Somerset Berkley Regional High School

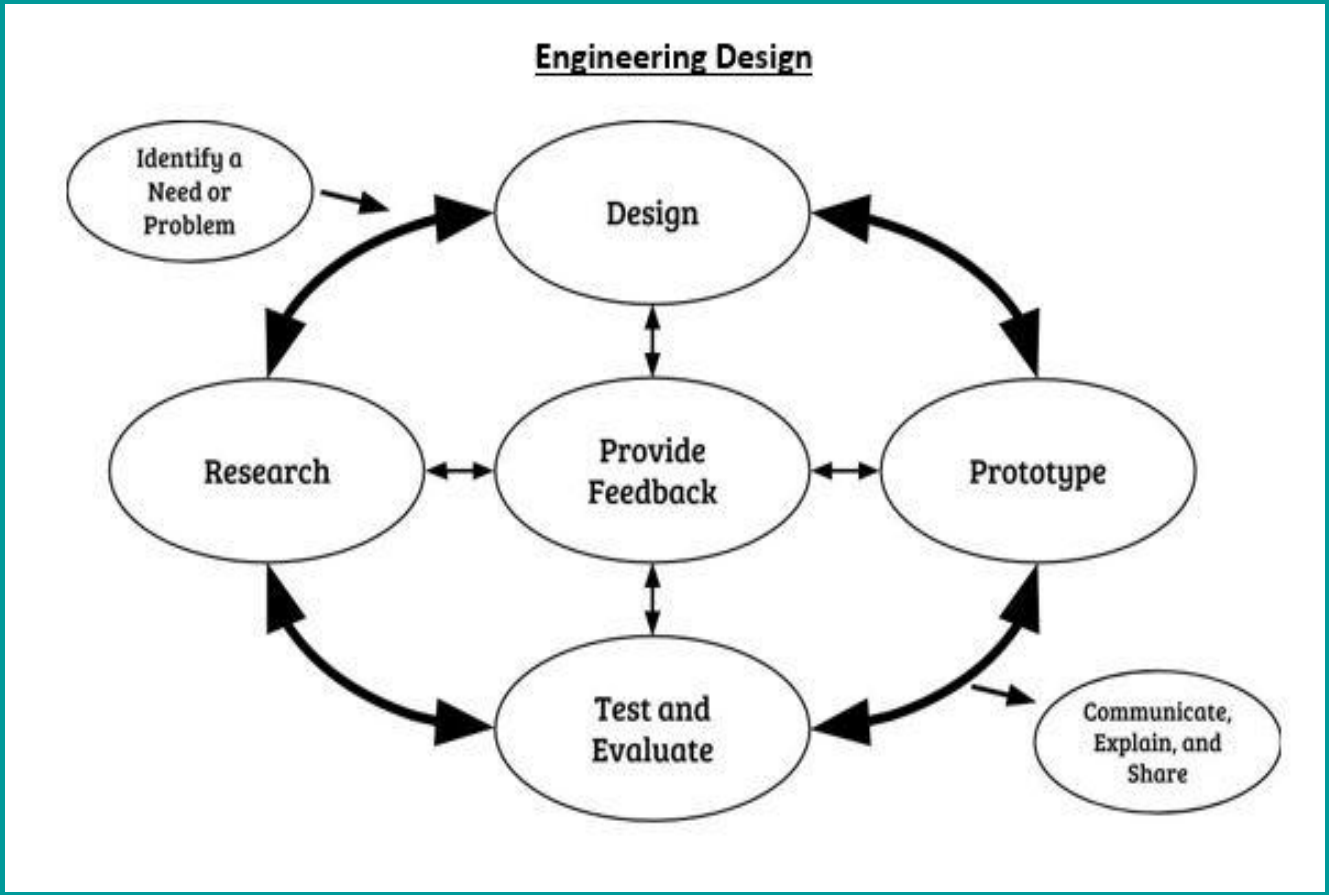
Robotics Engineering with LabView

1. Engineering Design

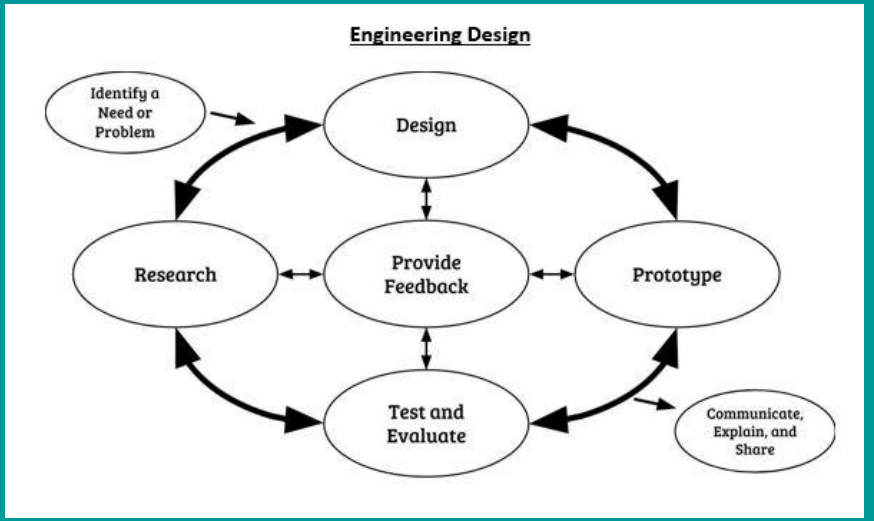
Central Concepts: Engineering design involves practical problem solving, research, development, and invention/innovation, and requires designing, drawing, building, testing, and redesigning. Students should demonstrate the ability to use the engineering design process to solve a problem or meet a challenge.

