

# Somerset Berkley Regional High School

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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?**

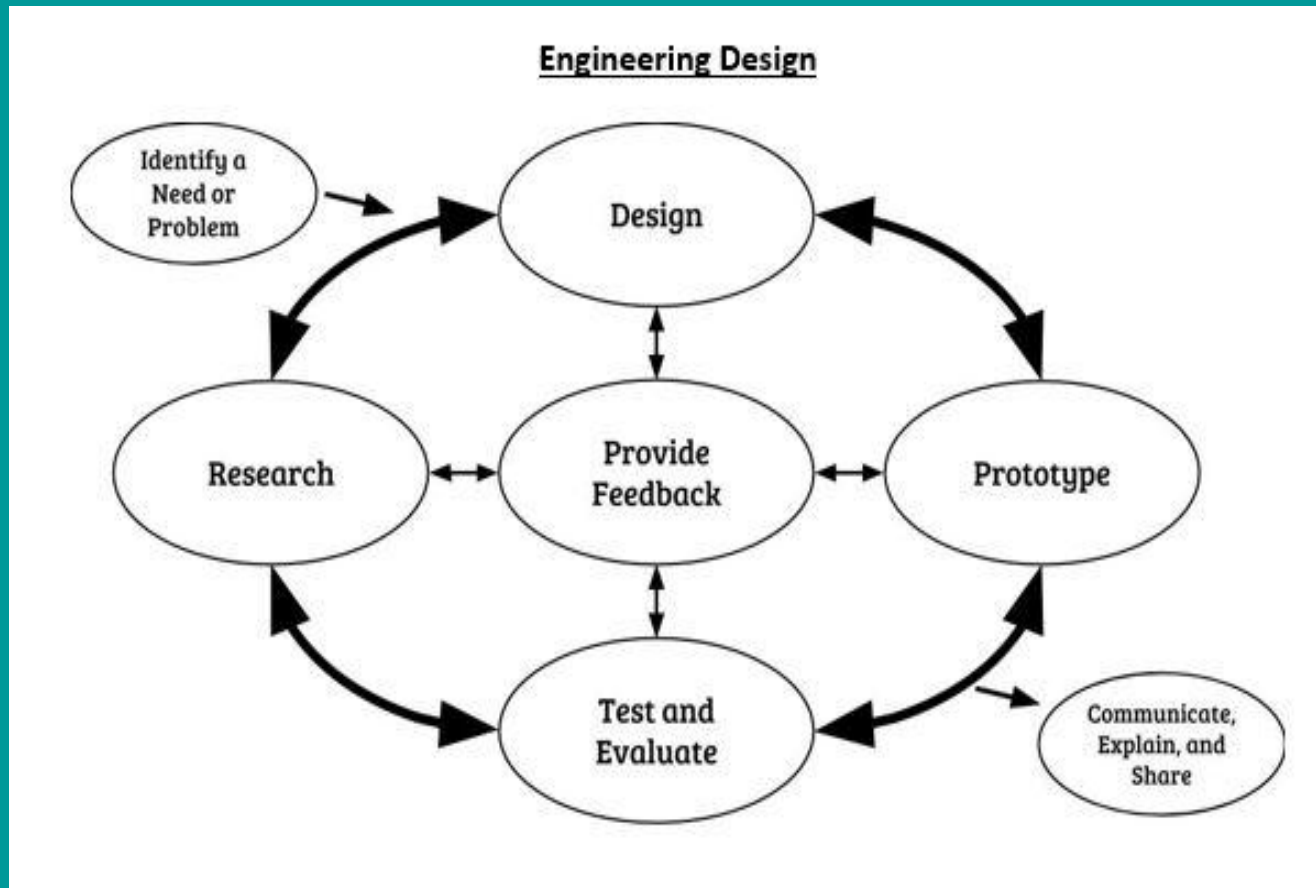
**Goal setting Set realistic goals. How much time do I have?**

