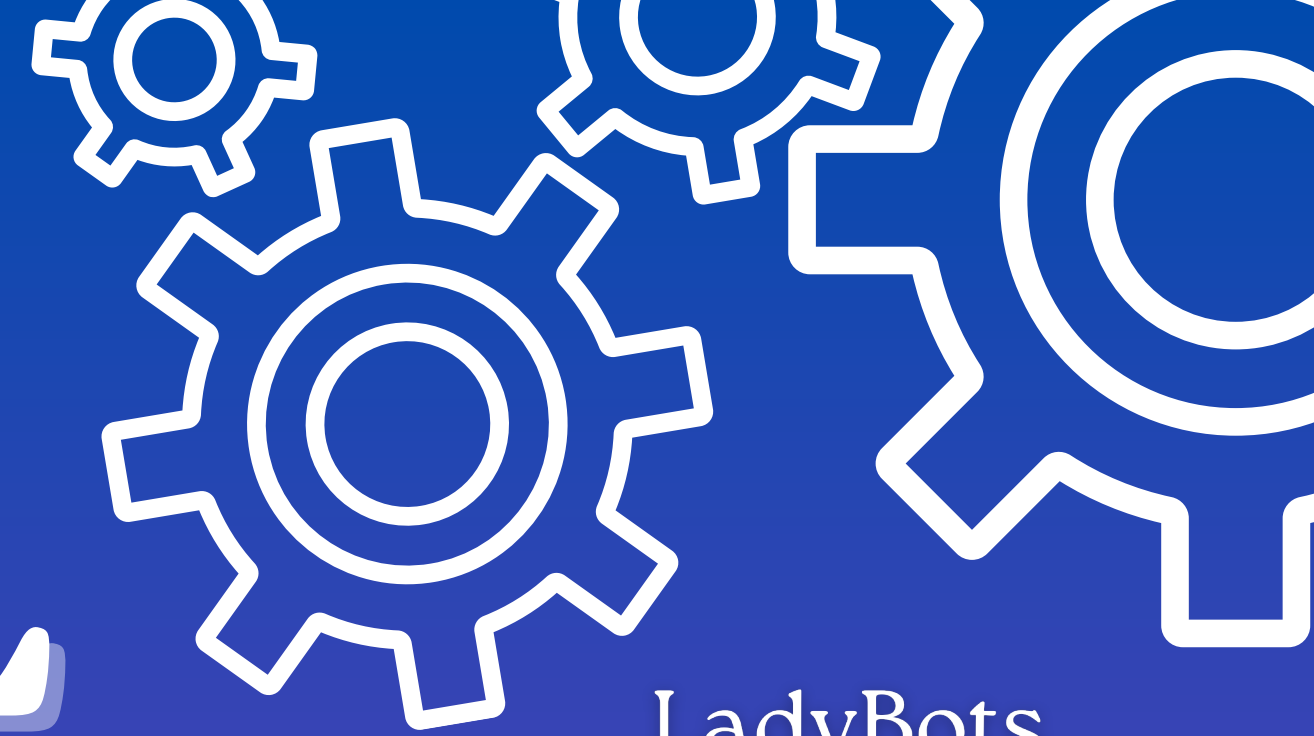


MECHANICAL



LadyBots

Dallas , Texas. USA

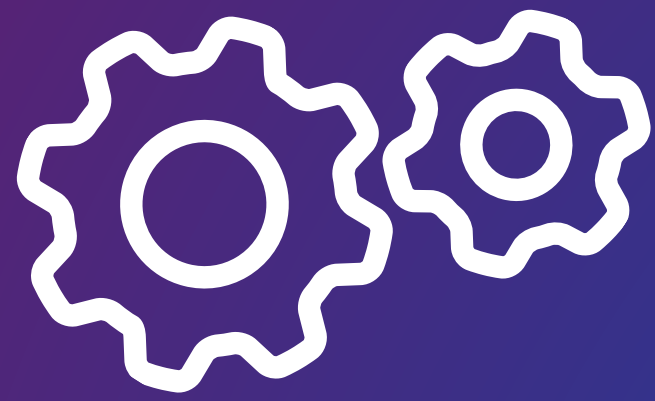
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ENGINEER