Engineering Design Process Standard 1.1

2016 Revised Massachusetts State Framework



Step 1
Identify the need or problem

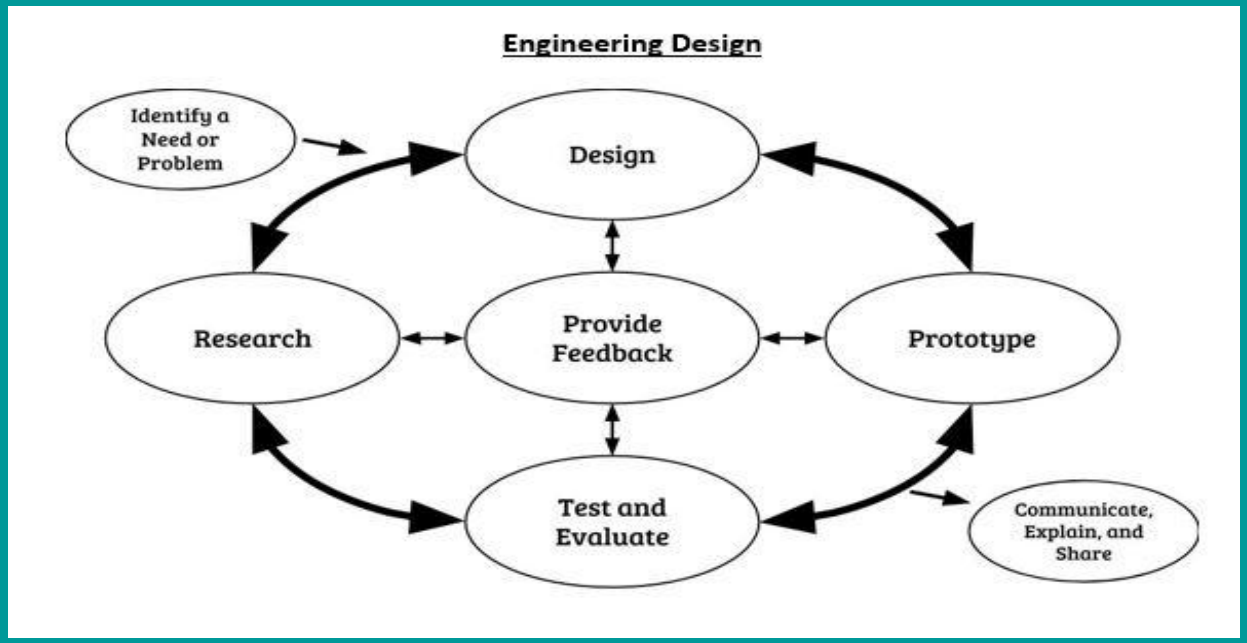


Identify a need or a problem. **To begin engineering design, a need or problem must be identified that an attempt can be made to solve, improve and/or fix. . This typically includes articulation of criteria and constraints that will define a successful solution.**

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.

