

Somerset Berkley Regional High School

Robotics Engineering with LabView

Objective: To support the development of metacognitive skills and habits of reflection for effective problem solving

Planning ; What should step one be? What do I know about the problem?

Step one should be figuring out what gears to use to create torque. Torque should be most useful for the tug of war bot.

Goal setting Set realistic goals. How much time do I have?

2 weeks

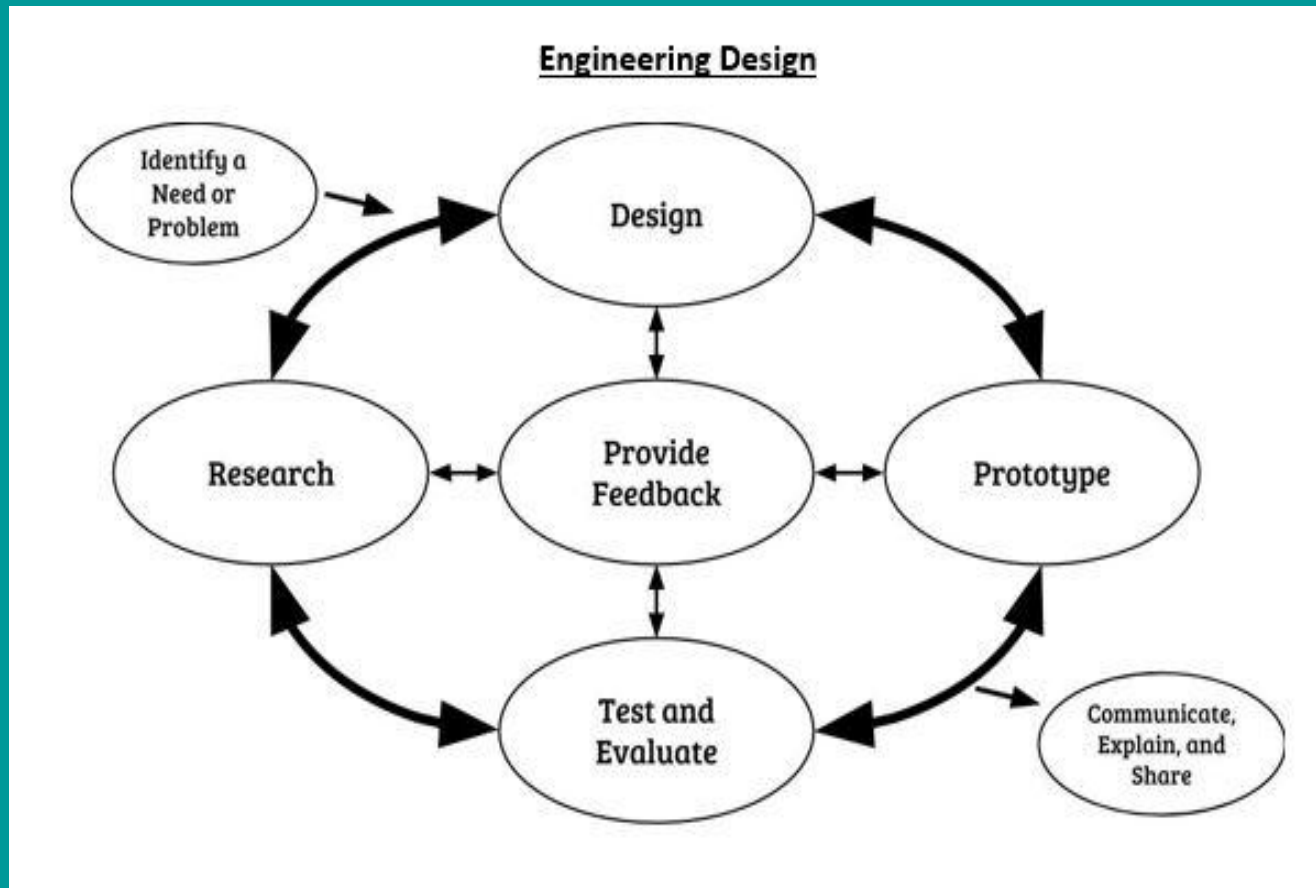
Monitoring progress Am I on the right track?

