

# Somerset Berkley Regional High School

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Robotics Engineering with LabView

## 1. Engineering Design

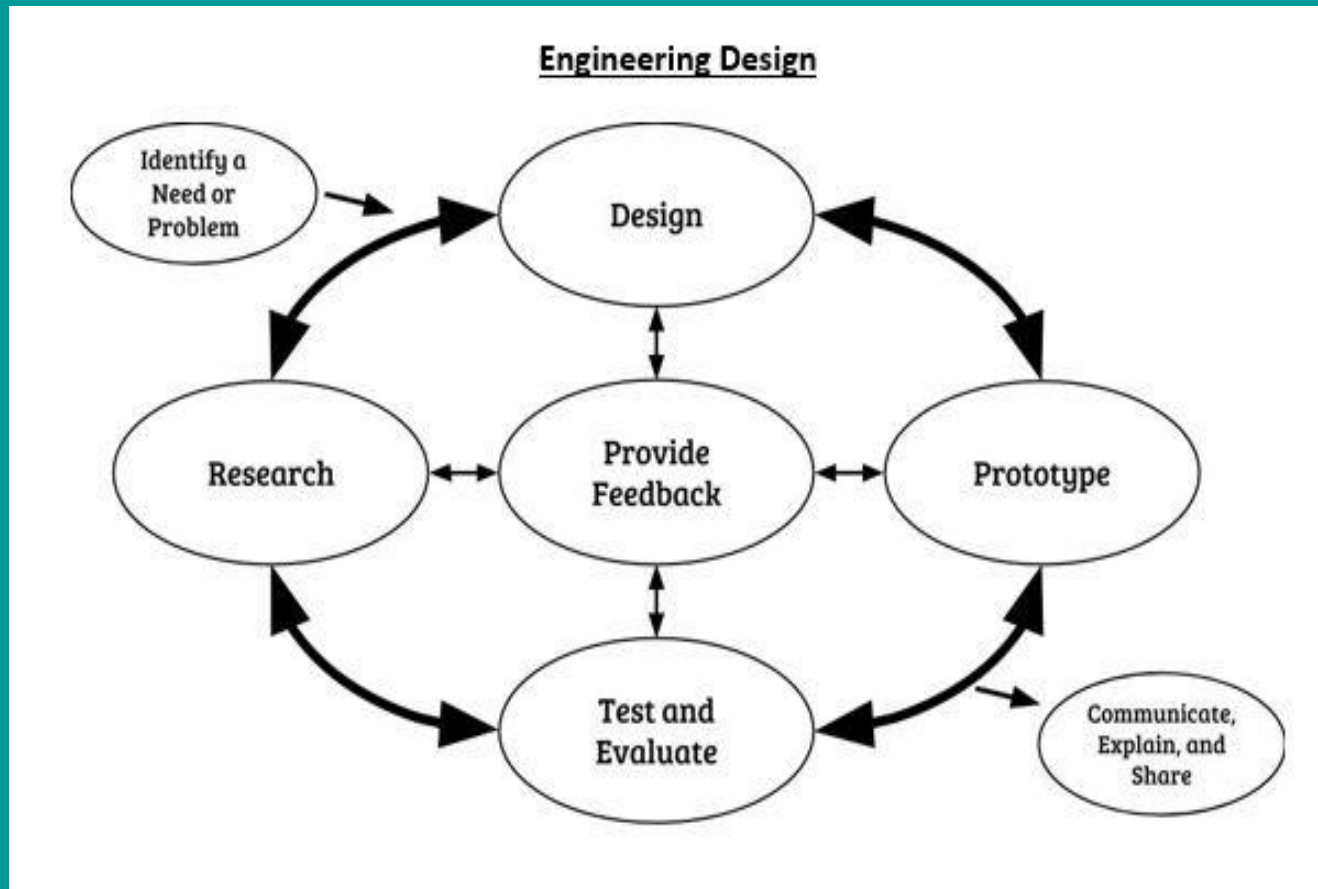
*Central Concepts:* Engineering design involves practical problem solving, research, development, and invention/innovation, and requires designing, drawing, building, testing, and redesigning. Students should demonstrate the ability to use the engineering design process to solve a problem or meet a challenge.



