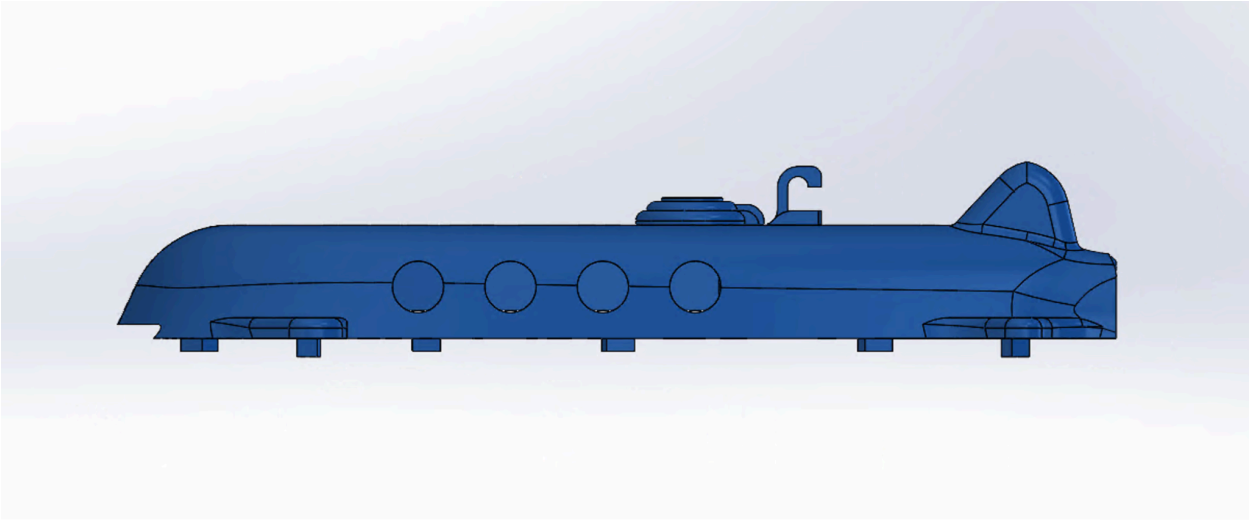

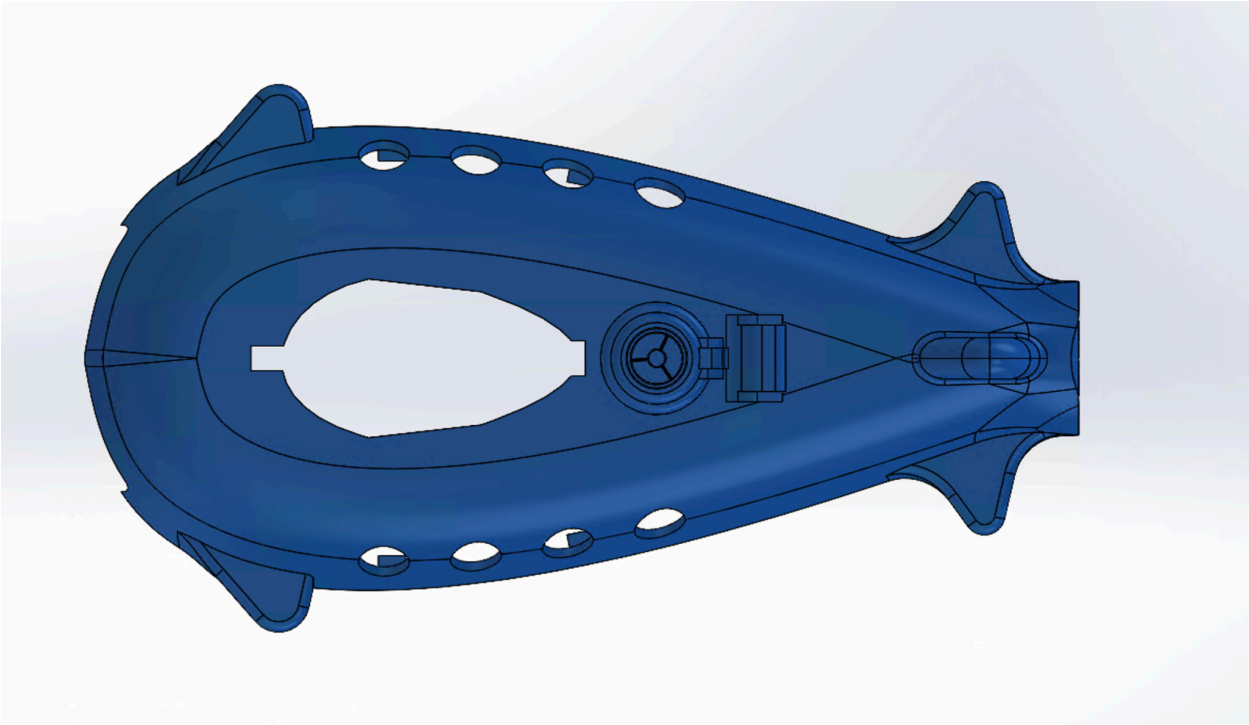

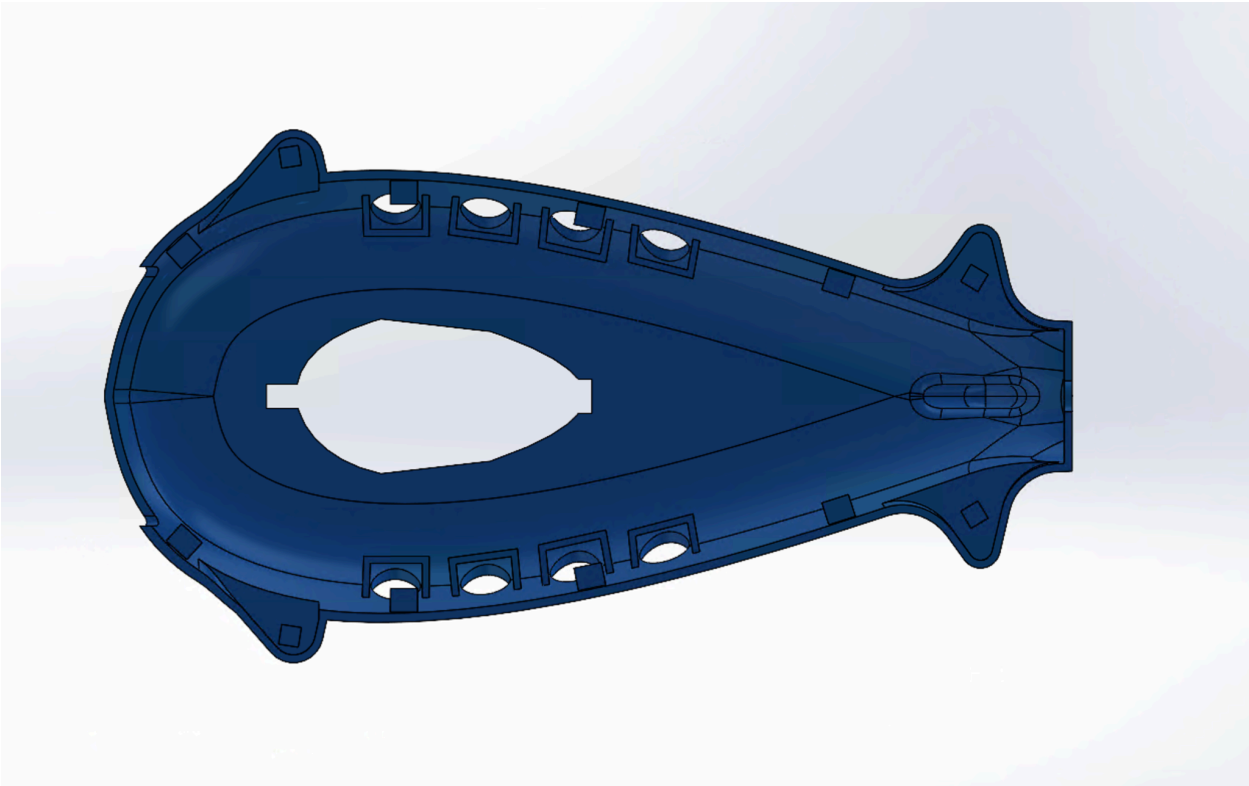