Yes

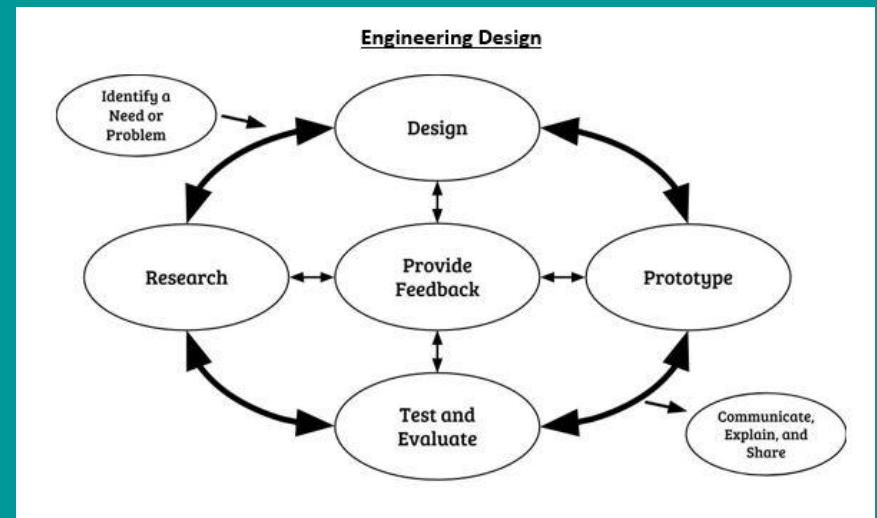
**Adjusting What did I learn. Did I get the results I was expecting?
If I could do this over again I would.....**

Standard 1.1 Engineering Design Process

2016 Revised Massachusetts State Framework



Identify the need or problem



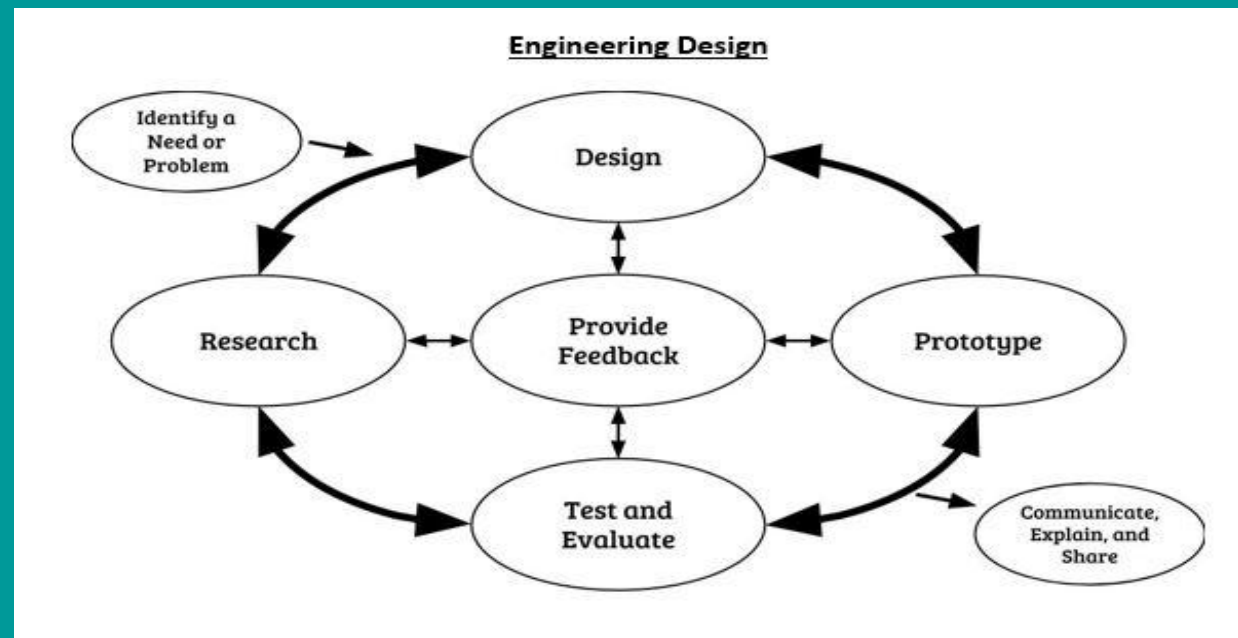
Identify a need or a problem. To begin engineering design, a need or problem must be identified that an attempt can be made to solve, improve and/or fix. . This typically includes articulation of criteria and constraints that will define a successful solution.

