

Rucha Damle & Advika Arya

VEX Career Readiness **Online Challenge 2021-2022**

***The Genius Behind Mercedes-Benz
and Its Applications to VEX Robotics***



Team 97101W

Thing Two
American High School
Fremont, CA

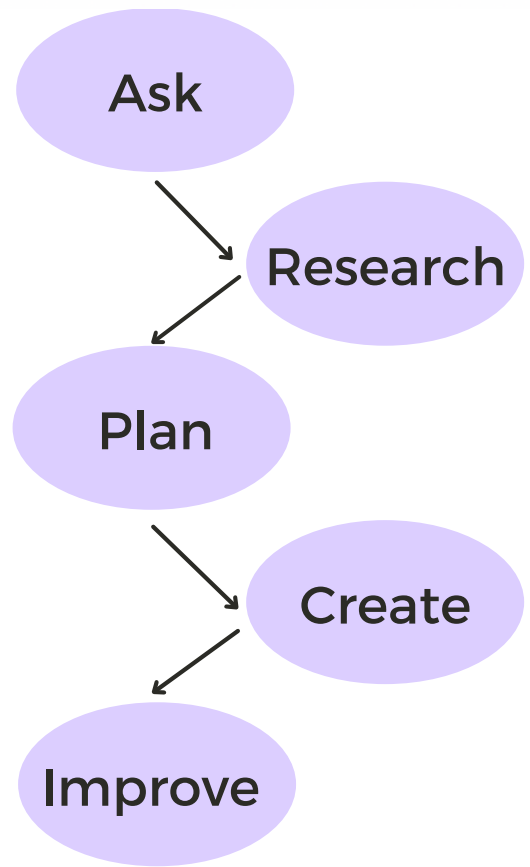
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INTRODUCTION

The engineering process is slowly becoming more ingrained within every career as technology grows to control nearly all professions. In every corner of a job, the engineering process is at play, even if it is not consciously thought of as a “designing process.” Without it, finished products are both harder to create and appear less polished at the end. As such, many large companies that produce technology closely adhere to this process as a way to ensure outstanding quality with a reasonable amount of resources.



WHAT IS THE ENGINEERING DESIGN PROCESS?

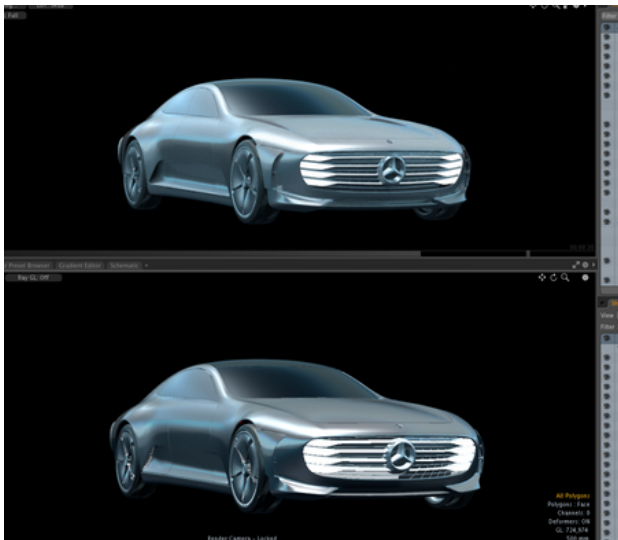
The engineering process begins with asking a question; framing a question in a “how,” “when,” or “what” format allows the rest of the process to become more streamlined and easy. Next, background research is conducted and a proper plan is created. This plan is tested to see if it works, and is then tweaked accordingly.



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MERCEDES BENZ ENGINEERING PROCESS

The most accredited companies around the world use this process to design any new products they come out with. Mercedes-Benz, a luxury car company, has consistently come on top at various car award shows for their impeccable and innovative design, notably in consistently winning the World Luxury Car award in the World Car Awards. These numerous awards are not a fluke, but instead a testament to their excellent design process.



Their process begins by seeking out a problem; this problem is usually about addressing people's needs, like having more efficient or more sturdy cars. The designers create hundreds of 2D designs that are transferred into a 3D design program and are later produced as a 1:4 replication of the design in clay.