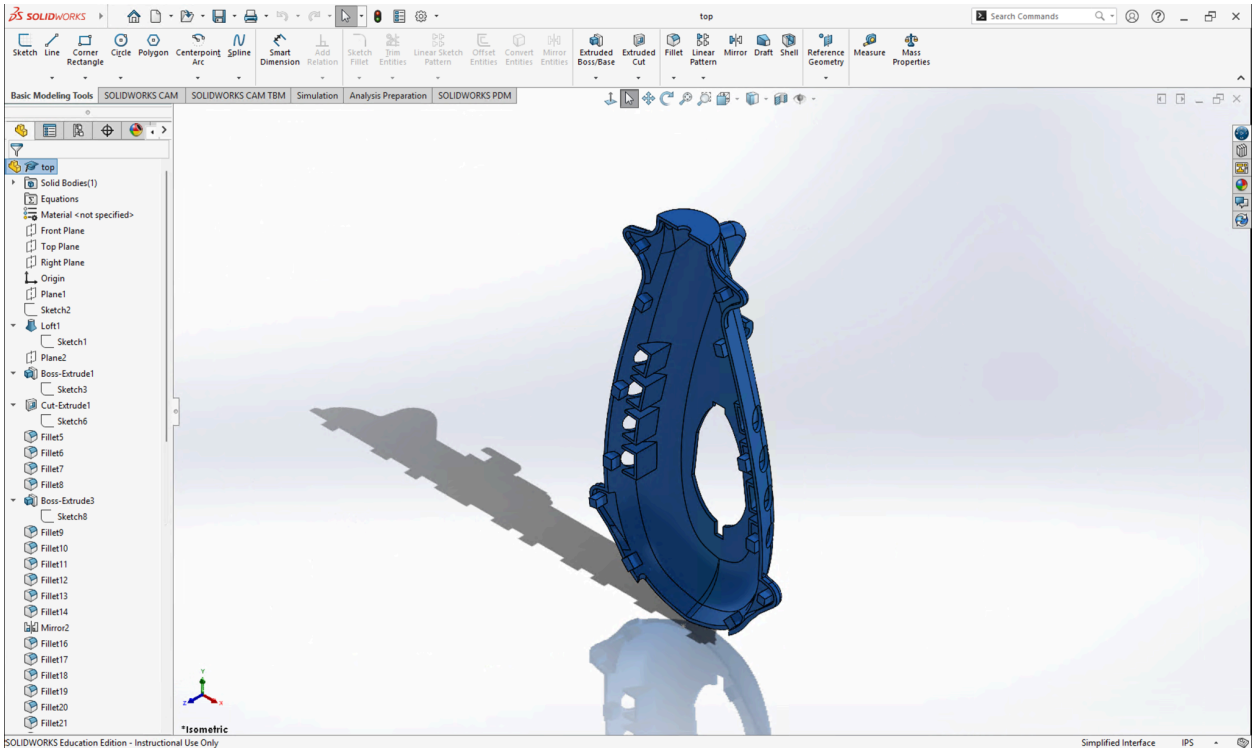
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