Evidence : Add a slide and describe what you already know about the problem. This helps to build an understanding of the problem

Describe the knowledge you will need or think you will need to solve this problem.

What we already know is that we need to create a lot of friction and torque to be able to pull the other bot for the tug of war game. Neither bot will actually pull harder, the winning bot will be the one with the most friction(grip) on the table

Research the problem



Research. Research is done to learn more about the identified need or problem and potential solution strategies.

Decide what information is needed.

What should step one be?

Use appropriate tools and strategies to access the information

Analyze the information gathered and its sources.

If there is more than one good answer to the problem,

*On your PowerPoint file show add a slide to show what you did for research. **Evidence***

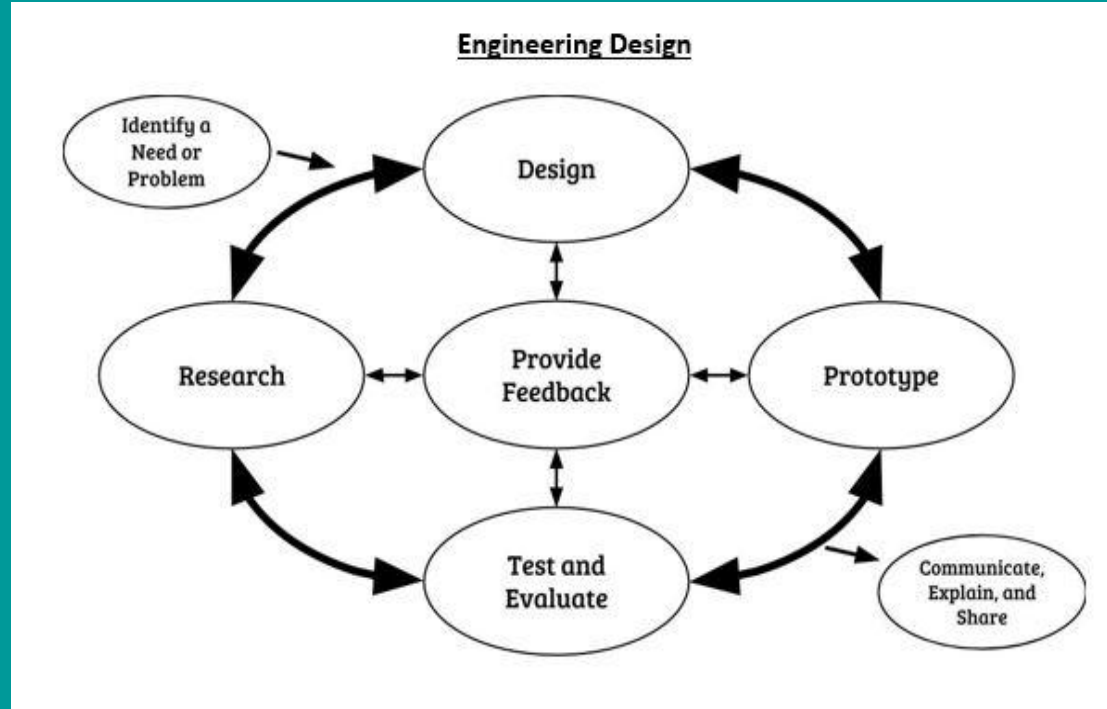
Research :

https://www.youtube.com/watch?v=-914HTEyF9A&feature=youtu.be&list=PLFd4sjeVCkV_sN15Y4Jiaz4v3Csk9cd3W

