NASA

National Aeronautics and Space Administration

Engineering/Design Process

65018B - "Nameless"

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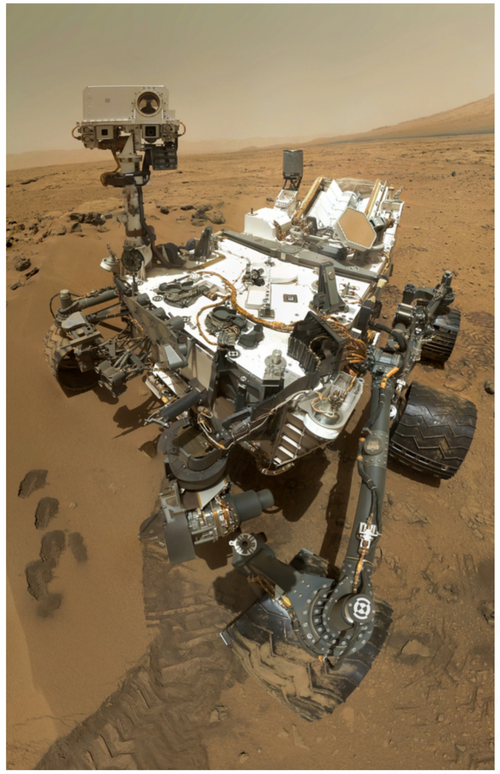
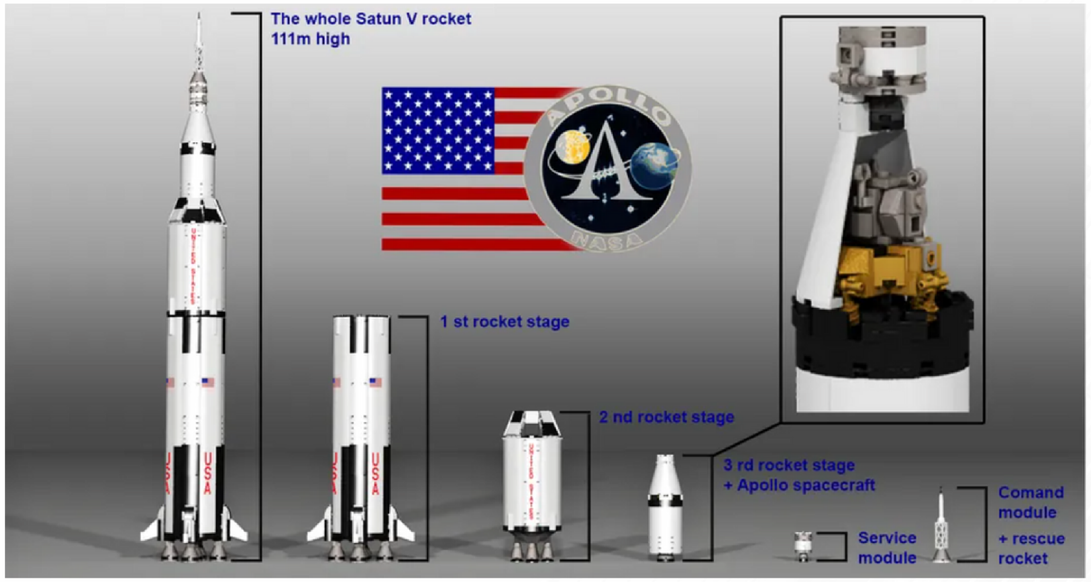
Innovagine Robotics





INTRODUCTION -

WHY THIS COMPANY?

NASA is one of the most important companies in the world. It has been known to have made some of the most impressive designs in history. For example, Apollo 11 became the most famous design of all space missions, being the first to land a human on an extraterrestrial body, and there are much more inventions that made a big impact in our world today. Without NASA, our generation wouldn't be at the stage we are at today.

NASA strengthens our economy, improves life, fosters American innovation, Builds bridges, inspires our world. NASA’s unique mission provides benefits in big and small ways. Dollars spent for space exploration create jobs, jumpstart businesses, and grow the economy. Our innovations improve daily life, advance medical research, support disaster response, and more. We're constantly evolving and finding new ways to add value.

