Mini Project:
FRC 2017 Steamworks Floor Gear Intake

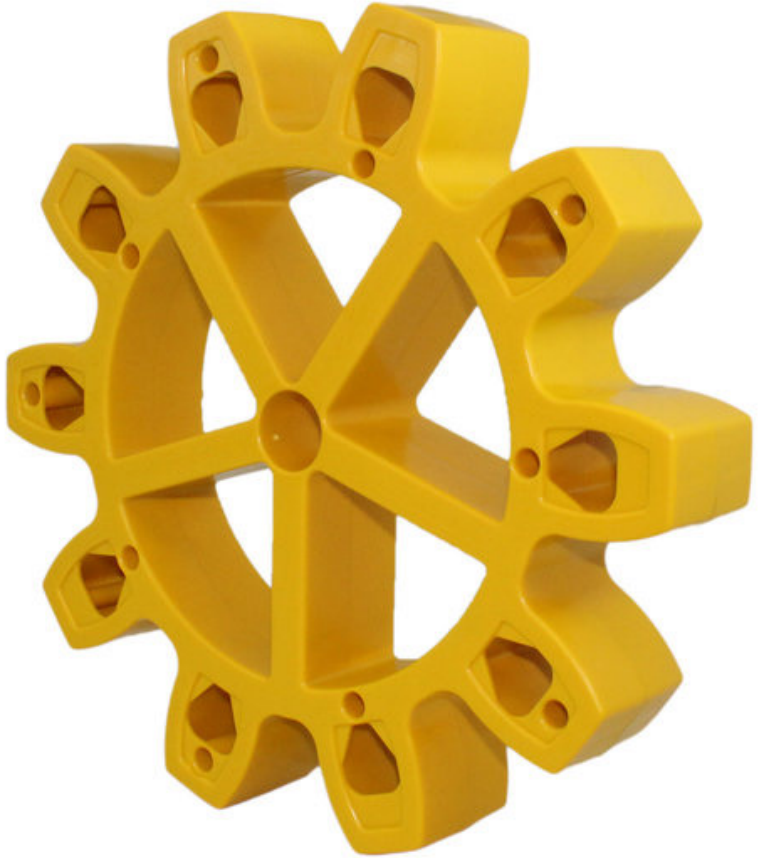
CS450 – ROBOTIC DESIGN & FABRICATION (HONORS)

FALL TERM 2021

Project Overview

For the mini project this term, you will be working with a partner to design and manufacture a mechanism to collect gears from the 2017 FRC Game – Steamworks, off the ground. This project will involve the following phases:

- Background research & strategic design assessment
- CAD design in Onshape
- Manufacture design
- Assemble & test design
- Iteration (if time allows)
- Reflection Question