<http://www.drgraeme.org/Dr/ev3g9.html>

<https://www.grasp.upenn.edu/sites/default/files/strategies4-2015.pdf>

Design



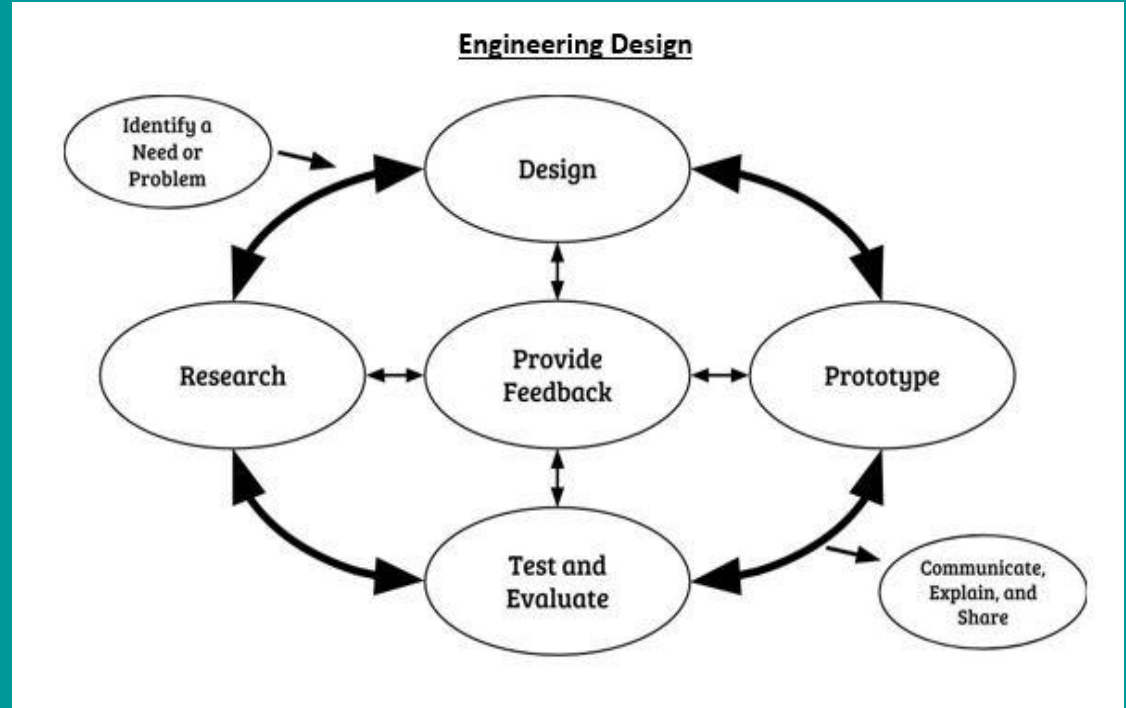
Design. All gathered information is used to inform the creations of designs. Design includes modeling possible solutions, refining models, and choosing the model(s) that best meets the original need or problem.

