Career Readiness: With Eriez Magnetics
From Cow Feed to Vex Robotics

56238A

Harbor Creek School District

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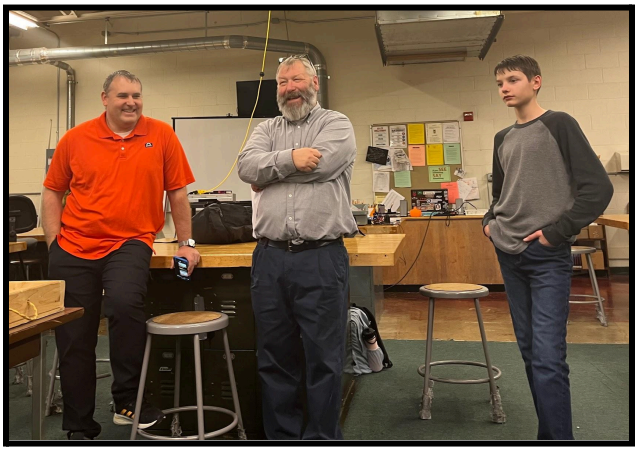
Special thanks too: Charles Mitchell and Brad Galloway

Why did we choose Eriez?

We chose Eriez mainly for the easy access to a well-known local company. Eriez Magnetics is known as the “Global leader in separation technologies.”

They were established in 1942, by O. F. Merwin. This company has 12 manufacturing plants and has a presence on 6 continents. The coolest part is that their headquarters is right here in our hometown of Erie, PA. This company has done a lot for the manufacturing world. One of our members' dad works there, so she was able to talk to him and get an engineer to come in and speak to us. We had two visits by a Mechanical engineer named Brad Galloway. Mr. Galloway taught us about the engineering design process, and how we can implement it into our engineering notebook.



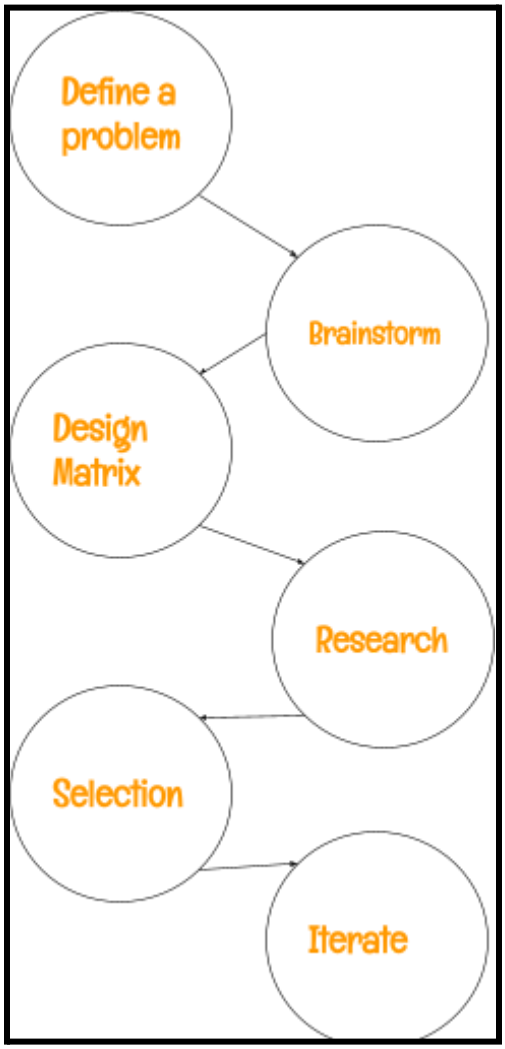
L-R Mr. Galloway (Eriez engineer), Mr. Knox (coach), and Liam Ferrick (team member)

Process

The process Eriez uses and Mr. Galloway presented to us
is as follows:

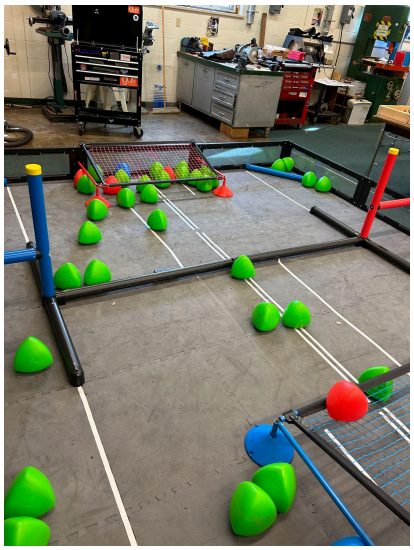
Step 1: Define a problem
Step 2: Brainstorm
Step 3: Design matrix
Step 4: Research
Step 5: Selection
Step 6: Iterate

Learning about this
not only has helped
our notebook, but
also the way we
approach our design process and go about
our work.