**Monitoring progress Am I on the right track?**

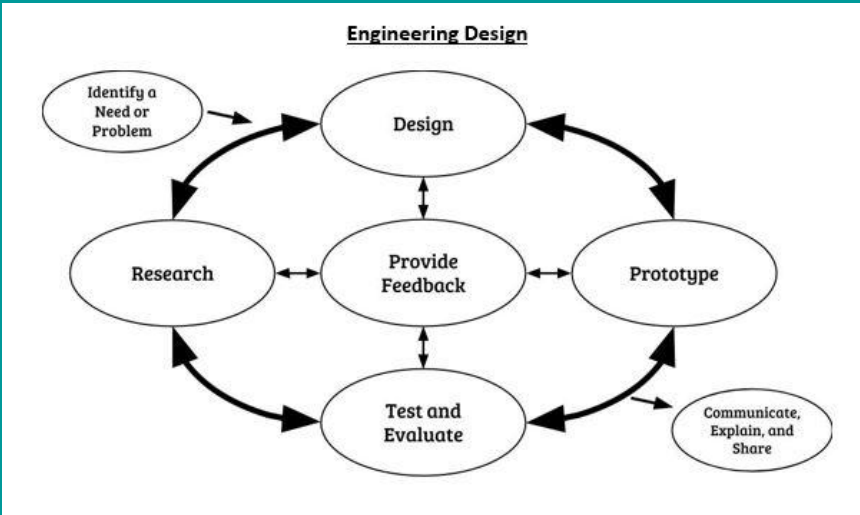
**Adjusting What did I learn. Did I get the results I was expecting?  
If I could do this over again I would.....**

# Standard 1.1 Engineering Design Process

2016 Revised Massachusetts State Framework



Step 1  
Identify the need or problem

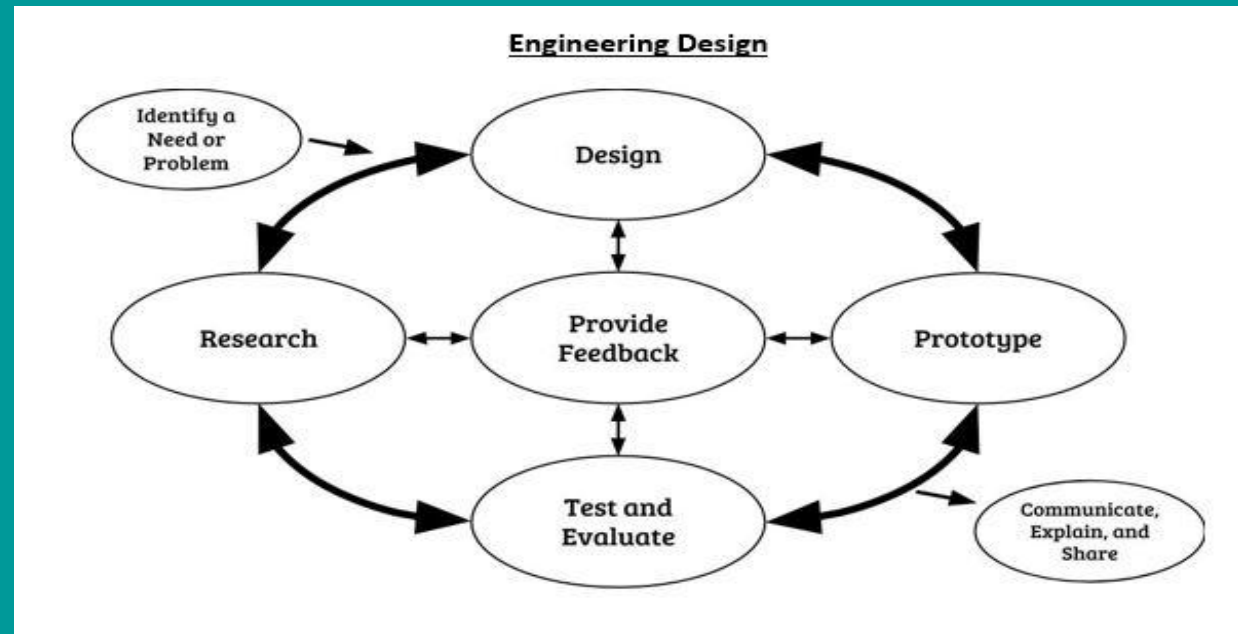


**Identify a need or a problem.** To begin engineering design, a need or problem must be identified that an attempt can be made to solve, improve and/or fix. . This typically includes articulation of criteria and constraints that will define a successful solution.