Evidence : Team Roles:

Evan Thomas: programmer and design

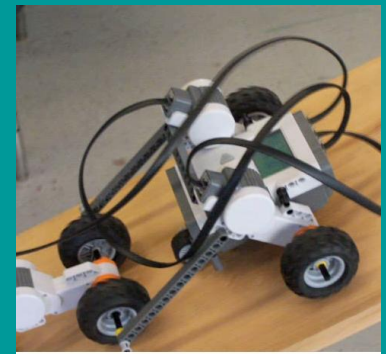
Keith Mello (me): Design and research

Prototype

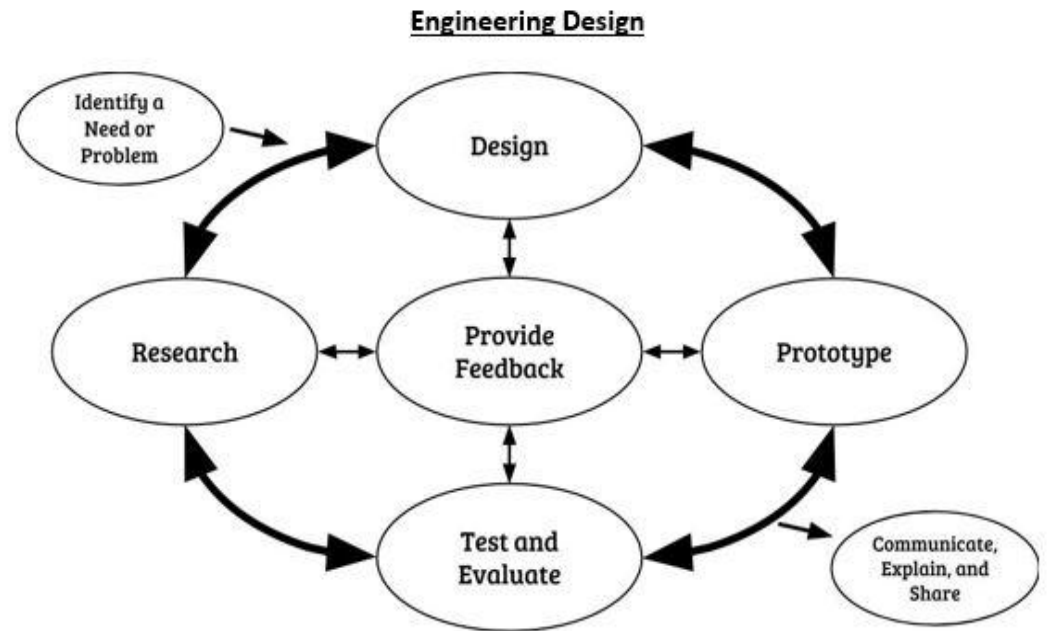


A prototype is constructed based on the design model(s) and used to test the proposed solution. A prototype can be a physical, computer, mathematical, or conceptual instantiation of the model that can be manipulated and tested.

Evidence : To build a bot with lots of torque to create the best grip (more friction)