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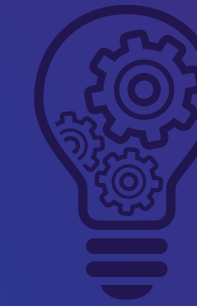
- WHICH STEM CAREER OR COMPANY DID YOU SELECT, AND WHY?
- WHAT IS MECHANICAL ENGINEERING AND WHAT DO MECHANICAL ENGINEERS DO?
- ENGINEERING DESIGN PROCESS FOR A MECHANICAL ENGINEER
- THE LADYBOTS DESIGN CYCLE
- DIFFERENCES & SIMILARITIES BETWEEN DESIGN CYCLES
- HOW HAS PARTICIPATION IN VEX ROBOTICS PREPARED YOU FOR A FUTURE CAREER?



Which STEM career or company did you select, and why?



STEM



STEM is used to create and design different products, and uses science to come up with new & innovative ideas.

The career we chose was a Mechanical Engineer and we chose this career for its similarities with the robotics area. Mechanical Engineering is a study that deals with physical machines that involve force & motion. This is an engineering branch that combines physics and mathematical principles. The assimilation between mechanical engineering and robotics is really just that mechanical engineering deals with manufacturing which involves the design and operations of robots used to assemble parts. Overall, this STEM career is one of the many examples of robotics involving jobs that can really impact and make a change in our world.



GIRL-POWERED

Even though the percentage of females in this field is 9%, overall in the stem field is growing by a 30%. As a female team, we wanted to research a career where there was a lack of female representation.



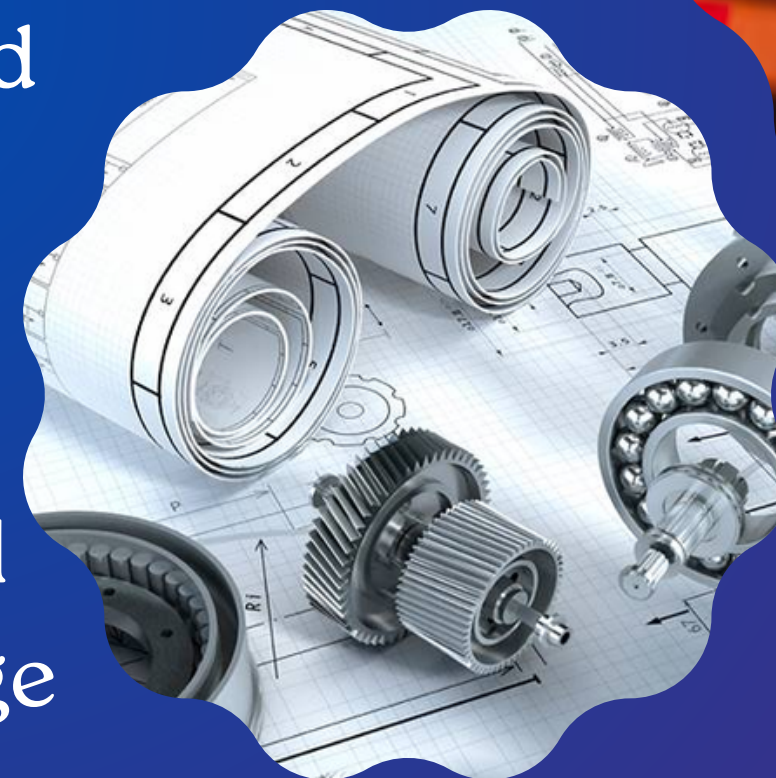
FUTURE

We have concluded that in the future virtual reality, artificial intelligence, and big data will change the way engineers design & develop projects.