NEED: We need to build stairs up to the work bench.

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

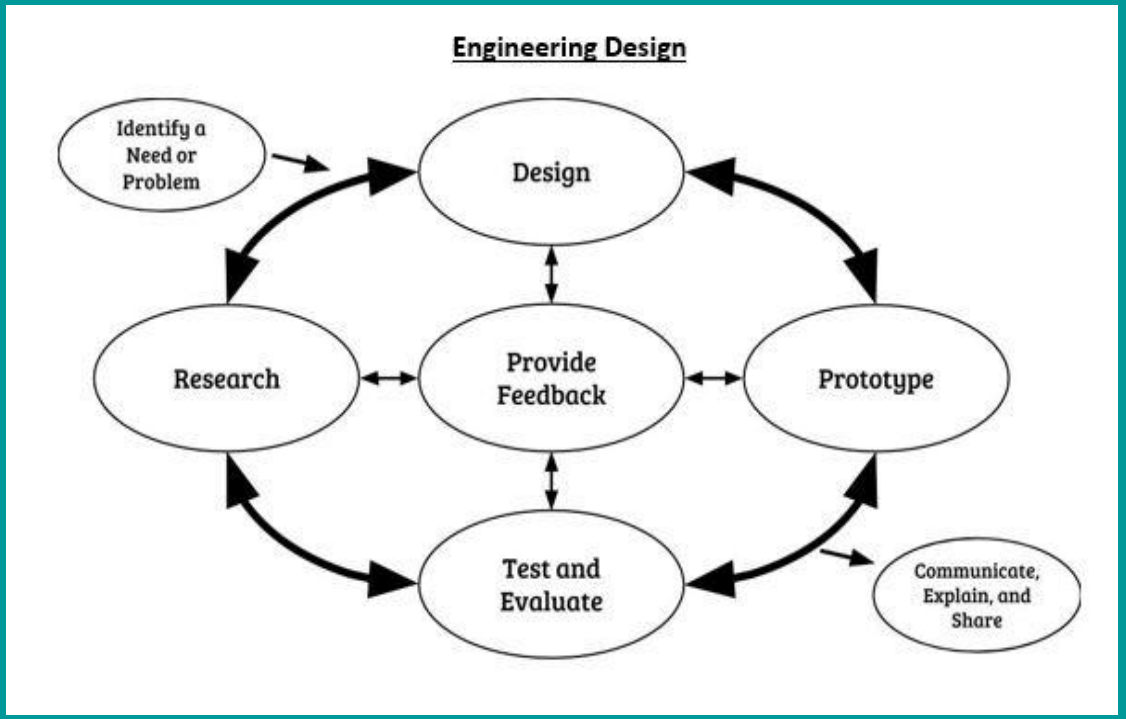
Analyze the information gathered and its sources.

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***

My group researched our project and found that each step, that is the part your foot touches, is on average 10” while the height of each step should be anywhere from 7-8”. Any more than 7-8” may be too much for elderly or children that may need to use the stairs