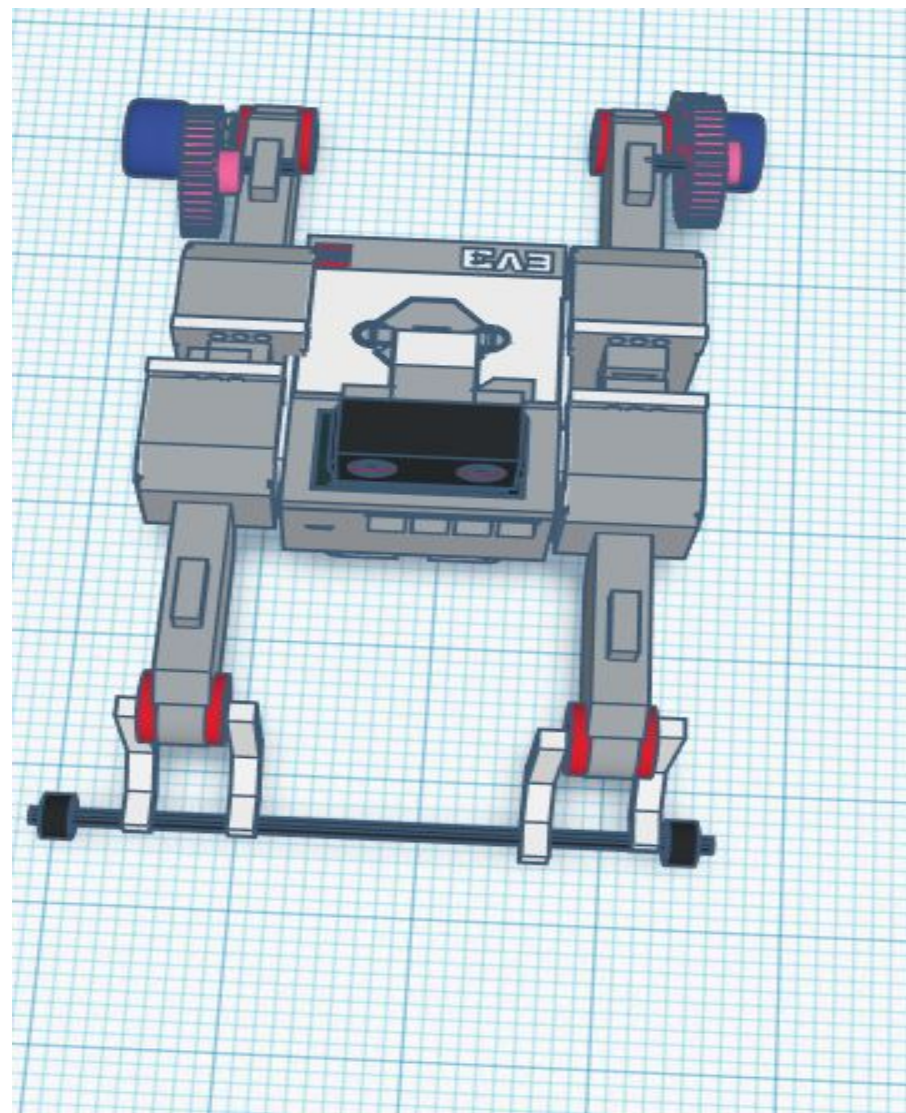
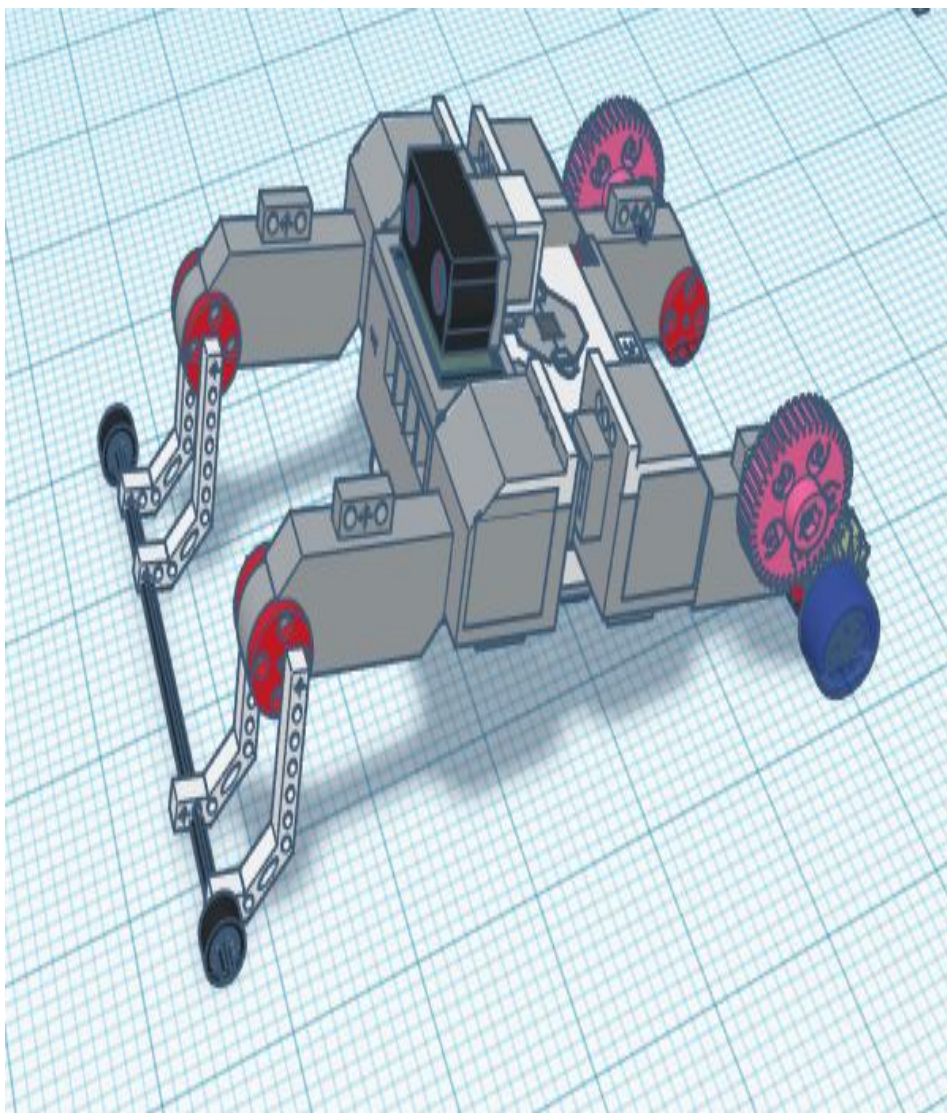
Test and evaluate