What is Mechanical Engineering and what do mechanical engineers do?

Mechanical engineering involves applying principles and problem-solving techniques to design, manufacture, and market objects. It involves analyzing work using motion, energy, and force principles to ensure safe, efficient, and reliable designs. Mechanical engineers create technologies to meet human needs in various fields, including healthcare, energy, transportation, and climate change. Mechanical Engineers have to combine creativity, knowledge and analytical tools to solve a situation or to create something new.



Interview with Ms. Bolaños, an engineer at Tesla in Austin

Emma: “What do you do on a daily basis at work?”

Ms. Bolaños: “I work on Model Y and the cyber truck. The area I focus on is basically the body structure of the car, so the "shape" of the vehicle. So think of fenders, doors, front, sails, etc. But one my big projects is working on the quality of the steel that makes up the cyber truck. So day to day, I'm basically problem solving any quality issues that's happening with my parts. Understanding if it's indeed coming from a supplier and seeing how we can contain it and not allow us to ship vehicles with bad parts. I also do a lot of long term improvements so we have good quality with our suppliers”

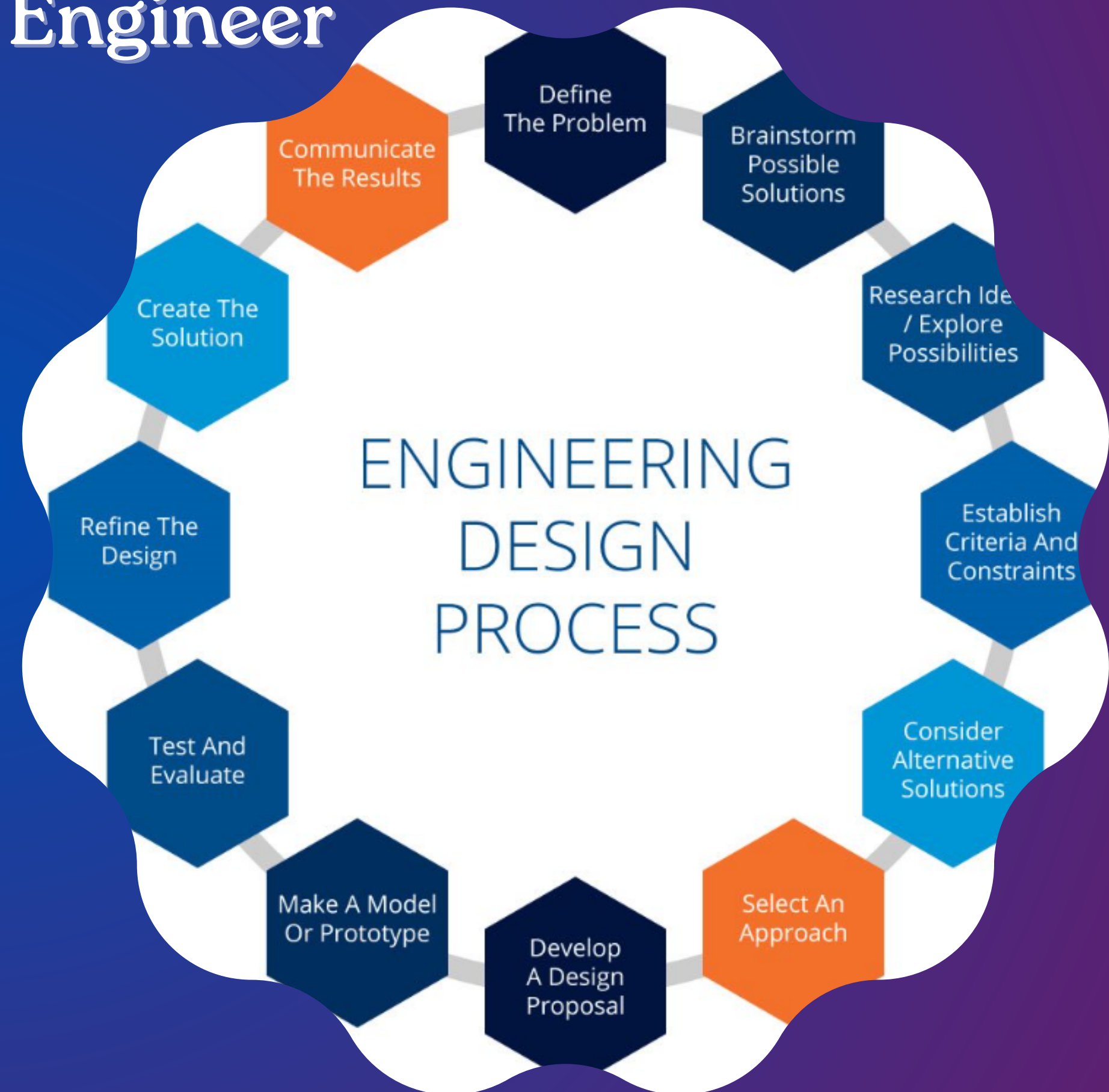


Engineering Design Process for a Mechanical Engineer

The Engineering design process is a very detailed process with the main steps for a design are

- problem definition
- research
- design develop
- evaluate
- refining/fixing
- communicate the results

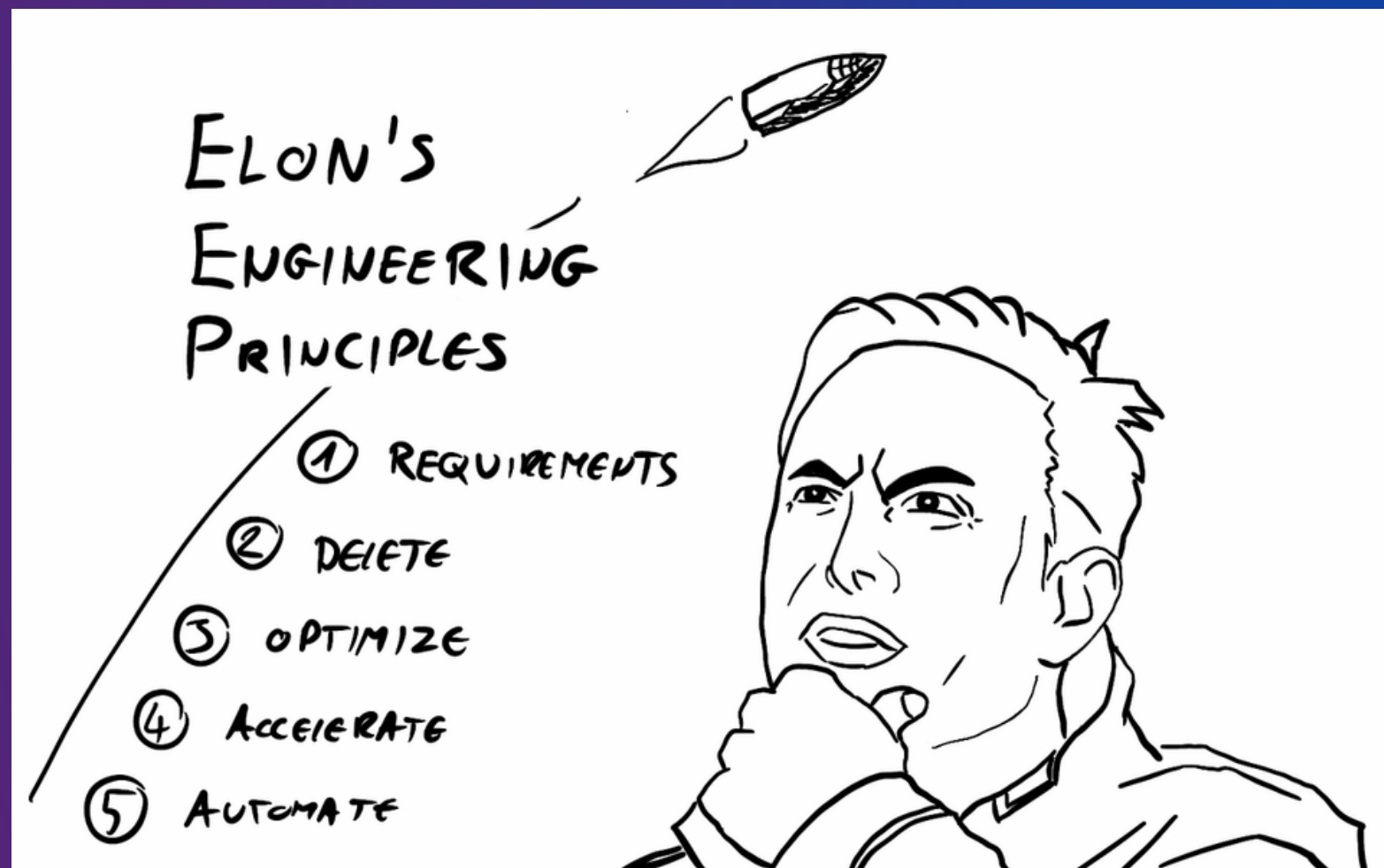
The Engineering design process is similar to ours, when it comes to the research, developing, evaluating & refining. As they use this to test and develop new items, we use it to develop new robots. This design process might be a little more longer or detailed but it's due to the pressure & dedication to each creation they develop.