Step 1- Define a problem

Eriez uses the design process in the same way we do. We are given a task (the game) that we have to “solve”. The first step is defining the problem.

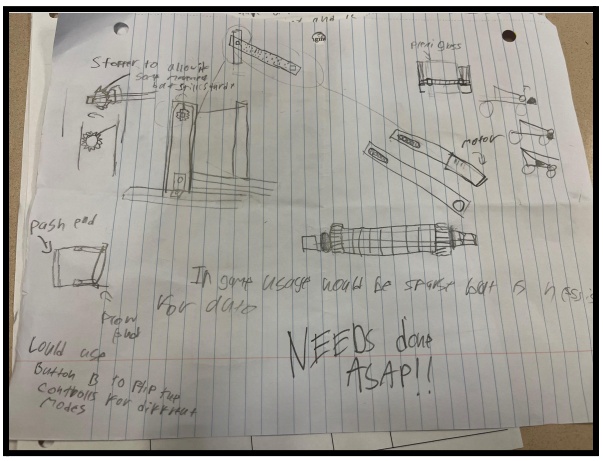


For Eriez, it could be figuring out the best and most efficient way to separate metal from cow feed. For us, we defined many problems. The task we were given was to score triballs into the net, and score as many points as possible. We could climb to score points, launch triballs, or push them into the net for points. We also have the opportunity for skills challenges. From this, we identified 5 main problems:

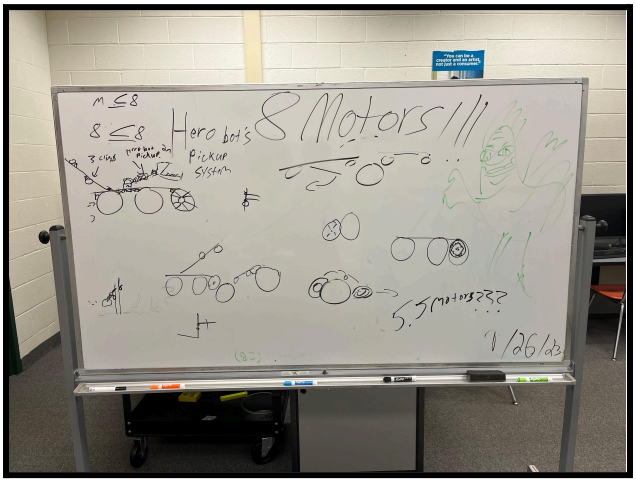
Problem list
Making an efficient climbing mechanism
Scoring triballs
Getting triballs onto the field
A high-scoring autonomous code
Entering, and doing well on skills challenges

Step 2: Brainstorm

The next step is to brainstorm. For Eriez, they sit down as a team and list different solutions to their design problem, like designing a separator. For

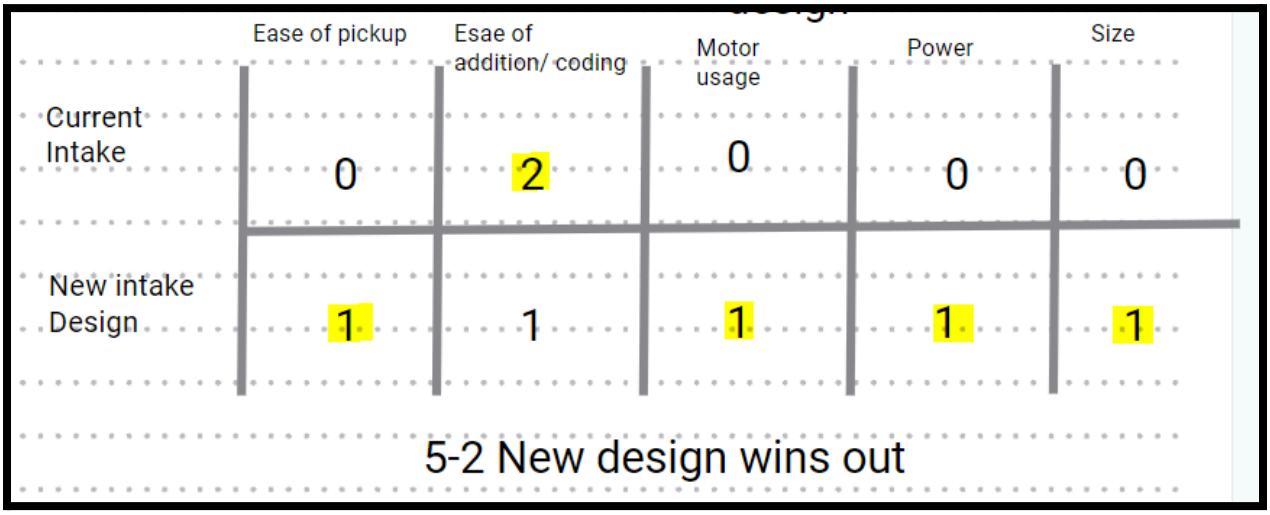


us, we similarly sat down as a team and listed possible solutions. We had many options, we could make a launcher, a climbing device, a pusher, a claw, or focus on coding. There were many things we had to think about, but in the end, we decided on creating a robot with a focus on a good autonomous code and a pusher. Throughout the brainstorming process, many different drawings were created and we settled on a design.