**Evidence** : Add 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 to solve this problem.

- Design, build, and program a robot to travel a specified distance.
- Know how far we have to drive and how much we need to carry
- how big the gap is between two tables
- when to stop and turn the robot
- solve different tasks like opening a lock
- we will need to know all this

## Step 2 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.**

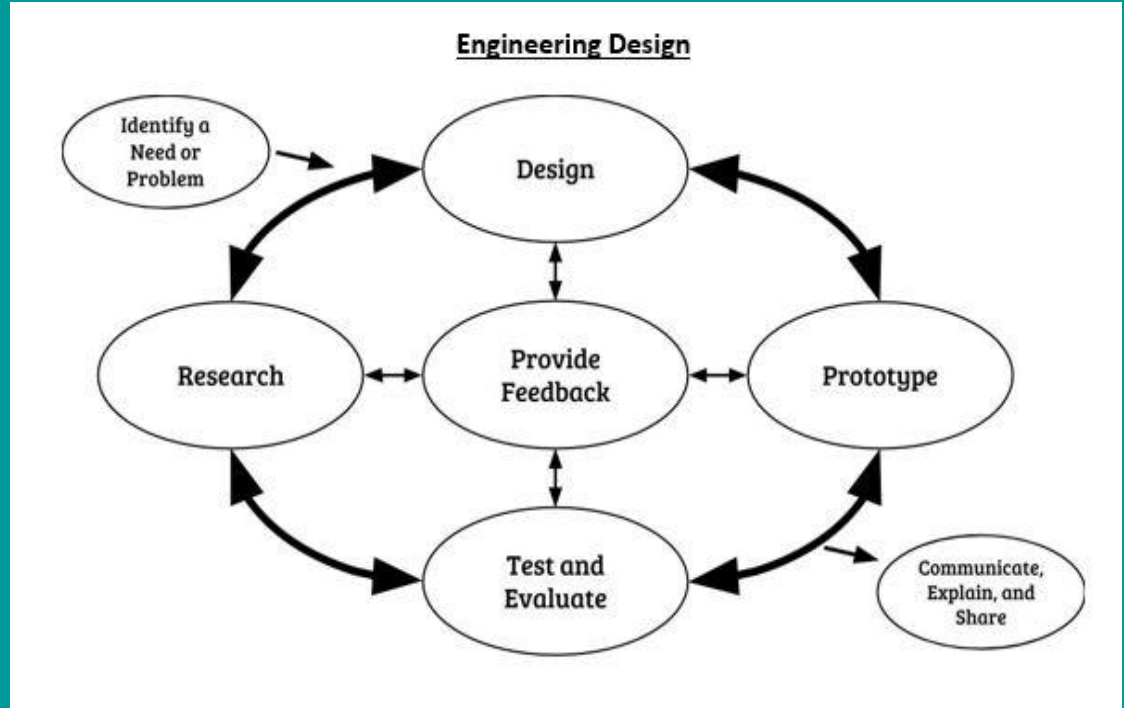
**If there is more than one good answer to the problem, list the positives and negatives of each of the findings.**

***On your PowerPoint file show what you did for research.***

**\*evidence**

- To complete this task we need to
- Know how far we have to drive and how much the robot is carrying
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# Prototype