Interview with Ms. Bolaños, an engineer at Tesla in Austin

Wendy: “How do you use the engineering design cycle at your job?”

Ms. Bolaños: “From my end, just making it simple. A group of people from different departments: design, quality, new product introduction, etc, meet together on what the design should look like for a part then after several discussions they run trials with the supplier to see if it's manufacturable, because sometimes what you design can not be made.”



The Ladybots Design Cycle

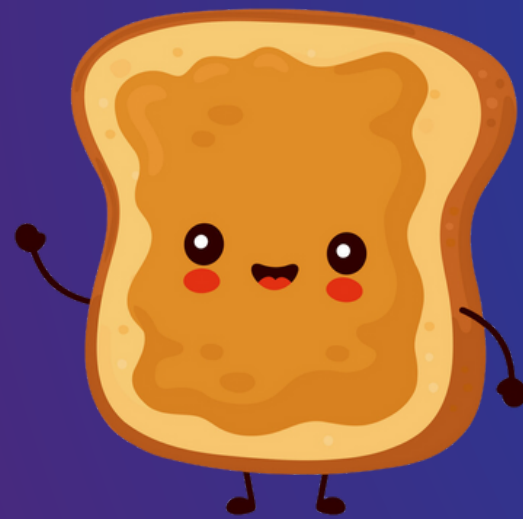


The Ladybots design cycle is very similar to the mechanical engineer design process, we both have the main step which is plan/research, then build/develop, and lastly test/evaluate.



Peanut - Plan

Here we research different ideas using VEX IQ lessons and our best friend YouTube!



Toast - Test

Here we test out the prototypes that we built. This can sometimes be the most frustrating part!!! Or the happiest part when it works!



Butter - Build

Here we begin building our prototypes of what we planned out!



