A Shot Towards the Future

C2C Robotics // Coast To Coast Robotics

62880A - Bayside, New York

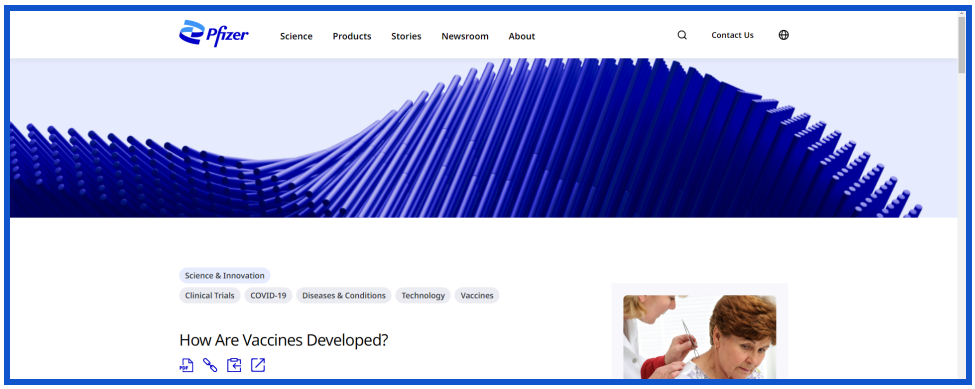
Michael L. and Enya C.

1 | Why Pfizer?

As a company that played a pivotal role in the world's survival during the COVID-19 pandemic, Pfizer demonstrates the aptitude to create miraculous products. Charles Pfizer and Charles Erhart built a company from the ground up. It all started in a little red building in Brooklyn and has grown into a multibillion-dollar organization. Pfizer stands at an astounding 91.3% vaccine efficacy and produces a large number of the world's vaccines. Pfizer is beacon in the STEM community with its effective design process. It is important to study its design process so that our team can maximize its efficiency as well.

Pfizer headquarters (Manhattan, New York)

Research on Pfizer's design process was taken from official Pfizer websites or media. To gather general information, we visited Pfizer's official website and official web presentations.

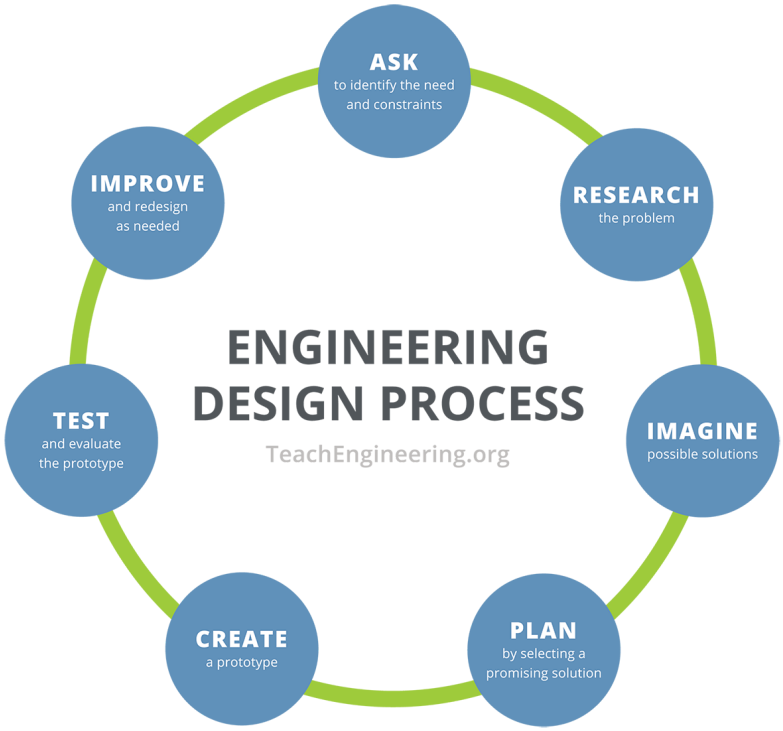


Pfizer Website Homepage

2 | The Engineering Design Process

What is the Engineering Design Process?