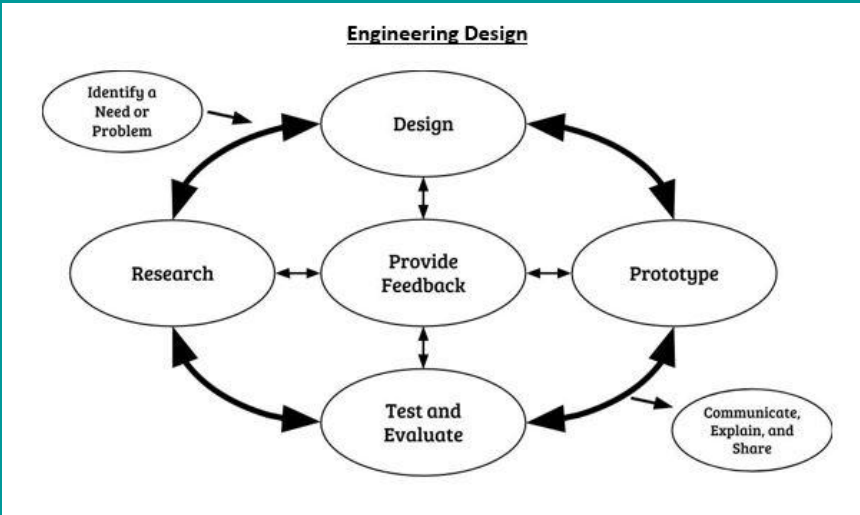
# Engineering Design Process

## Standard 1.1

2016 Revised Massachusetts State Framework



Step 1  
Identify the need or problem

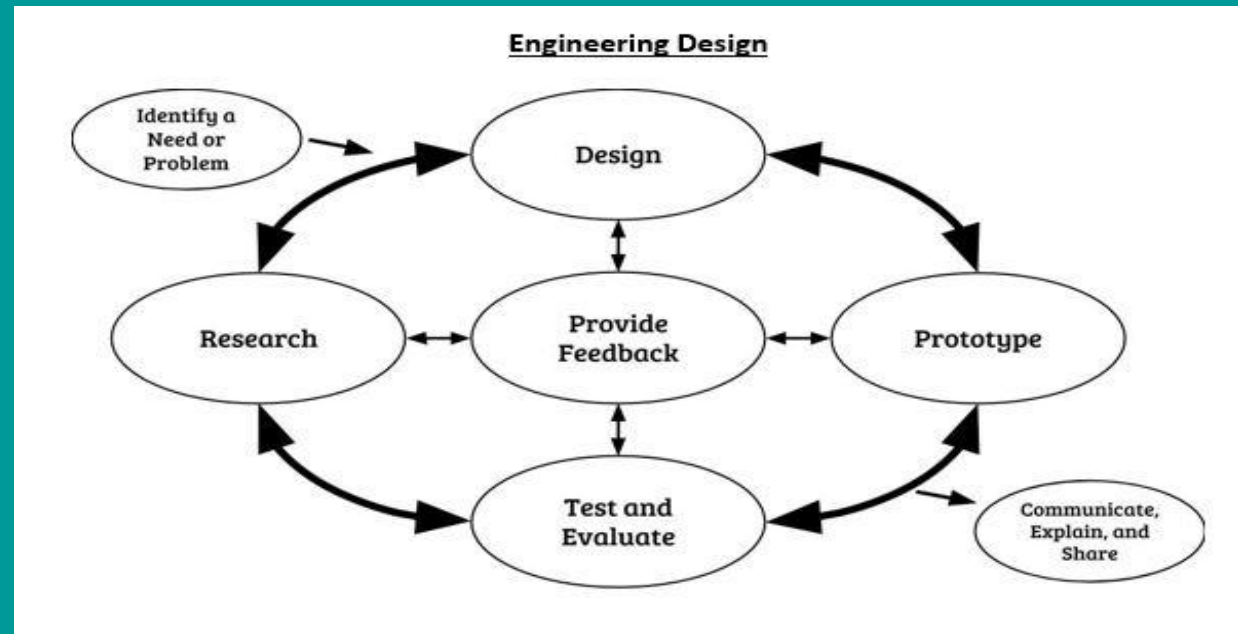


**Identify a need or a problem.** To begin engineering design, a need or problem must be identified that an attempt can be made to solve, improve and/or fix. . This typically includes articulation of criteria and constraints that will define a successful solution.