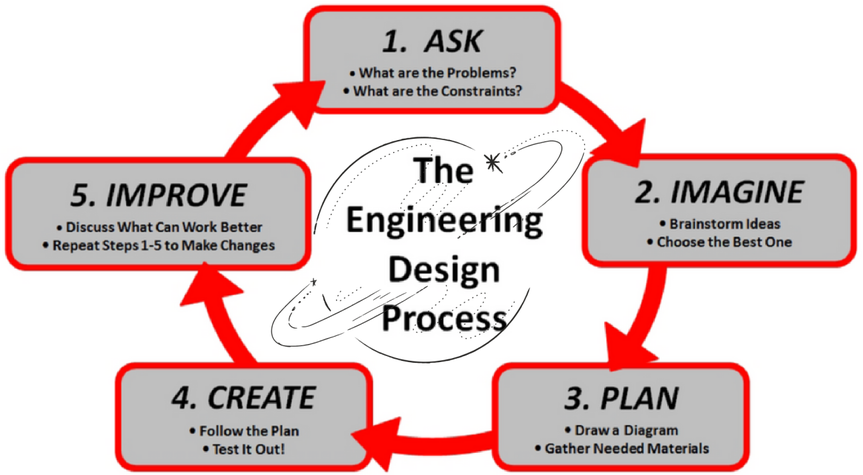
NASA ensures inventions for space find practical uses closer to home. They often become solutions to different challenges – ones we didn’t set out to solve. The International Space Station has led to many spinoffs and facilitated numerous technological and scientific advancements. Research in space helps improve health on Earth, from understanding bone loss to developing vaccines to improving eye surgery.

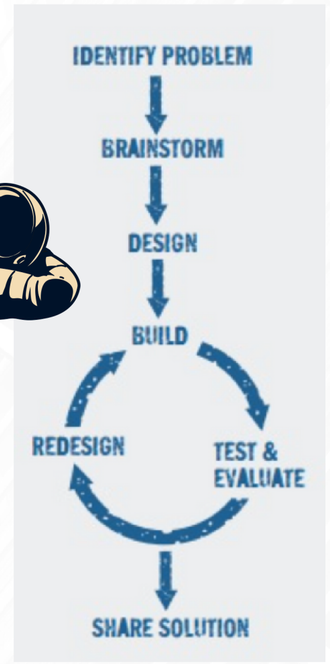
Using the space station and NASA satellites, we study Earth from space. NASA data helps predict the weather, monitor natural disasters like hurricanes and wildfires, and study long-term climate trends.

Our lives couldn't be at the level of where we are now if it weren't for NASA, and our team discussed and found NASA as one of the most interesting topic to learn and research more about. It gives us an overview of what created the world we live in now, and how the design process of NASA works, resulting in the amazing inventions that continue to impress us everyday.

THE DESIGN PROCESS

- **ASK:** Identify the problem, requirements that must be met, and constraints that must be considered.
- **IMAGINE:** Brainstorm solutions and research ideas. They also identify what others have done.
- **PLAN:** Choose two to three of the best ideas from their brainstormed list and sketch possible designs, ultimately choosing a single design to prototype.
- **CREATE:** Build a working model, or prototype, that aligns with design requirements and that is within design constraints.
- **TEST:** Evaluate the solution through testing; they collect and analyze data; they summarize strengths and weaknesses of their design that were revealed during testing.
- **IMPROVE:** Based on the results of their tests, students make improvements on their design. They also identify changes they will make and justify their revisions.



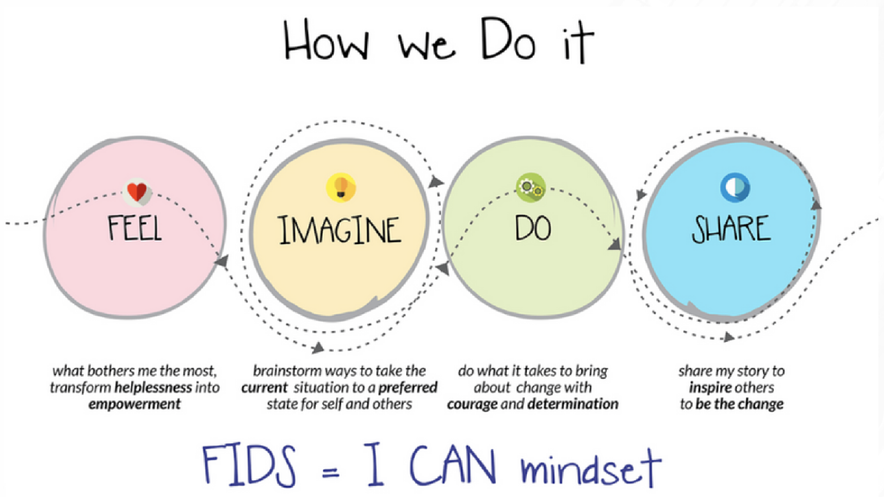


ASK

NASA scientists begin their engineering process with identifying the problem, and discussing the requirements or constraints needed to be met. This process is important because designing a product involves understanding your problem and its needs to create a meaningful and relevant experience. Defining the design problem way before generating potential solutions is crucial in the design process as it allows design teams to develop user-centered solutions that are achievable.