The Engineering Design Process is one of the most crucial factors when designing our robot, coding, and even documenting. This process is used to create a solution to a problem effectively. There are 7 important steps that help to guide the user in designing a solution to any problem.



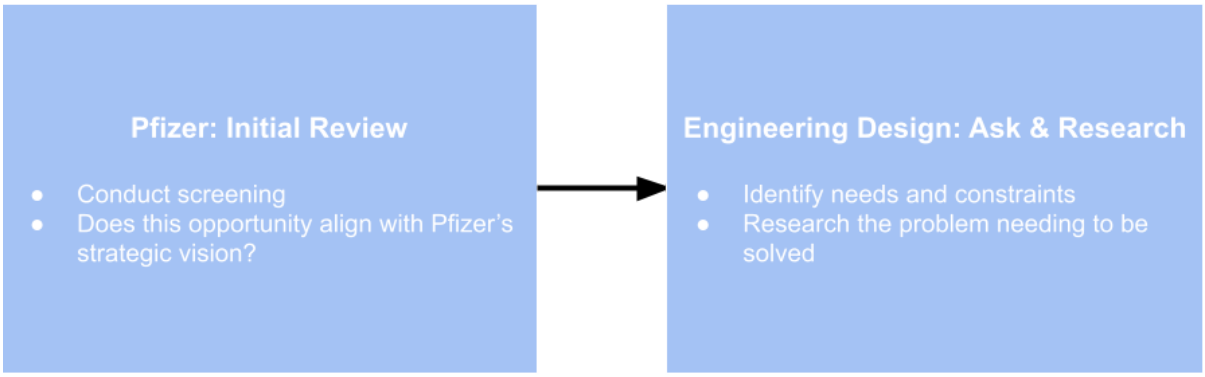
Engineering Design Process Graphic (Made by: TeachEngineering)

Pfizer's Design Process

Pfizer goes through the same steps dictated by the Engineering Design Process. Although the steps in Pfizer's process have different names, they still contain the same ideas as the Engineering Design Process. The four steps are listed below.

Initial Review

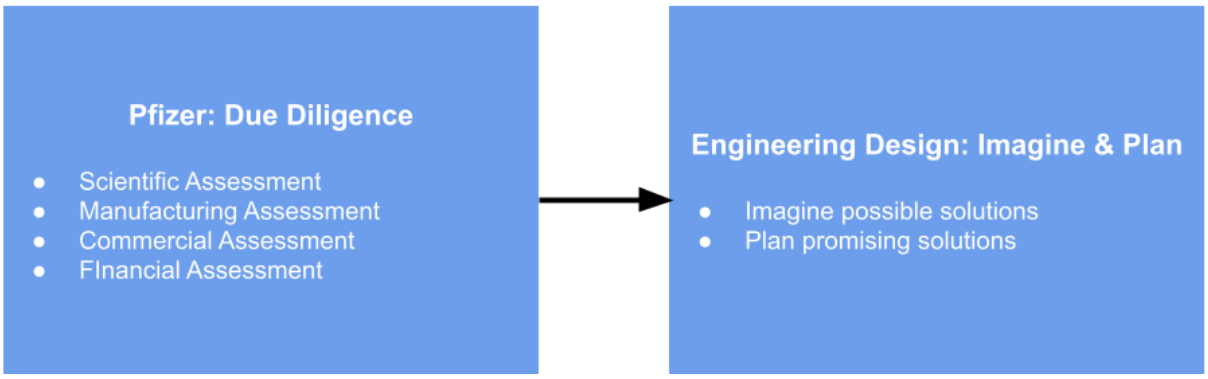
For this year's VEX game, Spin Up, it was critical to analyze the goals of the game we wanted to accomplish. We employed the *Ask* and *Research* steps of the Engineering Design Process. We analyzed the field elements and analyzed each task. Then, our team reviewed important subsystems and how we could employ them. By using this process, we were able to fully understand the issue at hand and begin to research our goal. Pfizer uses its initial review to conduct screenings on potential ideas which take on the role of the research step. They then ask if there is a motive for this goal.