**Evidence :** On your Power Point 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.

STEP1: The problem that we face is to create a 8-8-4" box that is held together primarily by dovetail joints

## 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.**

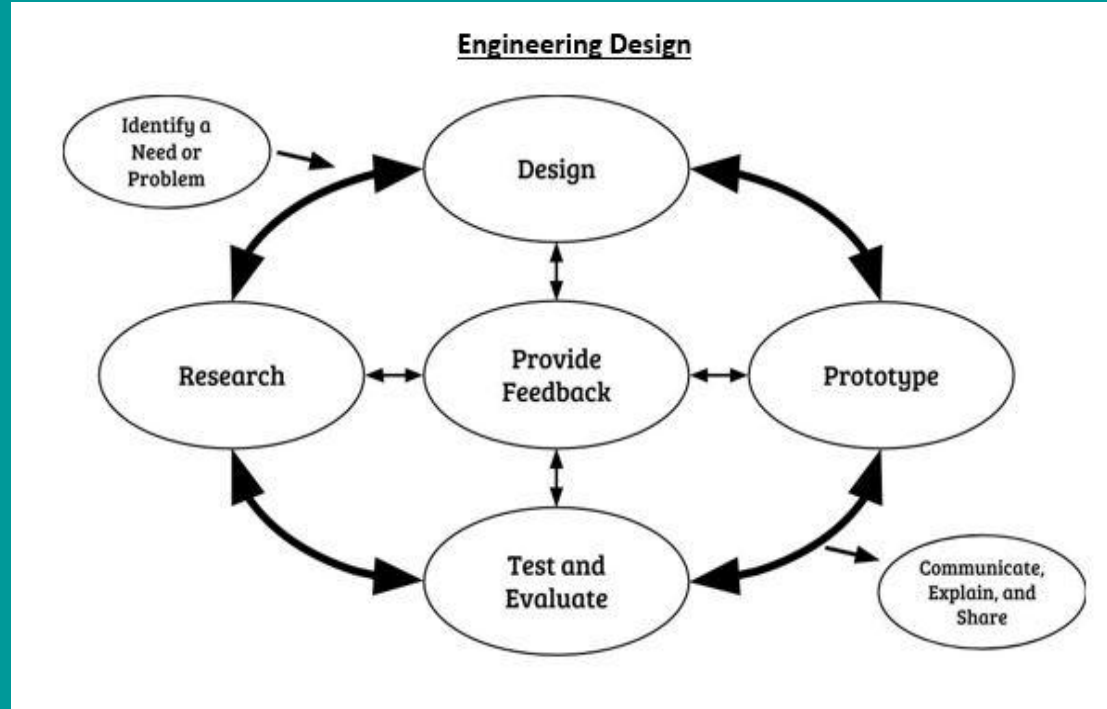
***On your Weebly site show what you did for research. \*evidence***

The majority of the research that I did was done on youtube watching multiple tutorial videos.