The feasibility and efficiency of the prototype must be tested and evaluated relative to the problem criteria and constraints.

Collaboratively decide whether the solution needs more work and repeat previous phases as needed.

- Does your robot work? Yes
- Did it perform as expected? Yes
- What changes are necessary for the robot and the program? More wheels for better friction
- Does it meet the original design constraints? Yes
- Is it safe? Yes
- Students present their solution to the other teams and celebrate the work of the problem solvers



This is the Prototype that I have made for the Tug of War Match. If we use it, we plan to tie the string to the front on the bar and have 4 wheels pulling on the rope (2 front, 2 back)

Evidence

modified prototype picture and computer program

Communicate the solution(s)

Provide the YouTube link of your video that shows how your robot meets the challenge.

YouTube video link :

Reflection

Think about your professional destination. What skills and or knowledge are you going to need that you don't have or have enough of. Add a slide and make a list
Reflect on your latest assignment in robotics and describe how what you just did supports what is on your list.

As always skills that could be helpful in professional field it using metacognitive skills. Also teamwork and communication to help everything flow nicely in the process along with trial and error. Lastly, having to think and do research before even thinking about design helped us a lot.

Letter to a future student

Take a few minutes to think of a time when you overcame a struggle in robotics class.

Reflect on the times when you failed at first but through persevering you eventually became better at the task at hand and succeeded. Briefly describe this experience in a letter to a future robotics student.

Dear future student. I recommend you take your time on the tug of war assignment. It might seem easy but you need to put a lot more work than you think. try trial and error for results of figuring out what not to do and what to do. Do some research too. It's totally worth the time to do research and figure out the best build type, gear ratio, etc.

What metacognitive strategies are you using?

We used trail and error to make sure of what to keep and fix when making the bot we tied out own string to the bot and held it for test runs. After finding the best build and rear ratio we decided we were ready to battle.

Instructions for posting to Weebly

1. Go to file->download file and then choose PDF document (.pdf).
2. Then on your weebly website under Build Media section drag the file option and upload the PDF of your Slides presentation to your website

References Faculty Focus .Com
Khan Academy
Massachusetts 2016 frameworks