Differences & Similarities between Design Cycles

MECHANICAL ENGINEER

- Consider alternative solutions
- Select and approach
- Design proposal
- Create a solution

BOTH

- define problem
- brainstorm
- research
- design/develop
- test (**LOTS** of testing)
- refine
- results

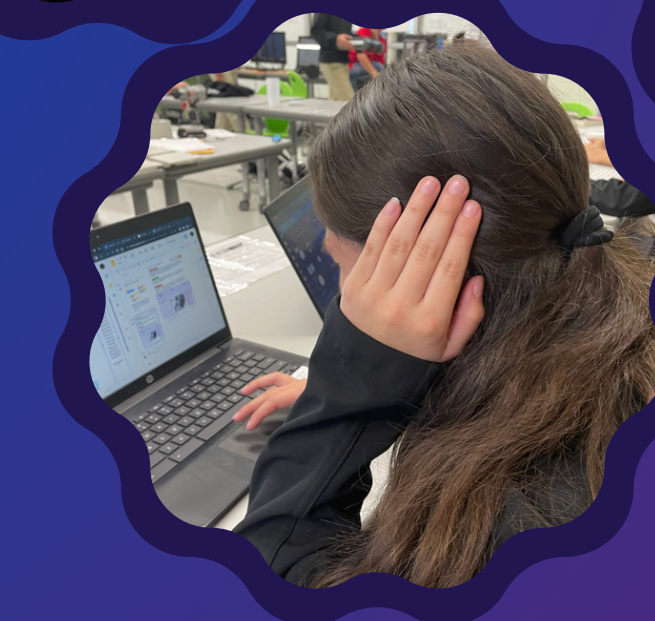
LADYBOTS

- planing
-(research)
- build
-(design/develop)
- test
-(evaluate/refine)



How has participation in VEX Robotics prepared you for a future career?

Our participation in VEX Robotics has shaped our ways of thinking and working for future situations. Robotics is not only the future but also the present, for our generation most future jobs will have to deal with robotics. VEX Robotics makes us familiarize ourselves with this new technology and also teaches us valuable problem solving skills, creativity, teamwork, leadership, dedication, and passion. We feel that VEX Robotics can help us with those skills and also get us starting with the thinking of our future. It also helps us recognize and learn our skills that might help us in our future careers. Overall, VEX Robotics can prepare us for our future careers by teaching valuable character lessons and skills.



As for the competitions...