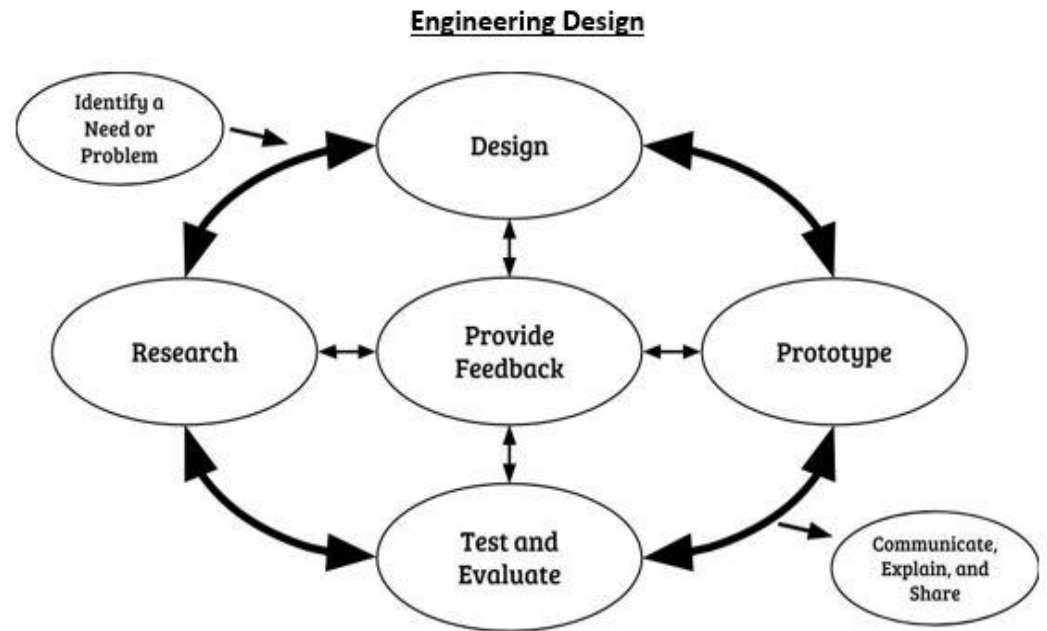
A prototype is constructed based on the design model(s) and used to test the proposed solution. A prototype can be a physical, computer, mathematical, or conceptual instantiation of the model that can be manipulated and tested.

**Evidence** : Execute the plan, (build your robot) modifying as needed.





# 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.

1. Does your robot work?
2. Did it perform as expected?
3. What changes are necessary for the robot and the program?
4. Does it meet the original design constraints?
5. Is it safe?
6. Students discuss what they liked best about the collaborative process and what could be done differently next time.
7. Students present their solution to the other teams and celebrate the work of the problem solvers