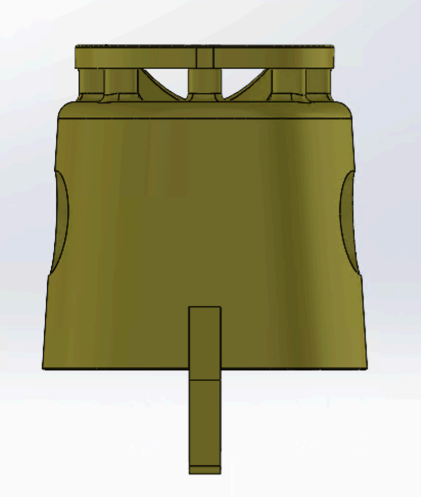
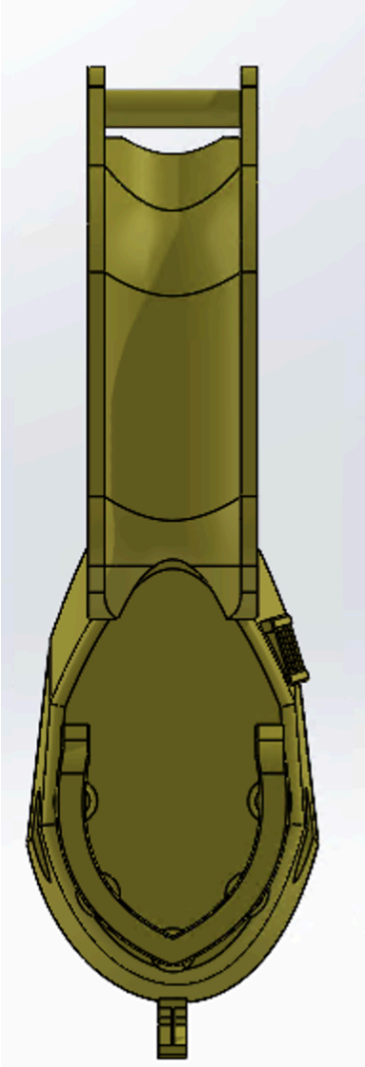
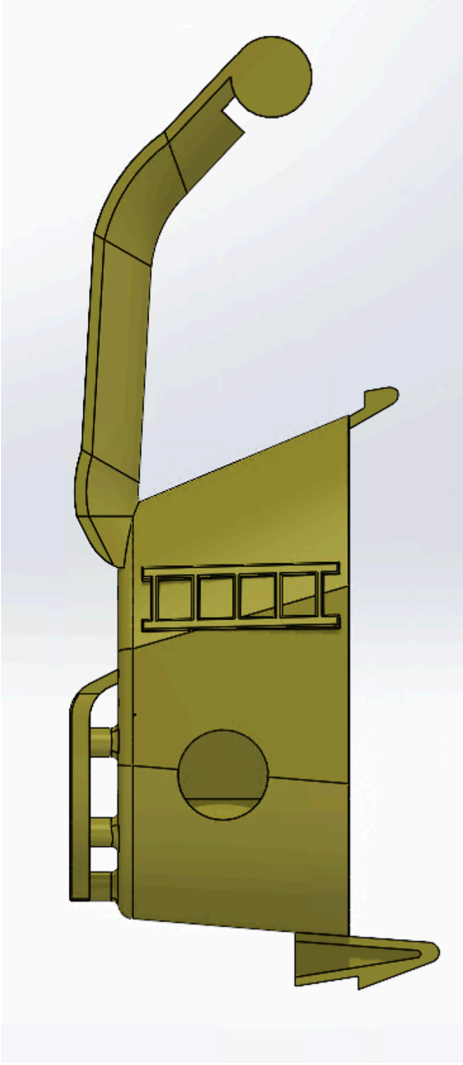