FRC 2017 Steamworks Gear

Background Research & Strategic Design Assessment

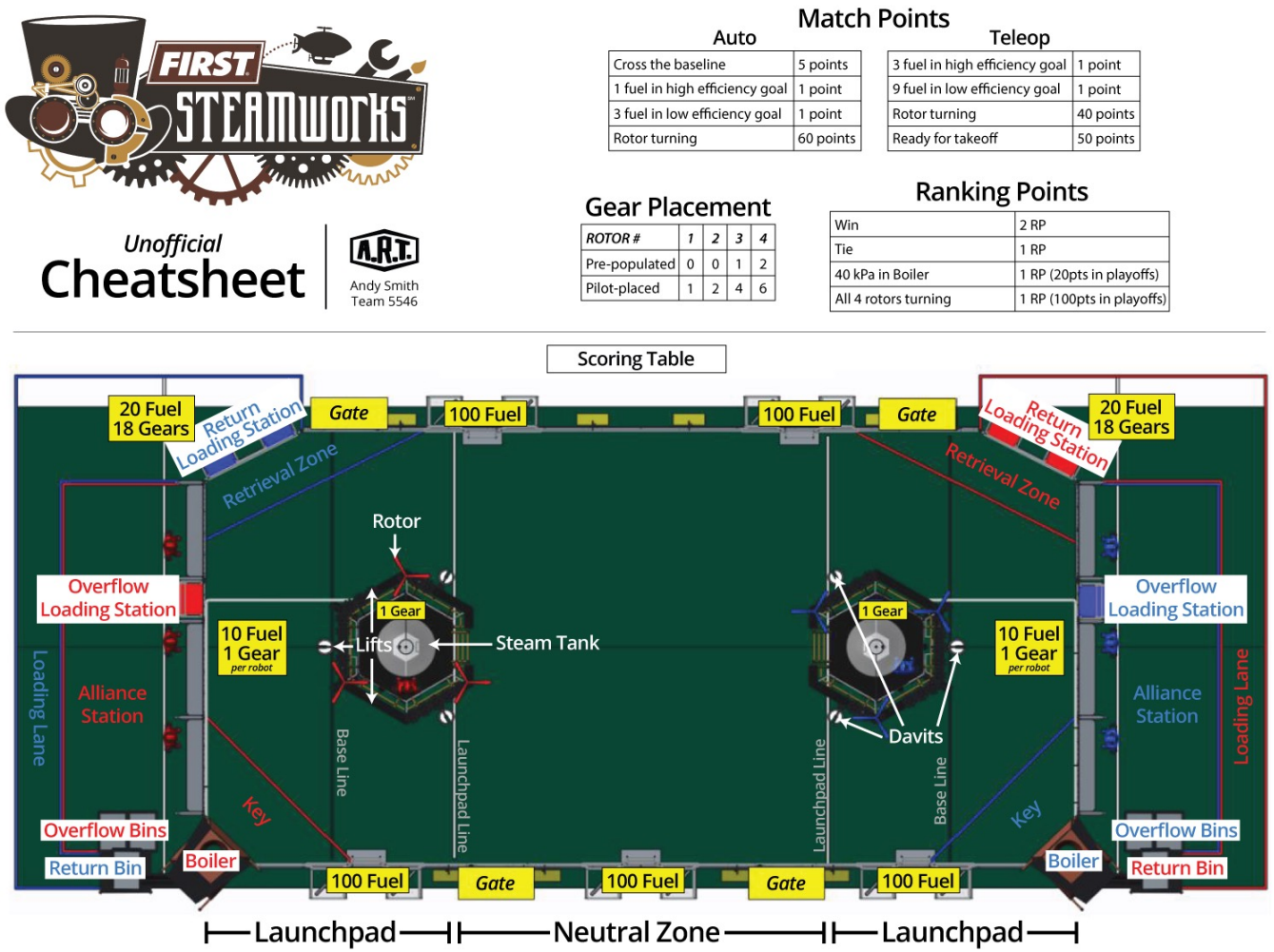
- During this phase you will research robots from the 2017 game that had floor intakes