<https://www.youtube.com/watch?v=W46gLCKC30c>

<https://www.youtube.com/watch?v=q-D4ShSw9io>

## Step 3 Design

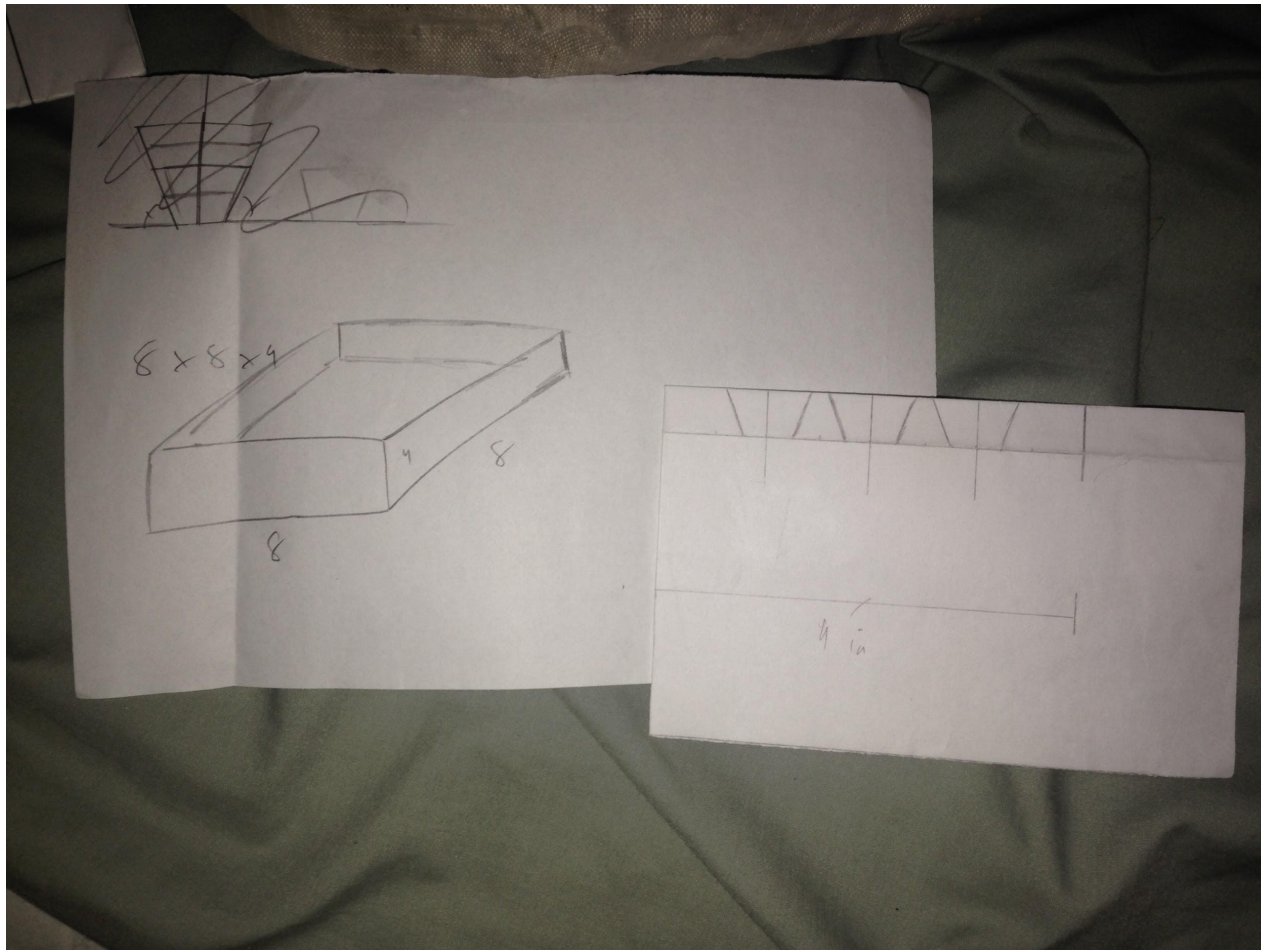


**Design.** All gathered information is used to inform the creations of designs. Design includes modeling possible solutions, refining models, and choosing the model(s) that best meets the original need or problem.

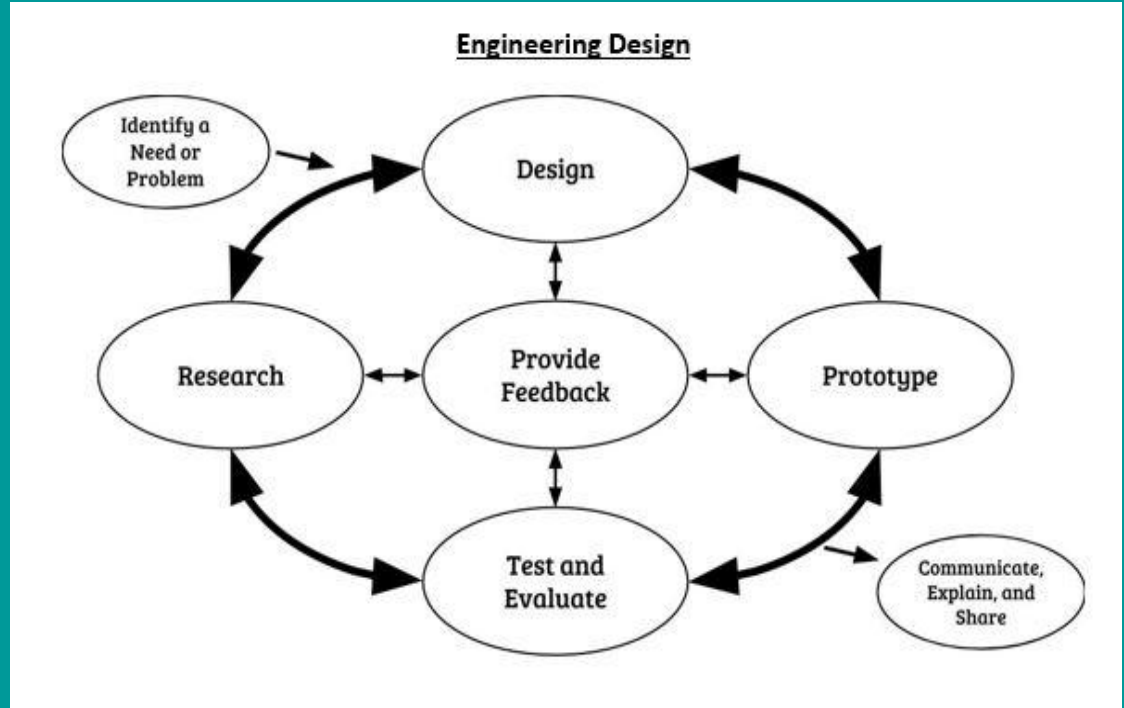
**Evidence:** Clarify the roles of each team member, taking advantage of individual strengths. On you Weebly site list the role of each member.