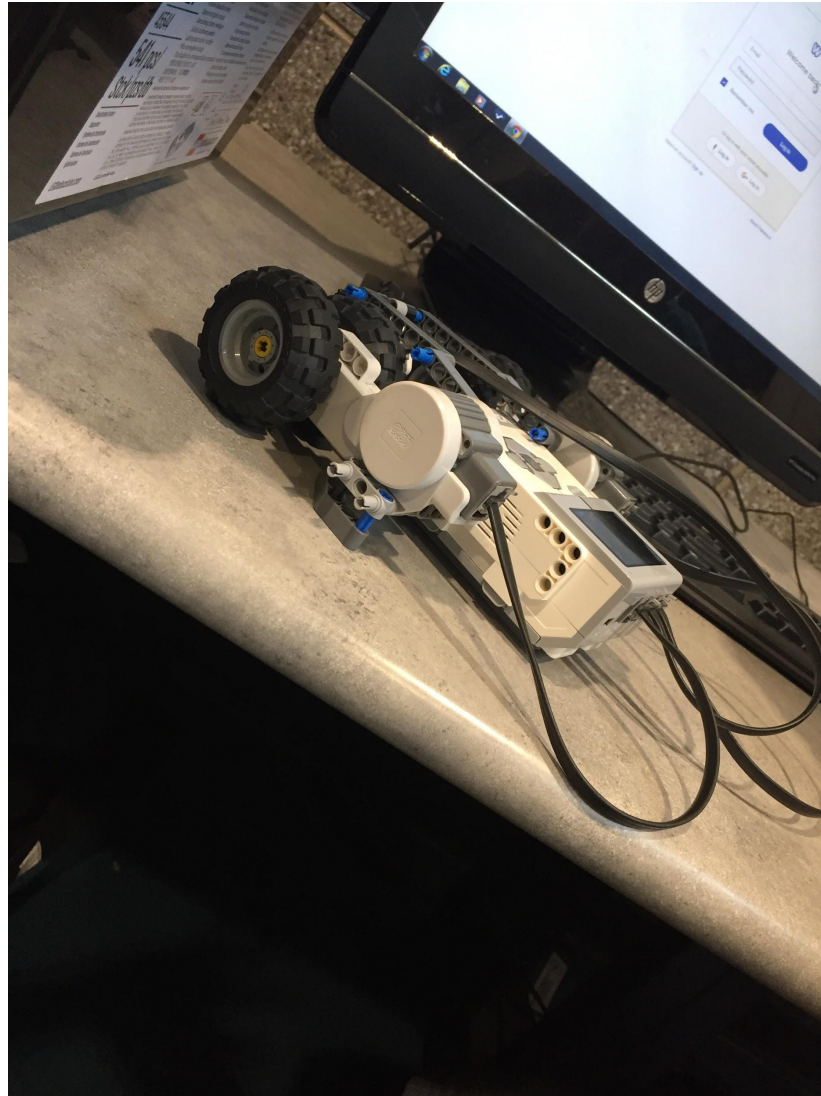
## Step 5 evidence

1st Prototype picture and computer program



## Step 6 evidence

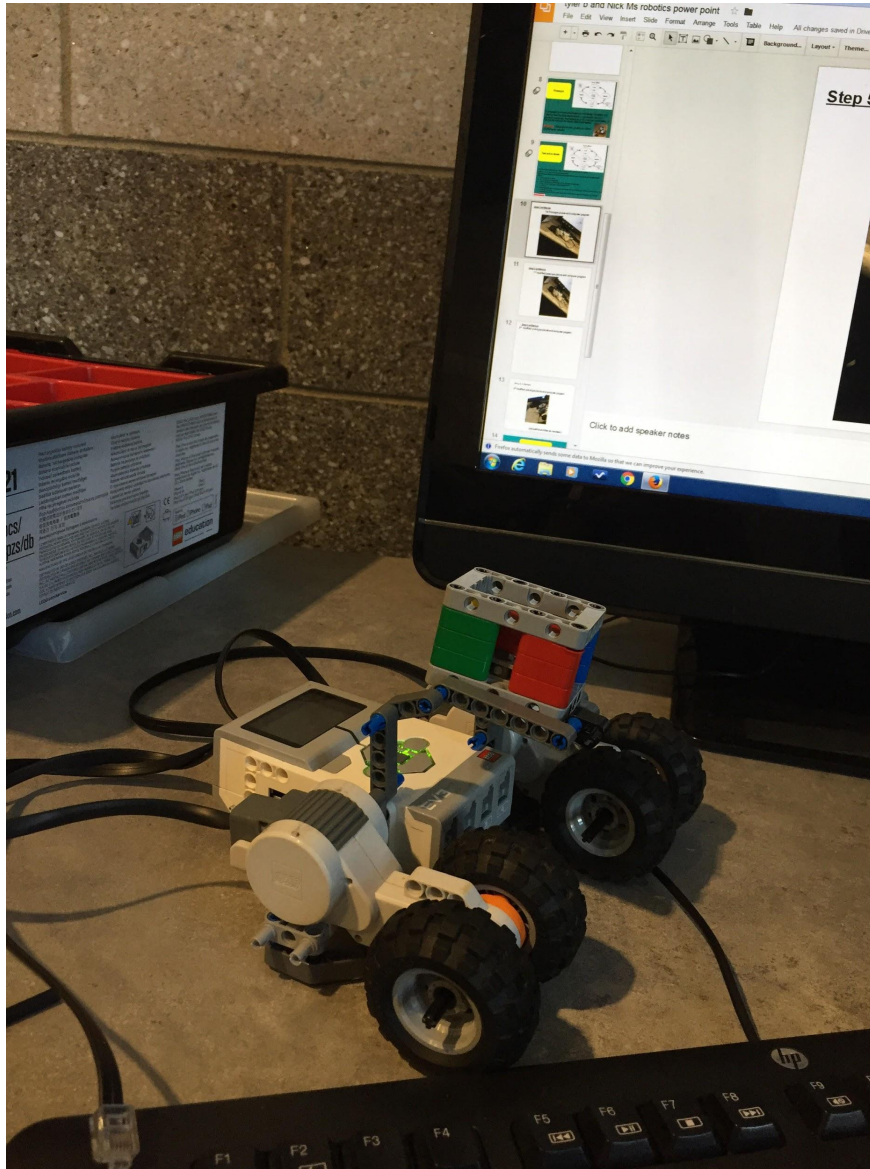
1<sup>st</sup> modified prototype picture and computer program





