**Computer Hardware Engineering**

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

This was the career we chose because we feel it relates a lot to what we do in robotics

**What resources did you find to learn about professionals in this career or company and how they use the engineering design process?**

* <https://www.bls.gov/ooh/architecture-and-engineering/computer-hardware-engineers.htm>
* <https://www.computerscience.org/careers/computer-hardware-engineer/>
* <https://www.wvu.edu/academics/careers/computer-hardware-engineers>
* <https://www.hwe.design/system-testing>
* <https://tech.co/news/prototype-hardware-startups-2015-02>
* <https://www.twi-global.com/technical-knowledge/faqs/engineering-design-process#:~:text=The%20engineering%20design%20process%20is,%2C%20prototyping%2C%20testing%20and%20evaluation>.

**How do professionals in this career or company apply steps of the engineering design process?**

Step 1: Define

* As with anything else, to start something you first need to figure out what you need to accomplish. This applies to anything.

Step 2: Ask

* They work with computer companies, component manufacturers, research organizations, and government agencies when doing projects so to be successful they all have to collaborate which include asking each other questions on how to improve or if they need help.

Step 3: Imagine

* Discuss any and all ideas with other co-workers

Step 4: Plan

* Research ideas and look at your past projects to try to avoid making the same mistakes you have made in the past. Communicate with users and customers to hear some solutions you may have not thought of.

Step 5: Prototype

The Electronics

* Step 1: Create schematic. This is a blueprint like drawing, this provides all of the necessary details to build the electronic
* Step 2: Create an intermediate prototype. This part is optional, you may not want to depending on your project and or budget
* Step 3: Create the printed circuit board layout
* Step 4: Electronics fabrication.

The Plastics- Step 1: Create a 3D model. Step 2: 3D printing.

Step 6: Test

* Bring on- Electrical engineers makes sure the device has the correct components mounted with the right orientation on the printed circuit board
* Validation- Ensures long term reliability of the electrical system. Electrical engineers, Power engineers, and thermal engineers all work together on this.
* Compliance testing- Safety tests are done on the part to make sure its ok to be sold in market. The electrical engineers work with a compliance team to adjust the design to make sure all the safety limits are met.

Step 7: Improve

* They identify what went wrong when testing said prototype which can lead to more prototypes being made until they are happy with the results

**How does the professional approach to engineering design match or differ from the approach used by your team?**

Both computer hardware engineers and our robotics team have multiple things in common like using the engineering design process, using problem solving and communication skills, creativity, and both being very competitive. Yet you always have to consider that we are working on two different things, therefor we are going to have two different though processes and working though things differently from each other

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

Vex has teaches you so many life skills to help prepare you for your future career. You learn communication by working with a team to accomplish a goal. Problem solving skills when working at any of the tasks that are required to get an end result your happy with. You learn the engineering design process by planning with your team on how to make your robot the best it can be.

**How does their engineering process compare to the team’s process?**

We are creating 2 separate things so our thought process is going to be different. We are designing a robot for the use of competing against other robots while they are manufacturing and designing parts for computers. Those 2 things have many differences when it comes to the engineering design process.