  YouTube Playlist FRC 2017 Game Manual

  Record notes and sketches from research in your Engineering Notebook

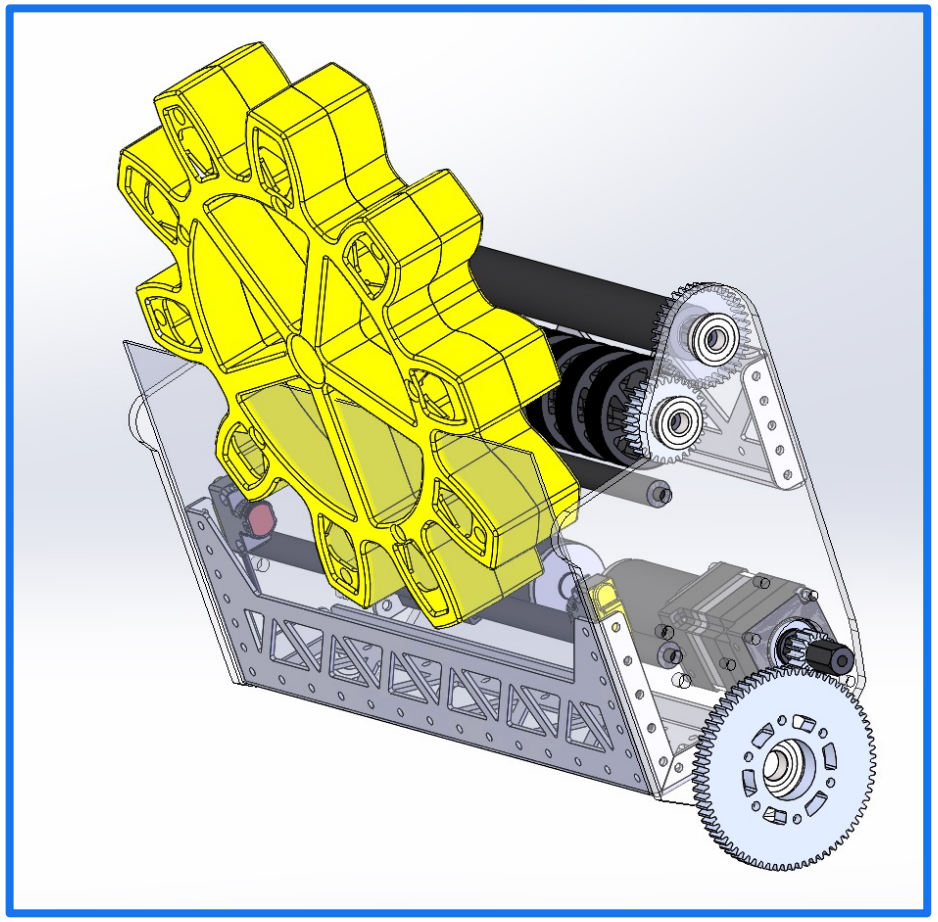
- You will also complete the Strategic and Functional Requirements spreadsheet to help shape your design to be efficient, simple and strategic

  Link to Spreadsheet



CAD Design in Onshape

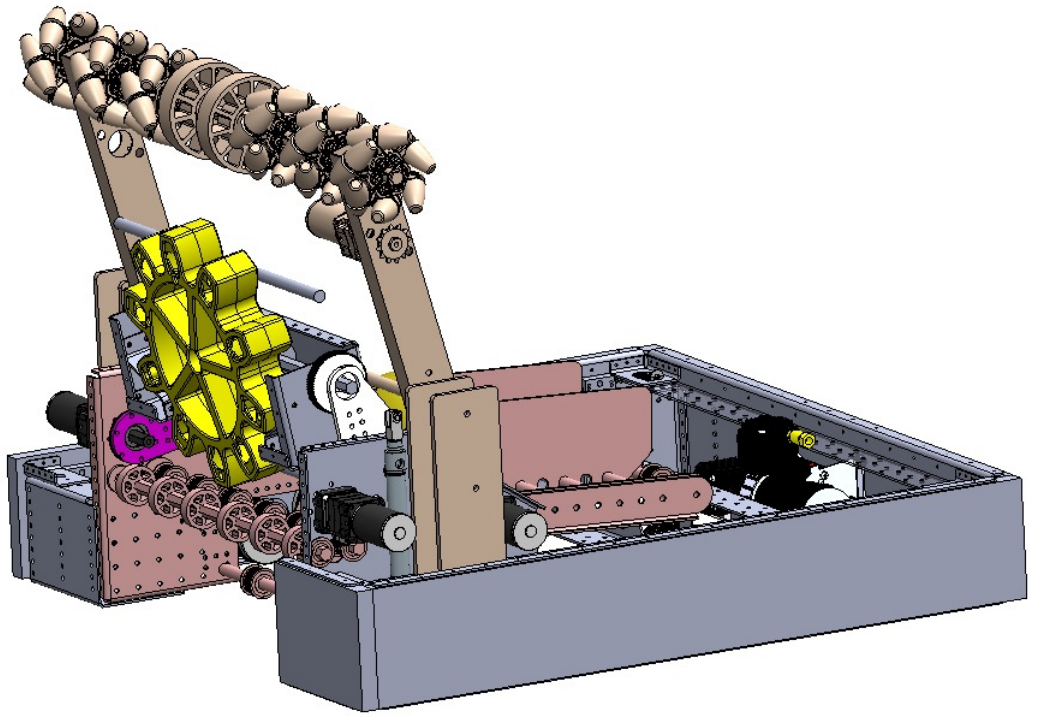
- You will use the CAD software Onshape to design your mechanism with your partner
- You should make one Onshape file with multiple part studios so you can work simultaneously
- You will create a final design assembly in your Onshape file, as well as part drawings to prepare for the manufacturing phase