In the design process I started by researching the average angle that dovetail joints are usually at, which usually happen to be at 70 and 110 degrees. I then continued to make a paper model of how to go about making the dovetails on wood.

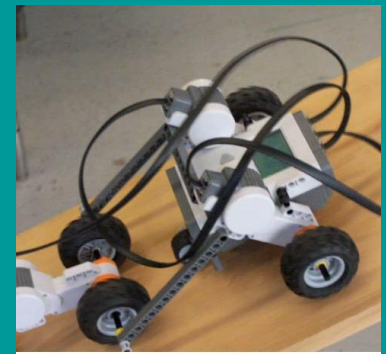


# Prototype

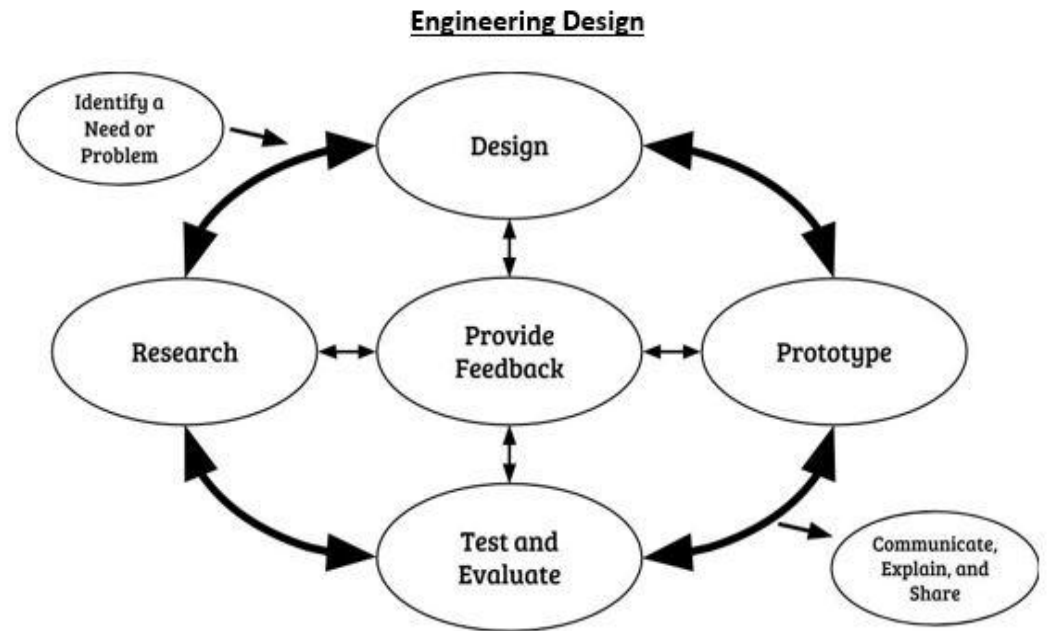


A prototype is constructed based on the design model(s) and used to test the proposed solution. A prototype can be a physical, computer, mathematical, or conceptual instantiation of the model that can be manipulated and tested.

**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?

- Students discuss what they liked best about the collaborative process and what could be done differently next time.
- Students present their solution to the other teams and celebrate the work of the problem solvers.

## Step 5 evidence

Unfortunately many of the pictures I had taken were lost in the emailing process, I was however able to save a good amount. In this picture (although it cannot be seen well) I have 4 pieces of wood 8" by 4"



## Step 6 evidence

My next step was to plan and cut out the dovetail joints into the pieces of wood. (Here is a picture of the dovetails already glued and fitted)



## Step 6 evidence

Once the dovetails were cut and fitted I assembled them together and glued into the basic box form. (Here is a picture of the box with its bottom already put into place)



## Step 6 evidence

Once the box was formed I placed it over another piece of wood and traced out the size I needed to create the bottom. (Here is a bottom view of the box with the bottom glued and fitted into place)



Picture of my final (basic) box





Step 7  
Communicate the solution(s)

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

YouTube video link :

## Redesign

Overhaul the solution(s) based on information gathered during testing and self-assessment activity.

Sources of information

Massachusetts curriculum frameworks 2006

Design and problem solving in Technology

By John Hutchinson & John R. Karsnitz 1997