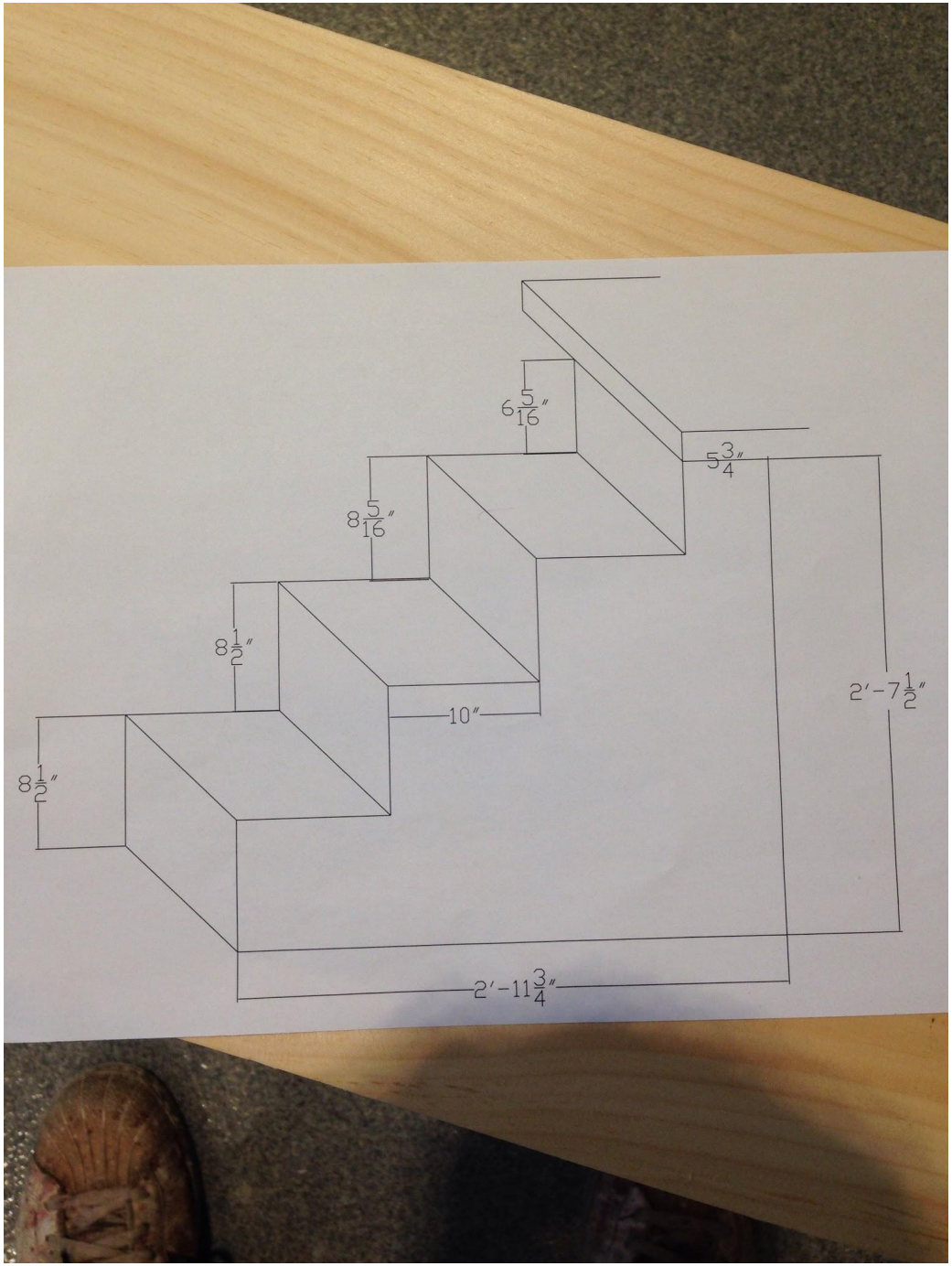
Step 3
Design



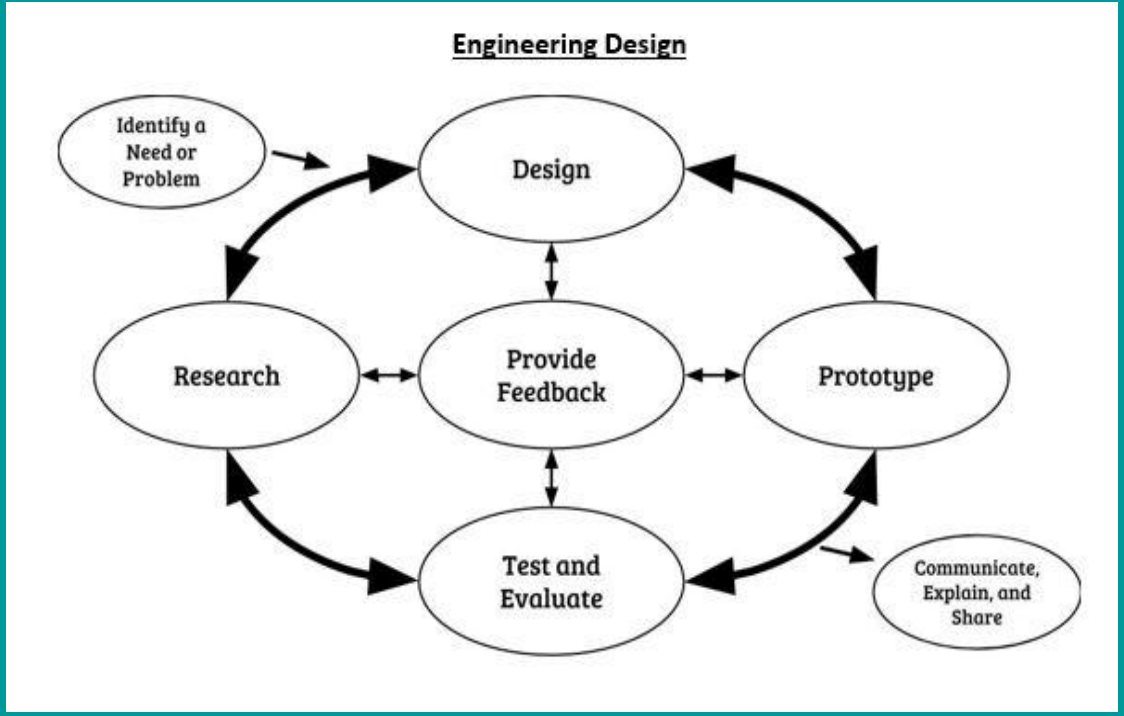
Design. All gathered information is used to inform the creations of designs. Design includes modeling possible solutions, refining models, and choosing the model(s) that best meets the original need or problem.