FRC 148 Robowranglers 2017 Gear Intake Design

Manufacturing

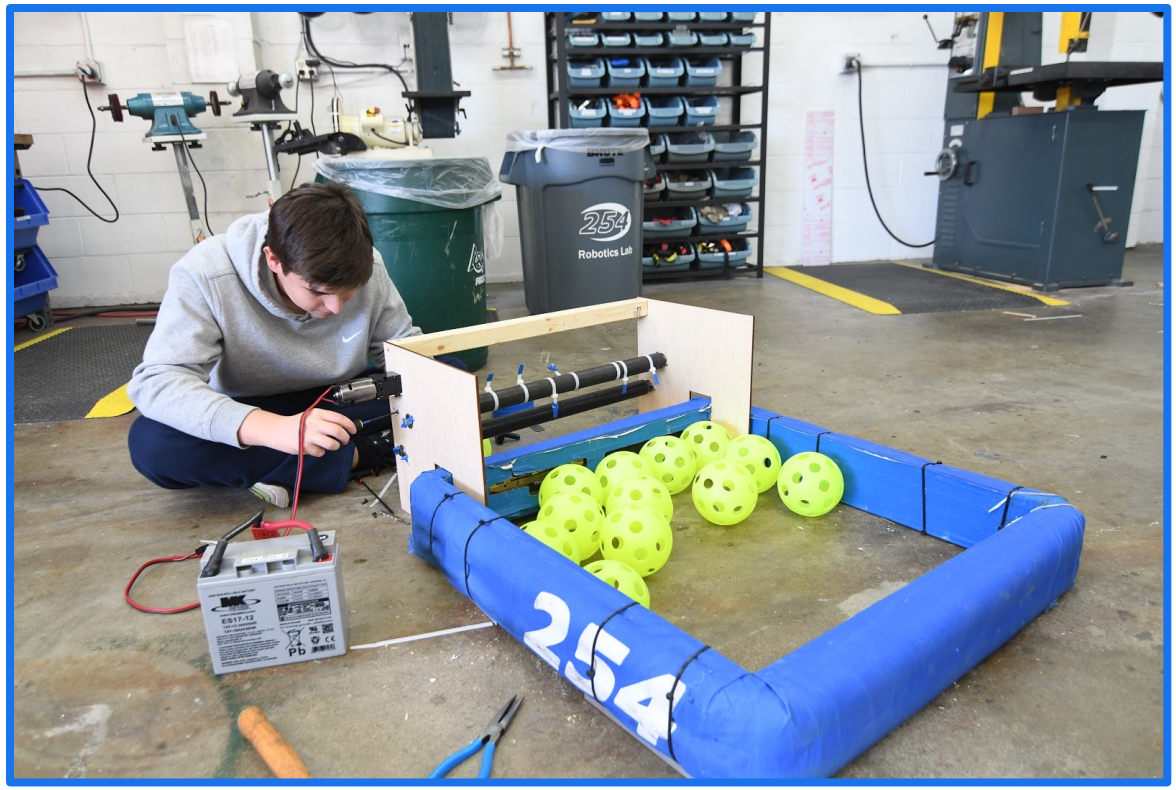
- Once your design is complete, you will manufacture your parts using tools and machines in the lab, such as the 3D Printers, Shop Bot CNC router, drill press, chop saw, etc.
- If you will need any specialty parts, please let me know ASAP so I can get them ordered