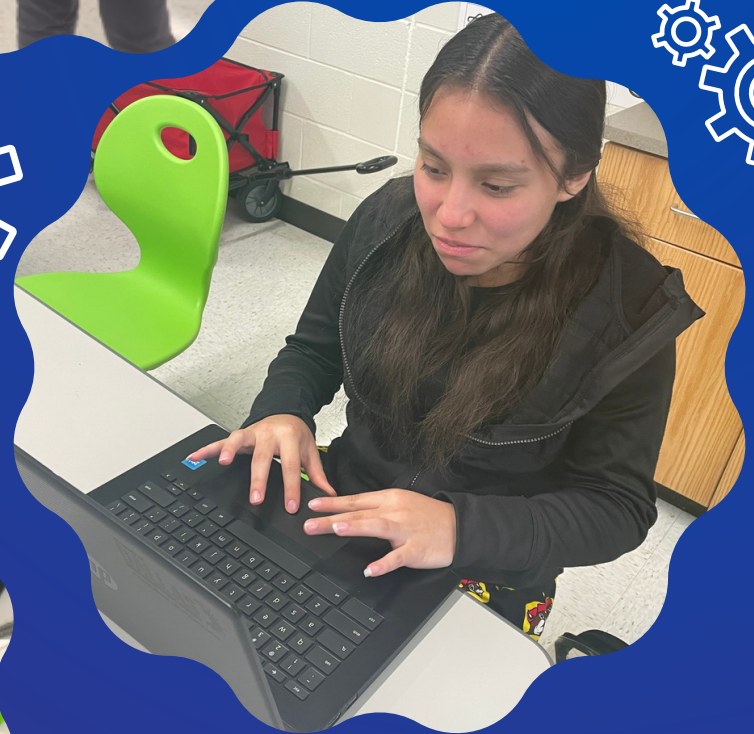
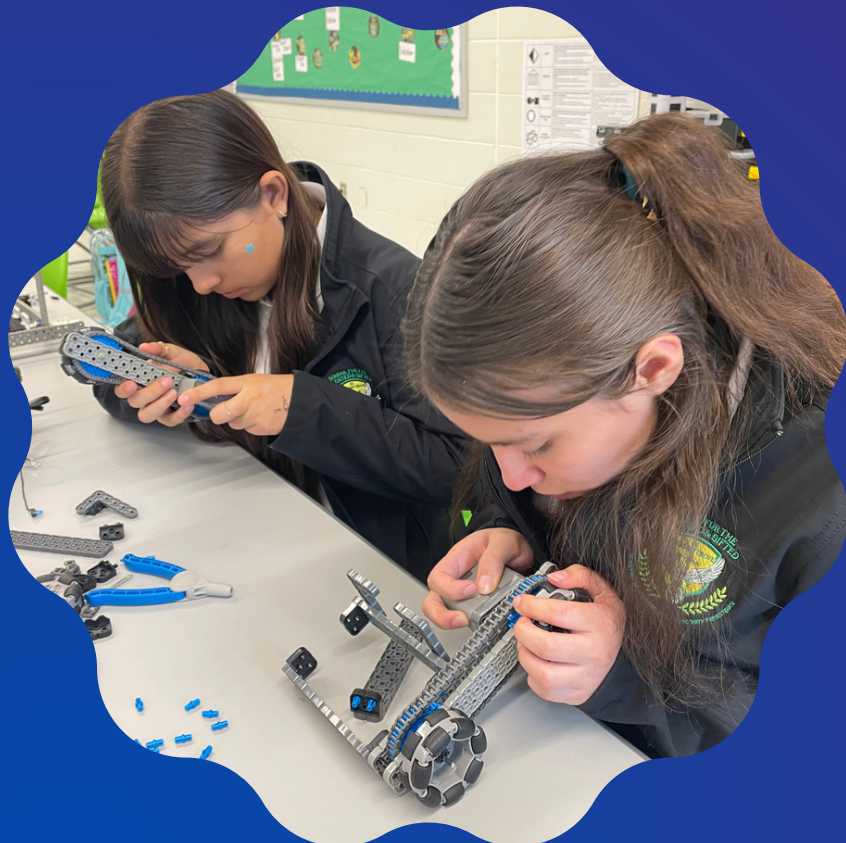
They've prepared us in many similar yet different ways than our team meetings have.

They teach us that sometimes we must take on different roles other than our assigned roles in order to be successful during the competition!

The robotics competitions also teach us how to work with our team but with other teams since we have to collaborate with others especially when strategizing and driving with our alliance.

The robotic competitions not only just teach us how to work more efficiently as a team but also how to work efficiently under pressure. The competitions allow us to learn how to deal with in the moment pressure and how to use our problems solving skills in a moment where the demand is big.





Created by the **LADYBOTS**

Amy, Camila, Cinthia,
Emma, Estrella, Fatima, Nya,
Sarahi, Wendy

Resources:

- INTERVIEW WITH MS. BOLAÑOS AT TESLA

- THE LADYBOTS NOTEBOOK

- <https://docs.google.com/presentation/d/1aN-K9I7K75tp7ovTia4m-V0ndI9TH0P4ktDOwvCWzrk/edit?usp=sharing>

- VEX - EFFECTS IN FUTURE

- <https://www.vexrobotics.com/#:~:text=Beyond%20science%20and%20engineering%20principles,and%20problem%20solving%20among%20groups.>

- MECHANICAL ENGINEER DESIGN PROCESS

- <https://www.twi-global.com/technical-knowledge/faqs/engineering-design-process>

- MECHANICAL ENGINEERING INFO.

- <https://www.mtu.edu/mechanical/engineering/>

- FEMALE EMPLOYMENT IN ENGINEERING CAREERS

- <https://swe.org/research/2023/employment/#:~:text=The%20percentage%20of%20female%20engineers,informati on%20research%20scientists%20are%20women.>