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

Here is my groups CAD drawing of our stairs that we made in our planning phase

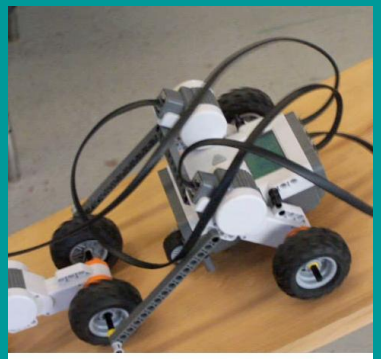


Prototype

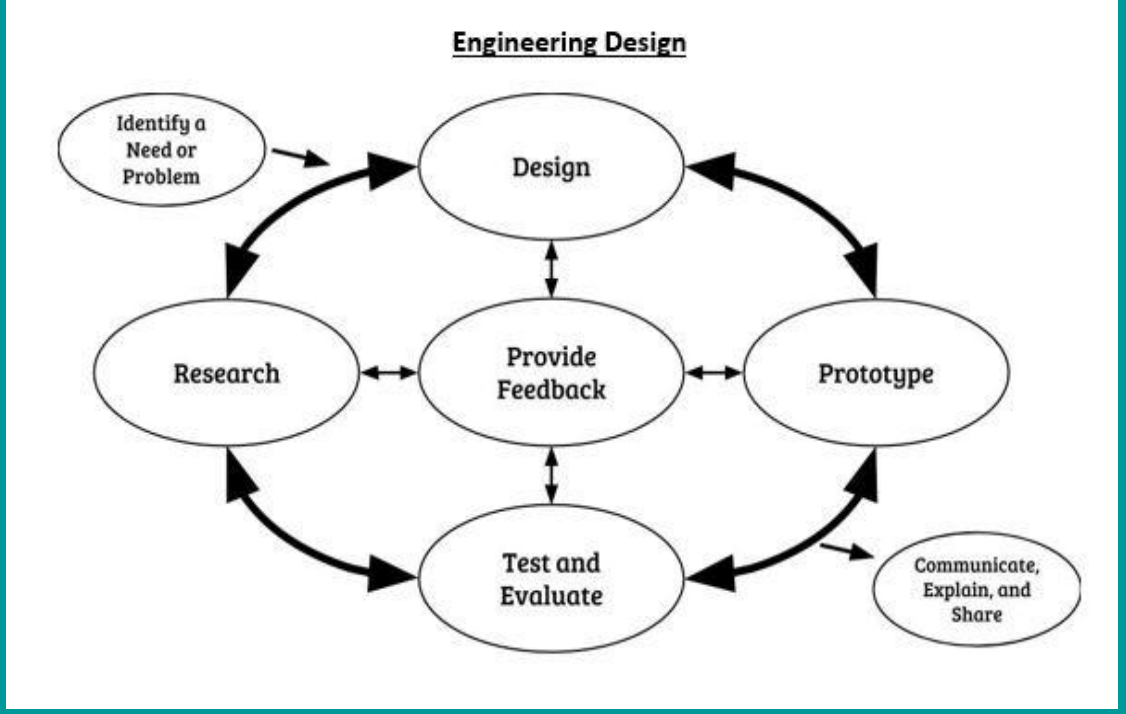


A prototype is constructed based on the design model(s) and used to test the proposed solution. A