FRC 3487 Spectrum CAD Progress 2017

Assemble & Test Design

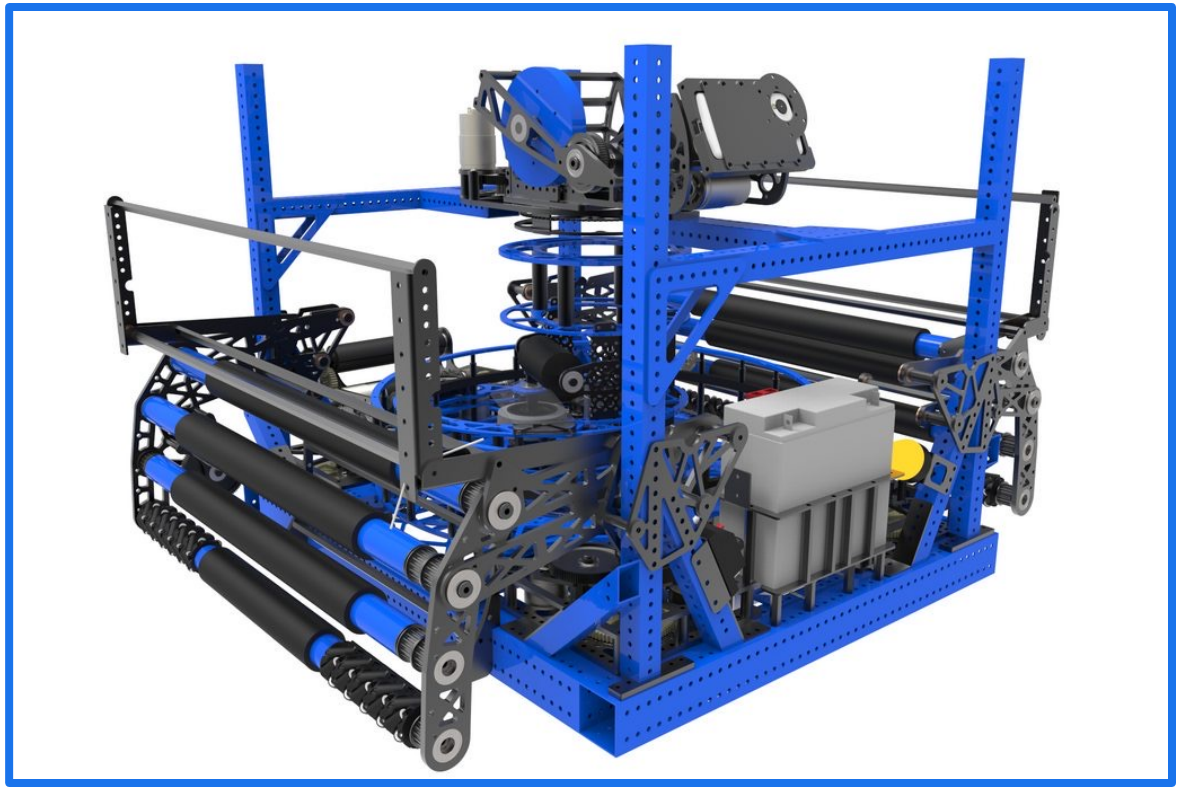
- The final step is to assemble and test your design
- You may utilize one of the existing FRC drivetrains to simulate a robot driving and picking up the gear off the floor
- You will have access to an FRC control system with working pneumatics to test your designs



FRC 254 Cheesy Poofs Fuel Prototype Testing

Iteration

- If there is enough time, you may iterate your designs based on testing results to improve your mechanism
- We may need to move onto the final project, so iteration phase is time dependent



