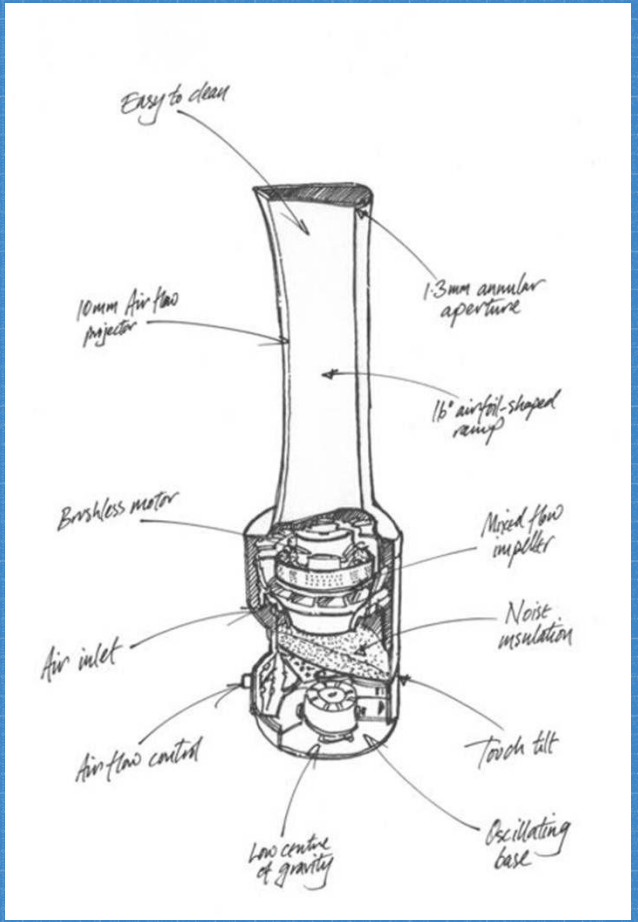
Dyson: Blowing Past the Design Process

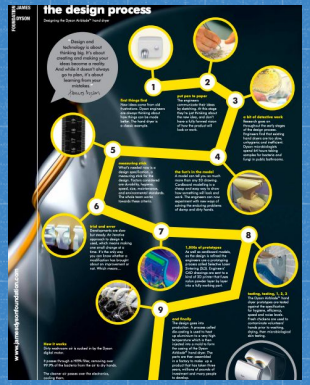


Dyson, a British technology company established in 1991 by James Dyson in the United Kingdom. Best known for its famed brand of industry-best vacuum cleaners, Dyson also sells award-winning hand dryers, bladeless fans, heaters, and hair dryers. The company designs and manufactures innovative household appliances.

WHY DYSON?

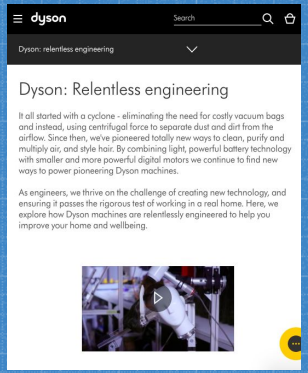
Our team wanted to find a connection between VEX robotics and a daily appliance. When we crossed upon a store with the world-renown brand, Dyson, we wanted to explore and develop a deeper understanding of how their products are made. Even when considering other companies, we researched more about James Dyson, founder of Dyson, and noticed his efforts to push boundaries of what house appliances could do. His motivated mindset inspired us to learn more about the design process in his company.

Findings:



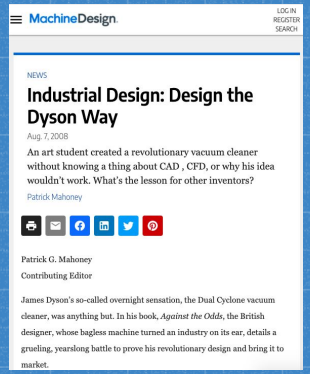
The James Dyson Foundation created a poster containing a step-by-step illustration of how they designed the Dyson Airblade hand dryer.

https://media.dyson.com/downloads/JDFUS/Poster_2_How.pdf.



On the Dyson website, they state their methods of engineering and design. Then they discuss how they relentlessly test and research to ensure they work efficiently and effectively.

https://www.dyson.com/newsroom/overview/features/dyson-relentless-engineerin.



Machine Design wrote about designing “the Dyson way,” how art students created a revolutionary vacuum cleaner without prior experience in design. They also explains their attitude and approach to designing and engineering at Dyson.

https://www.machinedesign.com/news/article/21817656/industrial-design-design-the-dyson-way.

Another resource by the James Dyson foundation is this case study explaining the design process of the Dyson Supersonic Hairdryer.

https://www.jamesdysonfoundation.com/content/dam/pdf/Standalone_DesignProcess.pdf.

Dyson’s Engineering Design Process:

When professionals at Dyson begin designing a product, they follow a set of stages in the design process: Specify, Plan, Design, Build, Test, Analyze. The process is iterative and non-linear.