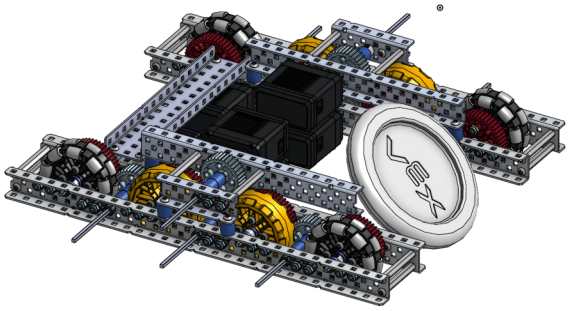
While Pfizer conducts screenings with patients and their company, we conduct a screening with our organization and utilize public sources. Ultimately, Pfizer's Initial Review step embodies the engineering design *Ask* and *Research* steps to an extreme degree.

Due Diligence

Pfizer requires perfection in its products which requires a great deal of planning. To plan accordingly, Pfizer simulates its creation using AspenOne Engineering which allows it to simulate the creation of its medicines and the statistics that come along with it. Similarly, members of our team use Onshape to CAD out our competition robots. Both of these methods fit under the imagine and plan steps of the design process.



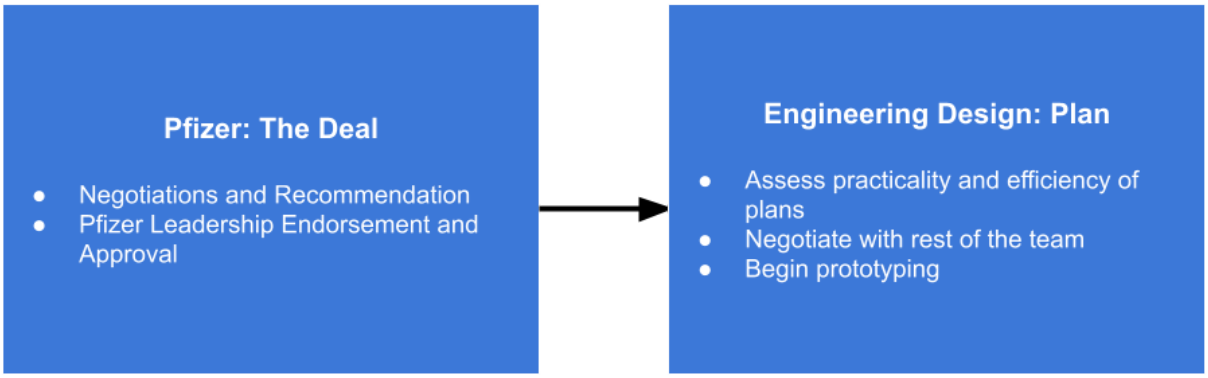
C2C Robotics members make sure to CAD their designs before initiating a build. CAD allows us to anticipate problems we may have and articulate our ideas in digital design. After our plans are fully complete, they are then ready for creation.



62880A V3 Drivetrain made using Onshape

The Deal

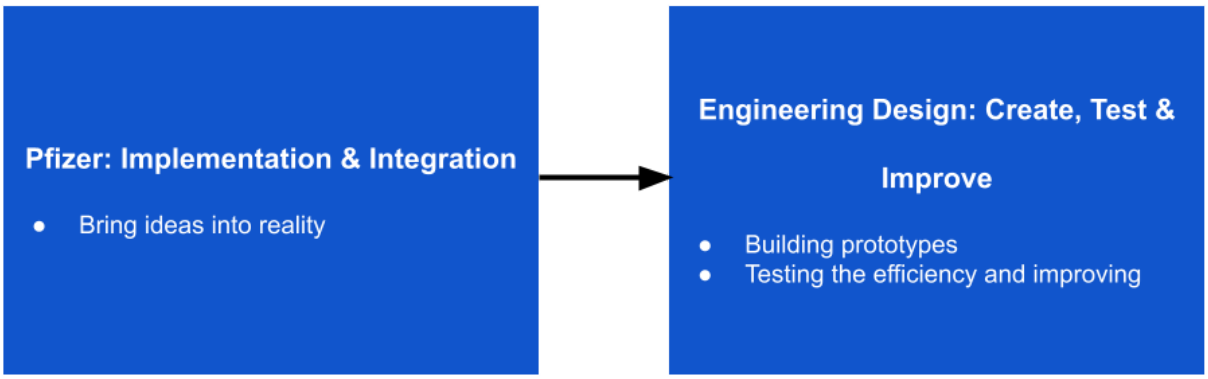
Pfizer continues the planning process by negotiating with its patients and leadership. A deal is organized to ensure that all members of the executing team are aware of the current idea that is being created. Getting recommendations from members of the team also allows all voices of the team to be heard and can contribute ideas that others may not have thought of.