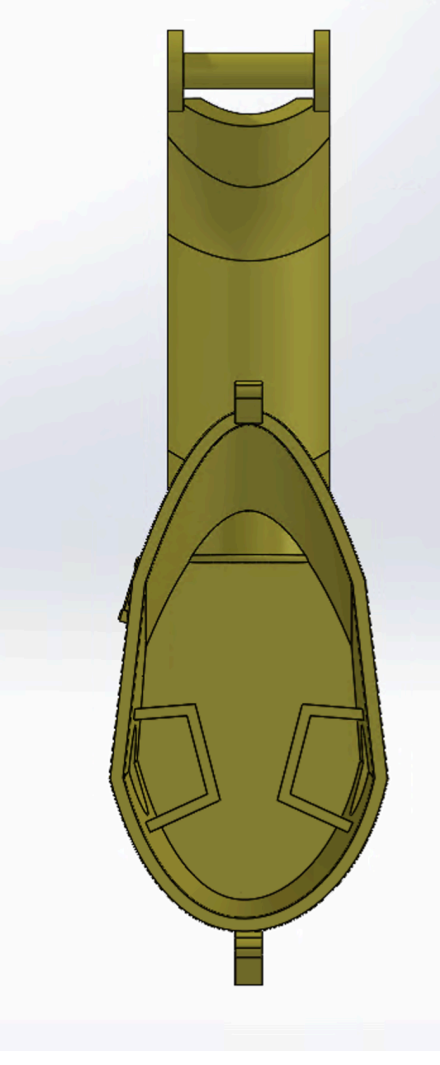
SOLIDWORKS Education Edition - Instructional Use Only
Simplified Interface