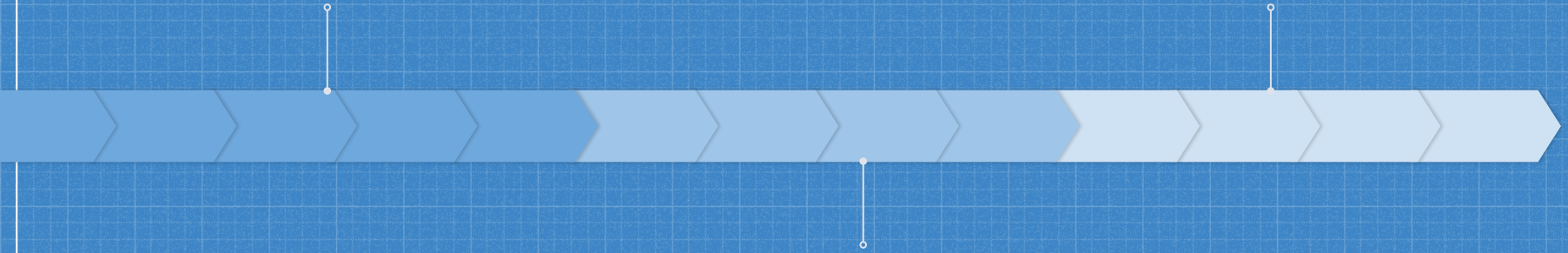
PLAN: When designing a product, Dyson runs a tight schedule. Even while going through the design process, the stages won’t be set as the ideas would have to be prototyped, tested, and modified again. But maintaining project milestones would help the professionals stay on schedule.

SPECIFY: The process of design begins with a broad idea, a list of requirements is then compiled, forming specifications of the product. The Dyson company follows certain key criteria and constraints that can be remembered with the acronym “ACCESS FM.” Aesthetics (How a product looks, feels, etc.), Cost, Customer, Environment, Safety, Size, Functions, Material.

DESIGN: Designs are constantly getting changed and tweaked, but the Engineers at Dyson work in teams. It allows more creative solutions as they constantly challenge each other to improve their designs. All designs are taken down, and it is established that no ideas are wrong. The next step is to create a rough sketch, some sort of 2D design to communicate the complex idea. It also assists the Engineers to visualize the rough layout of their design/product.

BUILD: From the 2D designs, the Engineers started to create cheap 3D prototypes to ensure the mechanisms work, and help them model functions quickly. They then move on to CAD which then will be sent to a 3D printer. Once completed, they will assemble the pieces from the printer with motors and electronics to become fully functioning machines.

ANALYZE: After the tiresome repetition of the design process, when the engineers are content with their design, the product will move on to manufacture. The first runs will go through intensive testing to make sure that the material and molding meet the design specifications and that the product will last a lifetime. The design might meet some challenges and failures in this stage, but engineers will take this as an opportunity to improve and make their machines better.

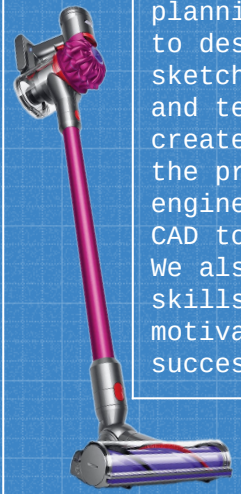


TEST: Testing is how the engineers find out whether their product works or not. They typically test it to destruction to make certain that the machine can fulfill design specifications. After the design is tested, the process repeats again. The Engineers will redesign, rebuild, and test it again and again to create the best product possible.

Professional vs. Teams Approach To Engineer And Design

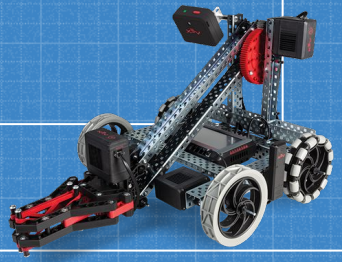
SIMILARITIES

When comparing the design processes, we noticed a lot of similarities between how the professionals at Dyson and our team follow a design process. We have similar stages when designing: our team starts with planning how our season will go, then move to designing the robot on paper and sketching it out. We then would try building and testing the ideas out, analyze what we created then modify the design and repeat the process again. Similar to Dyson’s engineering process, we use 2D designs and CAD to help ideate and visualize our ideas. We also rely heavily on our collaboration skills, we challenge each other’s ideas and motivate each other so that we can create a successful robot.



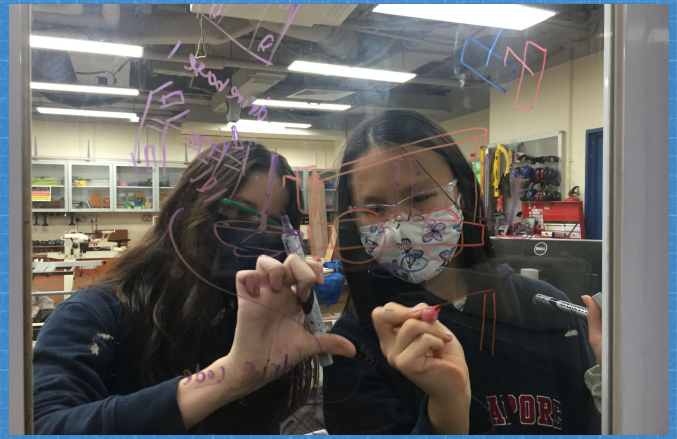
DIFFERENCES

The professional approach to engineering design differs from what our team does because our goal is different. In Dyson’s design process, they need to focus on specifications about their product because they need to market their product and think about consumers and manufacturing costs. Whilst in our team we focused on how to win points for the competition. This is why our approaches to engineering design are different as we have different end goals.



How VEX Robotics Helps:

There were many similarities between VEX robotics and how the engineers at Dyson create products. This shows that participation in VEX robotics can prepare us for a future career. VEX robotics has given us many opportunities to explore and understand how to design and create a robot, it was a hands-on experience that allowed us to get a better grasp of an engineer and design process. We learned the importance of trial error and how to improve from our mistakes. VEX Robotics prepares us as we learn real-world skills, we learn to collaborate well with others, how to communicate our innovative ideas and more. After analyzing how the Dyson engineers design their products, we notice how our ideating processes are similar and how we can apply what we've learned in robotics to a career in the outside world.



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