Similarly, our team begins our design process with analyzing the field, figuring out its difficulties and simplicities. For example, this years challenge presents a field with multiple dispensers spread amongst the course, taking up a large portion of the space we get for our robot to travel around in. For this reason, our team discussed and agreed on designing a robot that is not too large in size, but can achieve all dispensers. At the same time, the design should be fast and easily controlled to ensure a complete result of attempting all dispensers.

IMAGINE + PLAN



NASA scientists continue brainstorming for ideas, they imagine for any possible solutions to the problem they are trying to solve. Examples of this could be by creating models of smaller and more generalized forms of the design, or imagining a specific design that could meet all criteria's for the designated field/topic. Once an idea is formed, scientists begin planning the way their design is going to perform, before creating the actual design. By doing so, it gives a barrier for scientists to figure out if there are any problems.

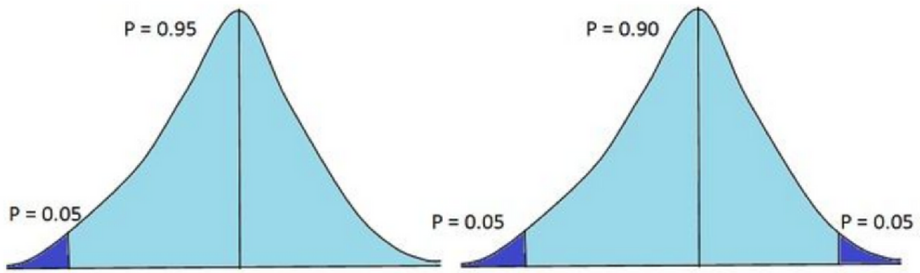
This is both different and similar to our teams engineering process because our team always takes the time to think through about our design before creating it. But at the same time, we don't create any models or actually spent a period of time imagining the way our design will fit onto the project. In the sense of planning our of design, it is more like a general understanding and image of what the complete design will look like in our head, going through lists of different designs.

CREATE

Next, one of the most important parts of NASA's designing process is to create the planned out design, which is agreed on after thoughtful discussions. Scientists take time designing and building each individual parts of the robot, and later piece them together to form the complete design.

Similarly, the way our team thinks is almost identical to NASA's creating/designing process. We build many of our parts separately before combining them together as a whole. For example, our team split into different roles and parts and design/create different/individual parts, later piecing them together. One team might be taking on the role to design the driving base, and the other to design the yellow dispenser collecting device.

TEST + IMPROVE



One-tailed Test Vs Two-tailed Test

The last step that Scientists take on in the field of NASA is to test their design before putting the invention to an actual test. Scientists test their completed design over and over multiple times to maintain a correct accuracy level. By doing this, if any problems occur, it is also easier for them to improve the design now than when the invention is set into space.

While our team doesn't require to test our design multiple times before putting it to the actual test, we do the testing process while practicing, which also is why it relates to the process of testing + improving similar to NASA's process. While practicing, our members might notice any malfunctions or places required to be modified. Thus, we can improve our design better and better everyday, until we reach the desired completion, is when we will put the design to the actual test.

CONCLUSION -

HOW CAN VEX PREPARE US FOR FUTURE CAREER?

VEX Robotics is educational robotics for everyone. VEX solutions span all levels of both formal and informal education with accessible, scalable, and affordable solutions. Beyond science and engineering principles, VEX encourages creativity, teamwork, leadership, and problem solving among groups. For these reasons, VEX can and will prepare many for their future careers.

Not only that, being able to learn about the many amazing things about VEX, gives students the knowledge of future event. Especially now that robots and technology is taking over our generation. It is important and useful for future generations to learn about basic information of VEX.

VEX® ROBOTICS

THANK YOU

Source Cited:
https://keydifferences.com/difference-between-one-tailed-and-two-tailed-test.html