Members of our team also make sure to confirm our ideas with ourselves and our coach. This prevents any surprises that may lead to consequences. After fully planning ideas, both our build and Pfizer's are ready to begin.

Implementation and Integration

Implementation and Integration is the final step in Pfizer's design process. In this step, they will bring their project to completion by creating their product. The team responsible for the physical design fabricates the product and tests its final design. This design will then go through repeated trials to be fixed to perfection.



Our team follows similar steps and builds the prototype created by CAD. After building the prototype, we perform extensive testing on each subsystem of the robot. We created documents detailing the process needed to test each subsystem. If the test fails, we fix our build and test until it is complete. This concludes the design process that brings our ideas to life.

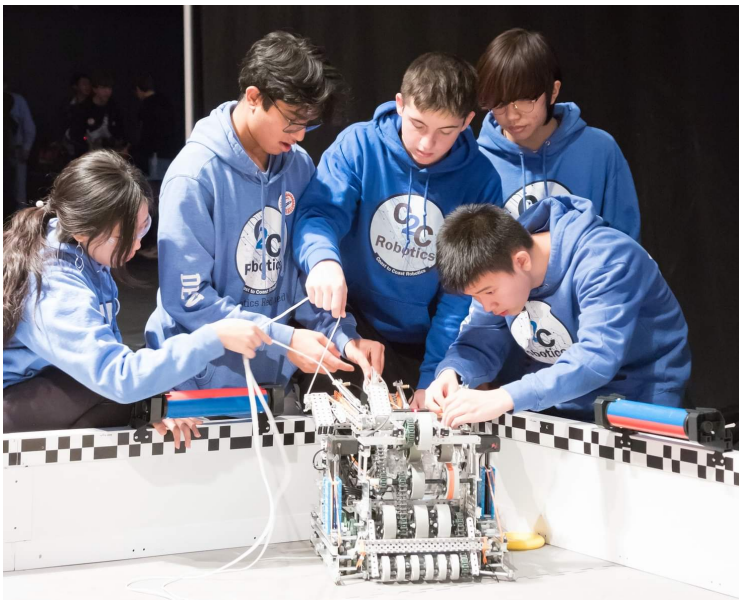
3 | Career Implications

Engineering Design Process

No matter which role you pursue on a VEX team, every job is associated with the Engineering Design Process. VEX familiarizes us with this process, which is used extensively in many different fields of work. Any workplace will require using the design process to accomplish a goal and solve problems.

Working as a Team

To ensure success in VEX robotics, all must be cooperative. VEX teaches us how to work as a team and get through hardships. By relying on the design process, we can hone our skills and maximize our productivity. It has resulted in our team becoming more of a family.



62880A members work together to prepare robot for the following match at WPI (Photo Credits: JHO STUDIO).

Problem-Solving

Participating in VEX robotics introduced us to the design process and dealing with problems daily. By constantly problem-solving and attaining lessons from our coach, we can problem-solve far more efficiently. Additionally, doing VEX teaches us the struggles and importance of repeated trials - and to never give up.

Our team

Our VEX team, 62880A has many commitments associated with joining. Our members are committed to 8+ hours of robotics per week, which requires us to learn time management. We also do volunteer work throughout the season - which gets us more involved within our communities and the VEX robotics community too.

C2C Organization at WPI (Photo Credits: JHO STUDIO)