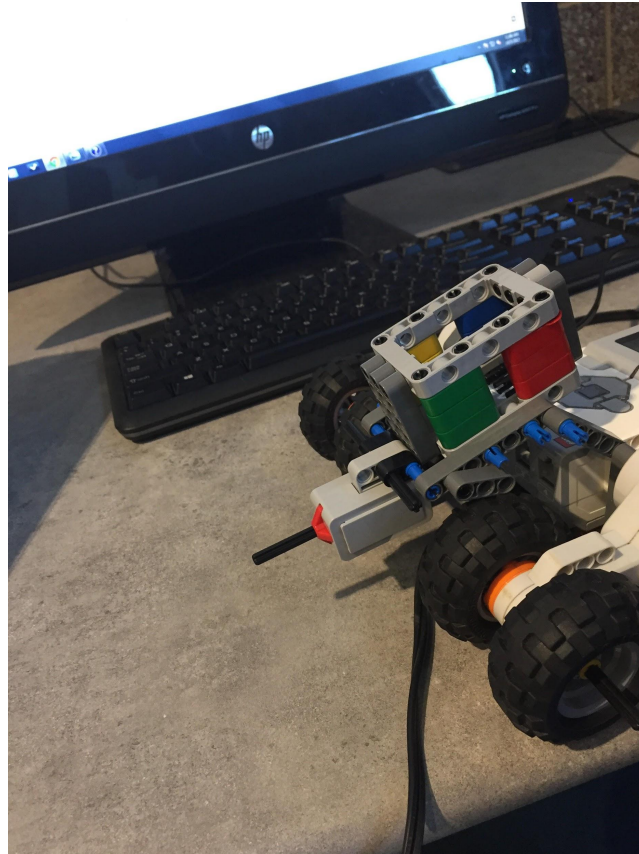
## Step 6 evidence

2<sup>nd</sup> modified prototype picture and computer program



## Step 6 evidence

3<sup>rd</sup> modified prototype picture and computer program



Add additional slides as necessary

Step 7  
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.

# 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 your brain created new neural connections and you eventually became better at the task at hand. Briefly describe this experience in a letter to a future robotics student.



# Letter To A Future Student

Dear future robotics student,

As you go into graphics you will start to realize that as a robotics student you have to try to get things done every day. While I was doing this project I was fooling around a little bit and fell behind and then i had to do tons of work in few classes and it wasn't very enjoyable. I would advise that you do a solid amount of work each class. If you put in work and try you will have at least an 80. My favorite part of robotics is easily crafting the robot because it is a fun the too do and you can almost always make it in whatever way you want. As a result of this if you want too excel in robotics all you have to do is try.

## Instructions for posting to Weebly

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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