IPS

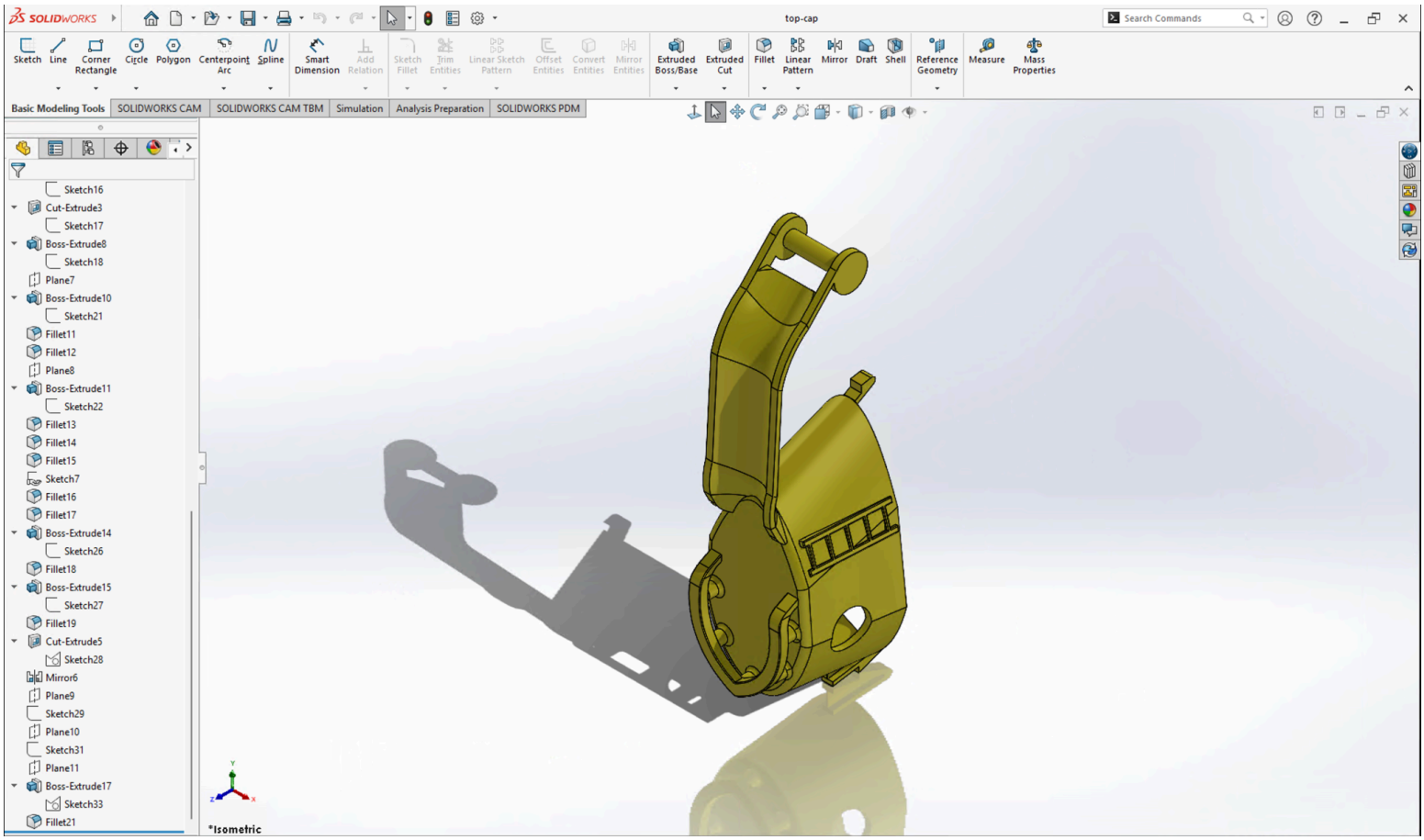
Top-Cap:







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