prototype can be a physical, computer, mathematical, or conceptual instantiation of the model that can be manipulated and tested.

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.

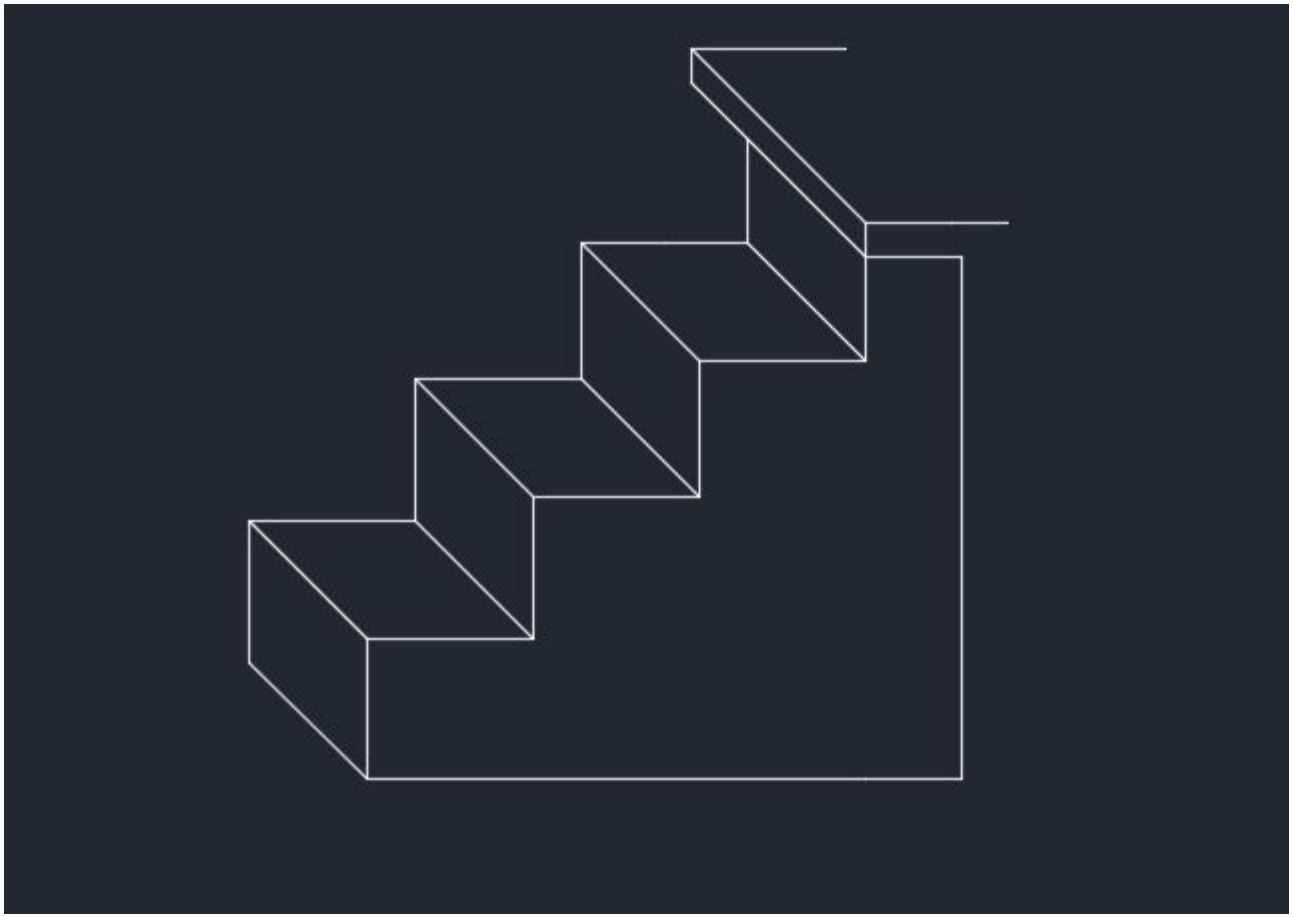
Collaboratively decide whether the solution needs more work and repeat previous phases as needed.