While creating these models, lots of research is done on other competing cars and previous models to pinpoint the specific needs of the new design. The designs are diligently looked over by peers for proper feedback throughout the entire process.

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A few of the best designs are recreated as a 1:1 model and are tested in numerous different situations, like different traffic patterns and different weather conditions. The model that is the best throughout all these tests is chosen as the car's first prototype. This prototype goes through more rigorous testing until all the issues are eradicated.



The Mercedes prototype for an electric car

Each test they do incorporates the engineering design process as well; they notice a problem, research why that is, make an action plan, and test and tweak it until it works. This attention to detail and strict quality control has kept Mercedes-Benz at the top of luxury car brands since its inception.



Mercedes car road testing

PROFESSIONAL PROCESS VERSUS TEAM PROCESS



Similarly, when faced with making a new robot from scratch, VEX also uses the design process to streamline everything. In a normal VEX season, students are shown a challenge for which they must make a robot. Our team starts off by brainstorming what we want our robot to be capable of.

This helps us understand what all we want to incorporate into the bot. Sadly, given the constraints provided by the REC foundation, we must narrow this list down to absolutely essential elements required on the robot. Now with a list of prerequisites, we CAD the robot in order to see whether we have a realistic design. After minor adjustments done on CAD, we start to build. In order to maximize efficiency, the builders on the team are split into groups; and each group is allocated a subsystem to work on. Each group is responsible not only for building, but also for checking periodically to make sure the subsystem works. Finally, we assemble the robot and finetune everything everything to make sure it adheres to the rules.

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HOW CAN VEX HELP IN FUTURE CAREERS?

Nevertheless, working in the car industry requires more than just adhering to the guidelines. To be successful, you need to be able to effectively communicate your ideas; a quality that VEX inculcates in you. Robotics students strive to get an award in order to qualify for worlds or states, and in this process put in a lot of effort for interviews. Almost all teams prepare answers beforehand and some even go to the length of making a presentation. Unknowingly, many students are enhancing their speaking skills, a skill vital to excel in any job.



Moreover, VEX requires working in a group, which introduces many to teamwork. Students learn how to articulate their ideas without coming off as arrogant and also get a taste of how working life is. It also provides students the opportunity to take on a leadership role within the team- which teaches them how to balance work and friendships.

Students are also introduced to harsh deadlines, and with more workload, must manage their time wisely.

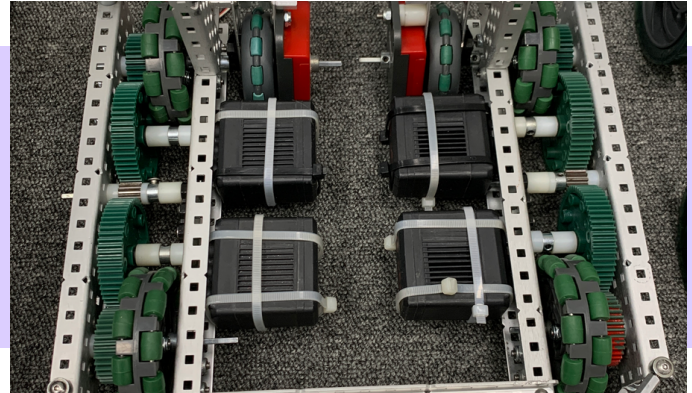
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However, the similarities between VEX and cars don't stop there. In fact, the chassis, or base, of both a car and robot are the same. In a car, the chassis is what supports all the other mechanisms and bears most of the weight. In a robot, the function is the same; but the scale is much smaller.



Car chassis



Robot chassis

Other similarities stem from common materials being used; such as worn-out axles. Due to crashes, they are often damaged. In VEX robotics, robots often ram into each other, which leads to many axles getting damaged. However, the ramifications are much bigger. Axles help gears mesh, which in turn powers most of the mechanisms in VEX. In a car, the function of an axle is the same, meaning that a car is rendered nearly useless if the axles are damaged.

Unfortunately, there is only one solution to fix damaged axles: to replace them. These common materials allow former VEX members to make connections and draw conclusions based on their previous experience using similar tools.



Car axle

For many, VEX starts off as “just an activity” that few think will impact their lives. But over time, it becomes much more than just an extracurricular and shapes peoples' personalities.

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