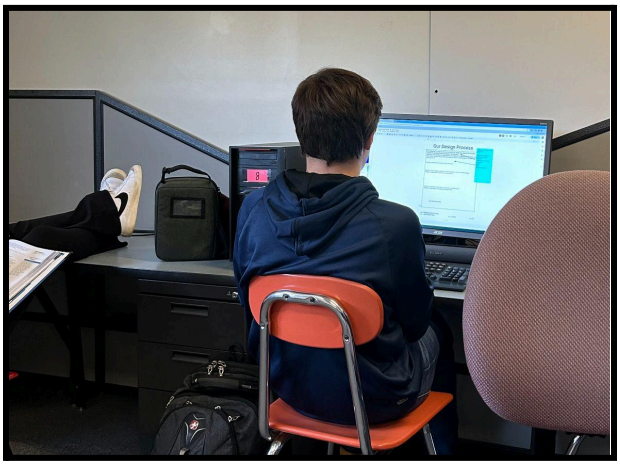
Step 3: Design matrix

The hard part of design is deciding what we want to include (or not include) and why. Mr. Galloway taught us about design matrices, a matrix helped us better understand the goals of our coding process, and it helped us focus on what we wanted to do with the information after the brainstorming process. Mr. Galloway shared with us how Eriez uses a design matrix in many different ways. The design matrix allows the team to weigh the advantages and disadvantages of choices more clearly



Step 4: Research

Research is a huge and important part. How else would you know what is out there? After you have decided on the problem, settled on an idea that works, and weighed out the pros and cons, your next step is to research and determine how to reach your goal. This step also involves listing constraints that your robot has to work within. For Eriez, this could be how strong the magnet needs to be. For us, we had to calculate how many watts of power we had available vs how many were required for the design. This was a huge task for us, as we had to figure out how design decisions would affect our final design.

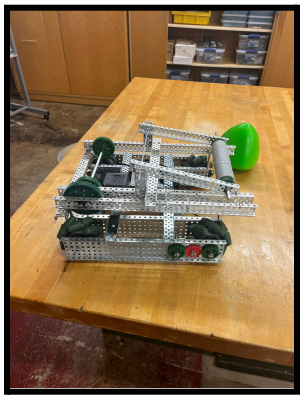


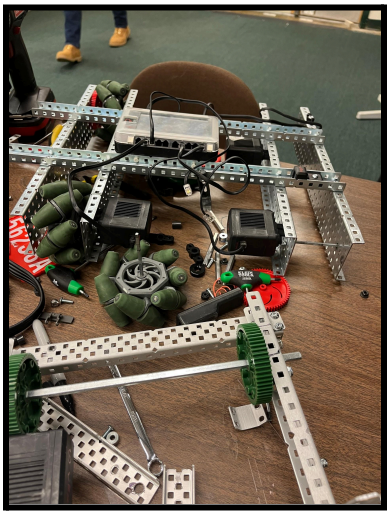
Step 5: Selection

In this step, just like Eriez examines all of the possible parts to use, we chose the parts we needed, the gear ratios we needed, and ordered parts we did not have in inventory. It is also during this step that we built the subsystems and the robot. Mr. Galloway stressed the importance of this step, because you aren't able to see what all we have available unless we take inventory of what we have available.

Step 6: Iterate

Once you have selected and started building, you need to test and iterate. You are never done! you can always make something better. For us, we had a pretty great robot when the first competition came around, but by our next competition, we practically had an entirely new robot. We iterated and created a way better robot. Just like at Eriez, after a product is created, before it's sent out to the customer, a great deal of testing is done to make sure it’s safe and will hold up for the task required.





Career Readiness

The professional approach to engineering design matches our design process in the way that we both use the design process to create the best possible robot. It differs because we have to go a bit faster to get everything done in the time given. We have to make our decisions quickly. Participation in VEX Robotics has prepared us for a future career because we now know more about engineering and the engineering process. The engineering process can be applied to any career. Vex robotics also gives us experience with working as a team to overcome challenges