FRC 1323 MadTown Robotics 2017 Robot

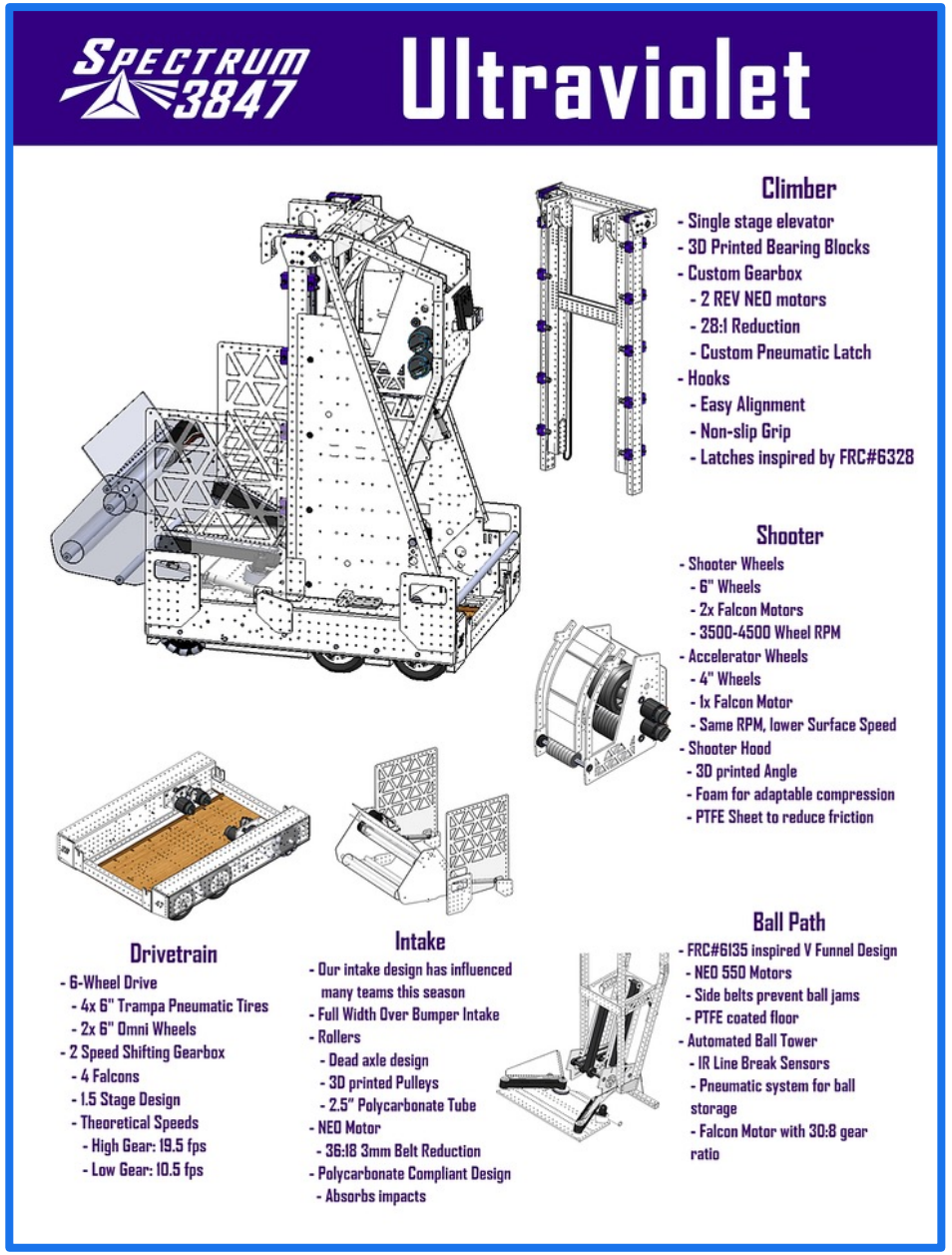
Final Reflection Question

- At the completion of the project, each group should develop a written response (2-3 paragraphs) to the following question:

Do you think having a gear floor intake was a necessary design feature in FRC Steamworks to be competitive? Why or why not? If you were to design a full robot for FRC Steamworks, what would that robot look like and why?

Deliverables & Timeline

- This project will be due October 1st in class
- On 10/1 student teams will:
  - Give a 5-minute presentation about their design and their design process. Teams should create a physical design poster as a part of their presentation
  - Demo their design to the class as a part of their presentation
  - Turn in their reflection question written assignment
  - Turn in their engineering notebooks (digital or physical copy)



FRC 3487 Spectrum Design Poster 2020