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.

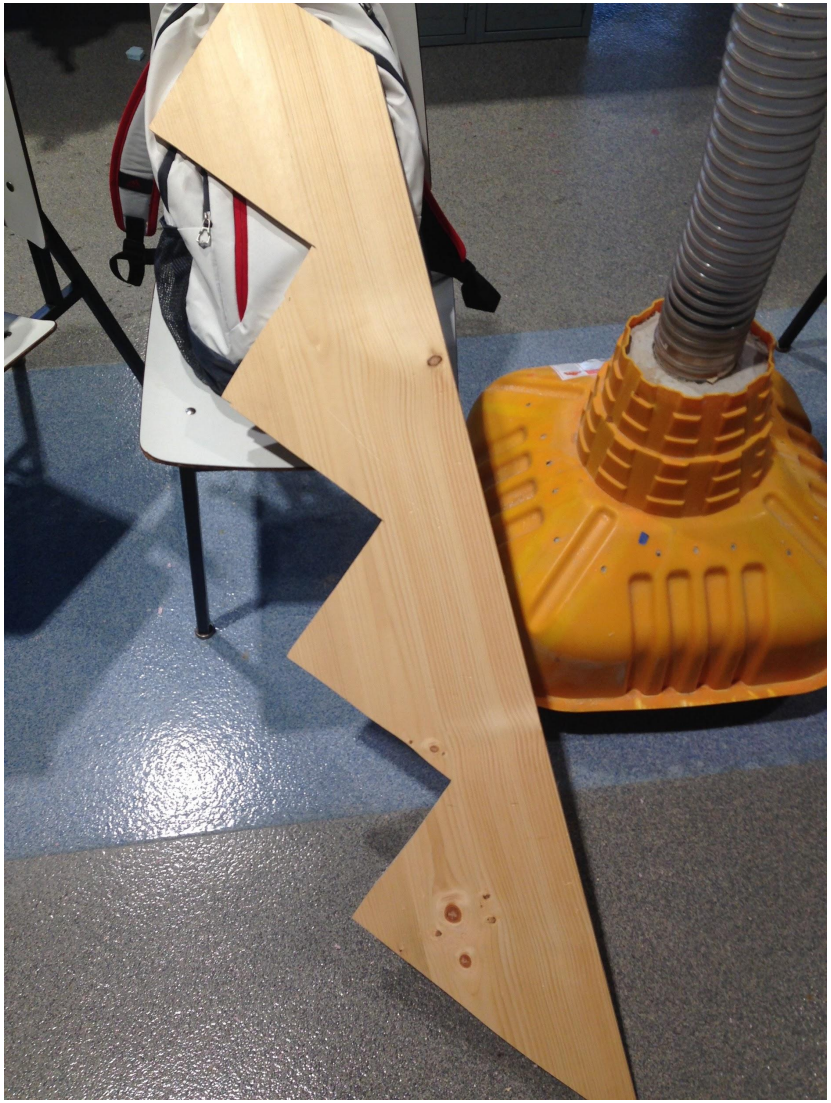
Step 5 evidence

1st Prototype picture and computer program



Step 6 evidence

1st modified prototype picture and computer program



Here we made the first side to our stairs, from here we copied it with another piece of wood to make two symmetrical parts

Step 6 evidence

2nd modified prototype picture and computer program

Once we had two equal sides for our stairs the next step was to place boards across the top and create the actual “step.”

Step 6 evidence

3rd modified prototype picture and computer program

Our last step was to make legs for the stairs so they could stand by themselves and then add extra support boards on the bottom to help reduce sway and provide extra support for the overall structure.

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 :

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