

STEM Career Challenge:
An Exploration of Helm Tools

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[Images](#)

As part of the career readiness challenge we chose to tour Helm tool company, a local toolmaking and plastic injection molding company. There were not a lot of companies that allowed sixth graders to tour them, so we reached out to [GCAMP](#), a foundation that helps connect students and companies. None of us had been inside of a manufacturing company so we were excited to see what it was like.

Plastic Injection Molding

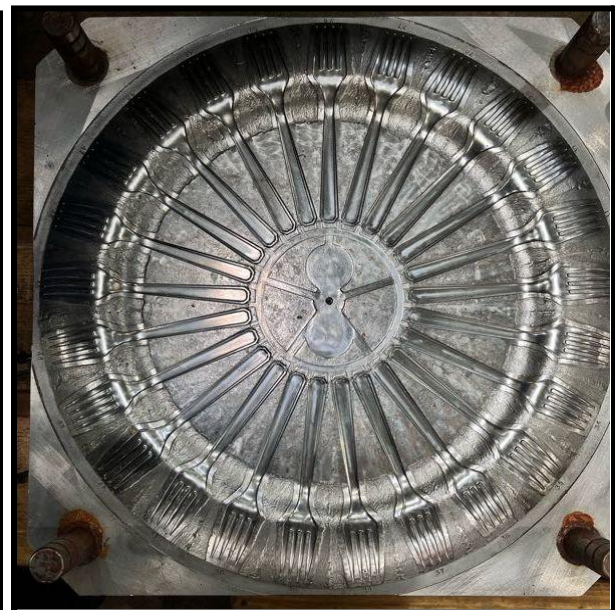
Since we did not know the process of injection molding we did research and watched a [video](#) that our GCAMP contact so kindly sent us. We learnt very interesting facts about plastic injection molding in the video. Since plastic is a bad conductor of heat, the plastic in the center of the core was hard to melt. This problem was solved by pioneers of plastic injection molding by introducing a reciprocating screw. We also learnt how molten plastic is injected to the molds and air is pushed out from vents. The plastic product is then cooled and ejected with ejector pins. We also learnt that the angle at which the product is pushed out is very important. Products that hug the mold at right angles are very hard to get off the mold. Using different angles though makes it easier to eject the product from its mold.

Exploration of Helm Tools Company

The tour of Helm tools company was led by the founder/president of the company. We saw that the company was divided into three sections. The first section was where molds were manufactured. Here we were shown the process of turning a steel block into a mold.



Steel blocks used to make molds.

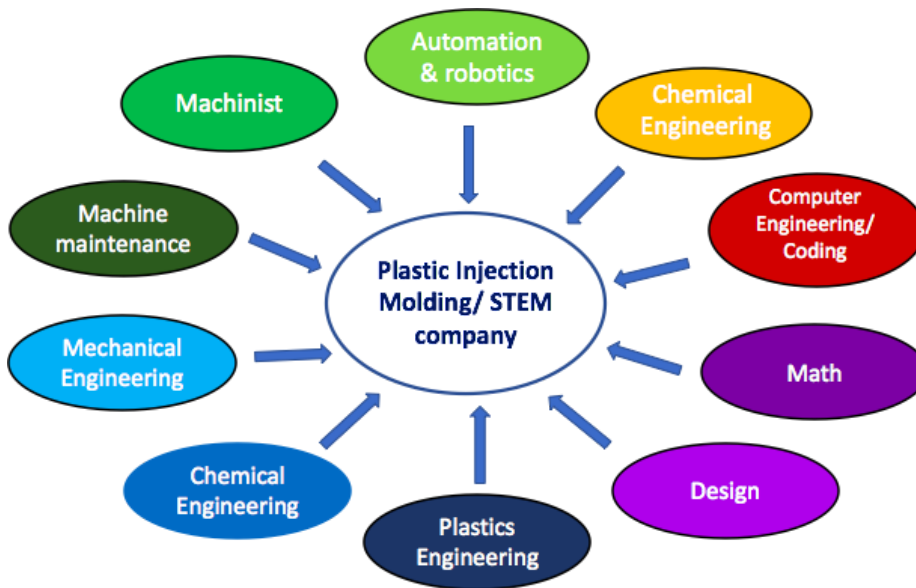


A mold for making forks by plastic injection molding

There were metal cutting, drilling/milling, and CNC machines (CNC machines are computer operated). This was also the place where they created prototypes, tested the molds and added final touches. In the second part of the company we saw the manufacturing of plastic utensils. We also noticed how quick and efficient the process of manufacturing was and were told how traditional plastics are easier to produce and cheaper to make than biodegradable plastics. The third part of the company packaged and shipped their products. The company also collects metal scraps for recycling.

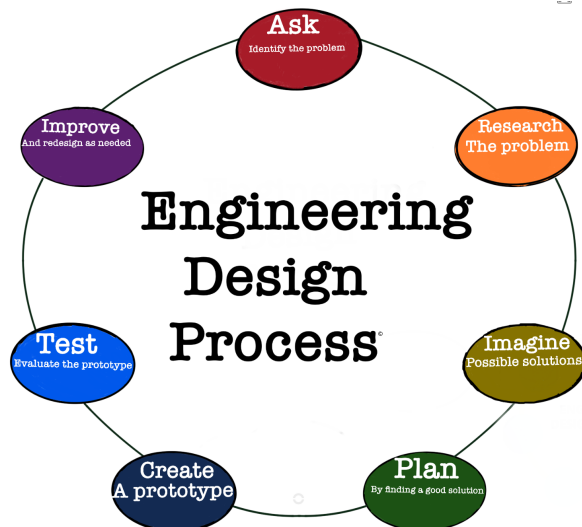


When we were on the tour we also learnt that there were various roles that go into running a company. There are different pathways that one can take to be in a STEM career. For example, to work in a plastic injection molding company. You could be a computer programmer, an engineer or expert at machine maintenance etc.



Different pathways can take you to a career in STEM

In various ways our engineering and design process is similar and different from Helm tools. For our VEX team we learn mostly by trial and error. Our building blocks are easy to take apart and put back together, but for Helm Tools the process of making molds is too expensive and requires too much effort, for mistakes. They make detailed schematics to make the steel into a mold. Meanwhile our team



builds first, tests what we build, then makes a drawing of what we built. Our drawings are not as detailed as the ones we saw at the company. Both the company and my team make tweaks to what we're building to make them better. For us we may add some supports to make sure that our robot is stable or add guard rails to align our robot with the tower. For Helm they use laser cutters to make an edge sharper, or use drills of different sizes to smooth out edges.

At Helm Tools, steel is used to make molds, which is expensive, hard to cut and too much effort goes into each mold. So, starting out they made very detailed blueprints and tweaked only a little bit if it didn't work. Our group is more hands-on and plans a little then attempts and repeats that process. Like we said before we work in very different ways because Helm Tools has very expensive equipment and needs to be very precise. Another difference is in Helm Tools each person has a dedicated role they are supposed to work on and they are experts in their role. In VEX, we switch around in the positions and try different roles like designing, building or coding, so we are comfortable in all areas and learn all. We don't get everything right in the first place but we keep trying new things to overcome those impediments and keep going.

VEX Robotics and Career Readiness

Working in VEX robotics is preparing us for our future career in many different ways. In robotics we learn to troubleshoot and problem solve. This is something you need to do all the time in real life situations. It also teaches us to brainstorm, share our ideas and collaborate. Being able to cooperate with other people is a skill you need to work in groups. It is required to work in big teams and solve big problems. Considering other people's opinions is equally important too otherwise it prevents everyone from helping each other fix things. It is important to be receptive to other people's ideas and be inclusive. We are a diverse team and try to consider everyone's ideas as we work together.

We learnt that there are many different pathways to be able to work in manufacturing/tool making/ STEM companies. By doing VEX we are learning important skills like coding, building, design

VEX Robotics

Problem solve

No be discouraged by things not working right away

Keep trying to make the design better

Collaborate/ work as a team

Learn from each other

Design, build, coding and math

Organization Skills

and math all of which are needed for the foundation of a STEM career. We need to be able to program (the machines), build (making molds), and cooperate with other people. In sorting and storing the various parts we use to build the robot, we are learning organization as well.

Being in VEX teaches us to be flexible and work around obstacles, just like in reality. Also you have to be able to build and apply your knowledge of tools and pieces to your work. Another similarity is we build with what we have and try to improve.



Our VEX team with the president of Helm tools.

Acknowledgements:

[Helm tool company](#) for the opportunity to tour

[GCAMP Foundation](#) for arranging the tour

Resources:

[How Injection molding works?](#)