

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?

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.....**

Step 1: Discover problem and come up with possibilities of fixing that problem. What I know about the problem is only going to help me more with solving it.

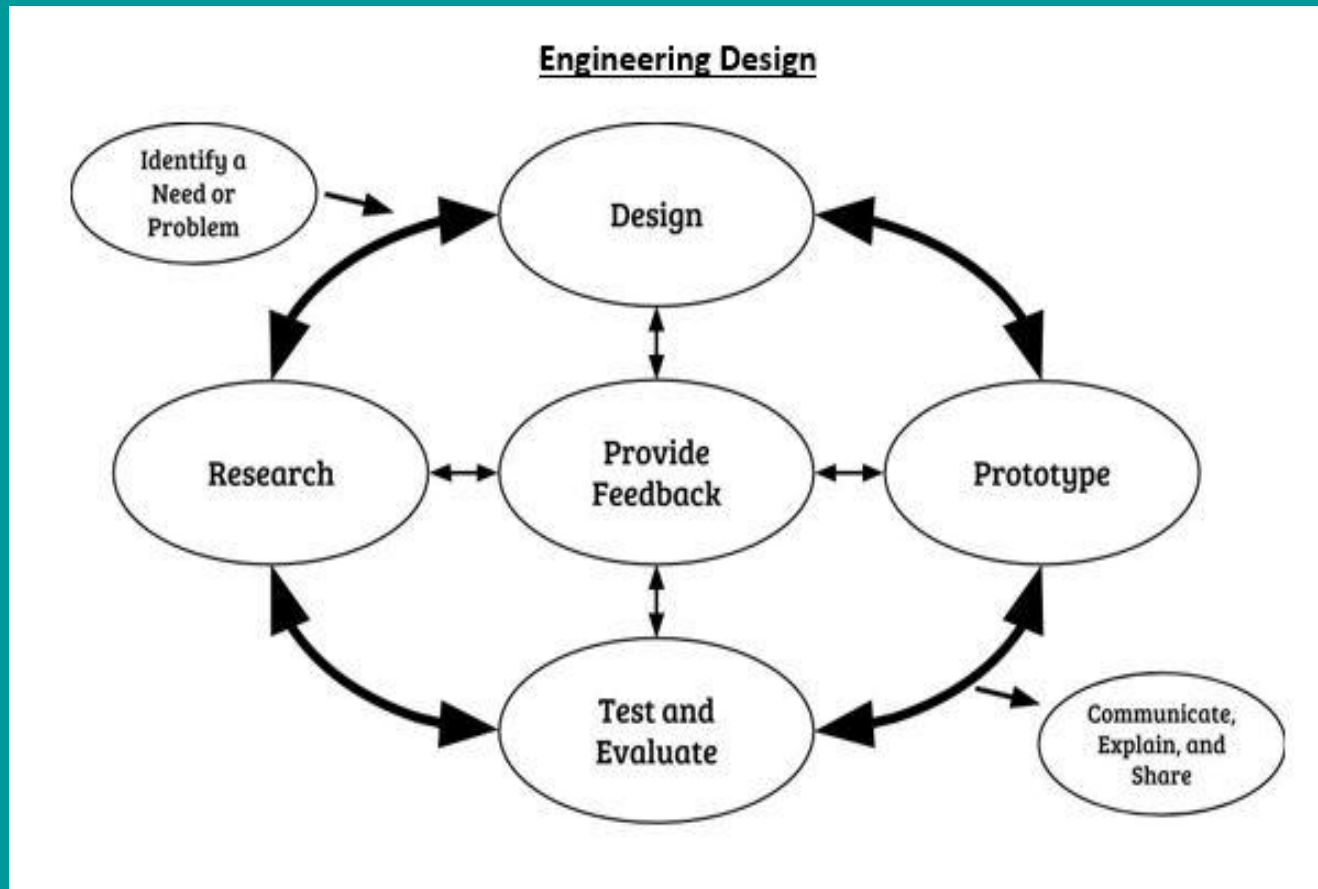
The time I have is by the due date: 10/19

Yes i'm on the right track of continuing to make changes and propositions for the problem

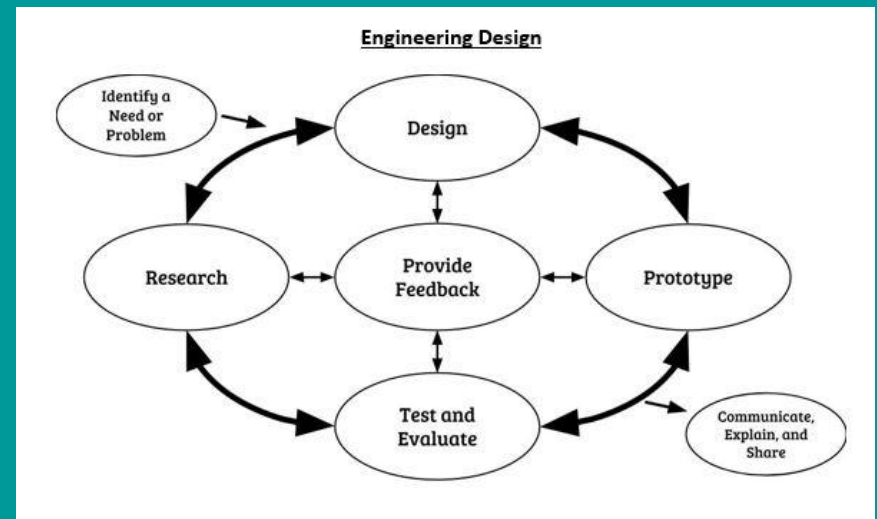
The results that i expected happened. I expected to get up the second ramp and I was successful in doing so.

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.

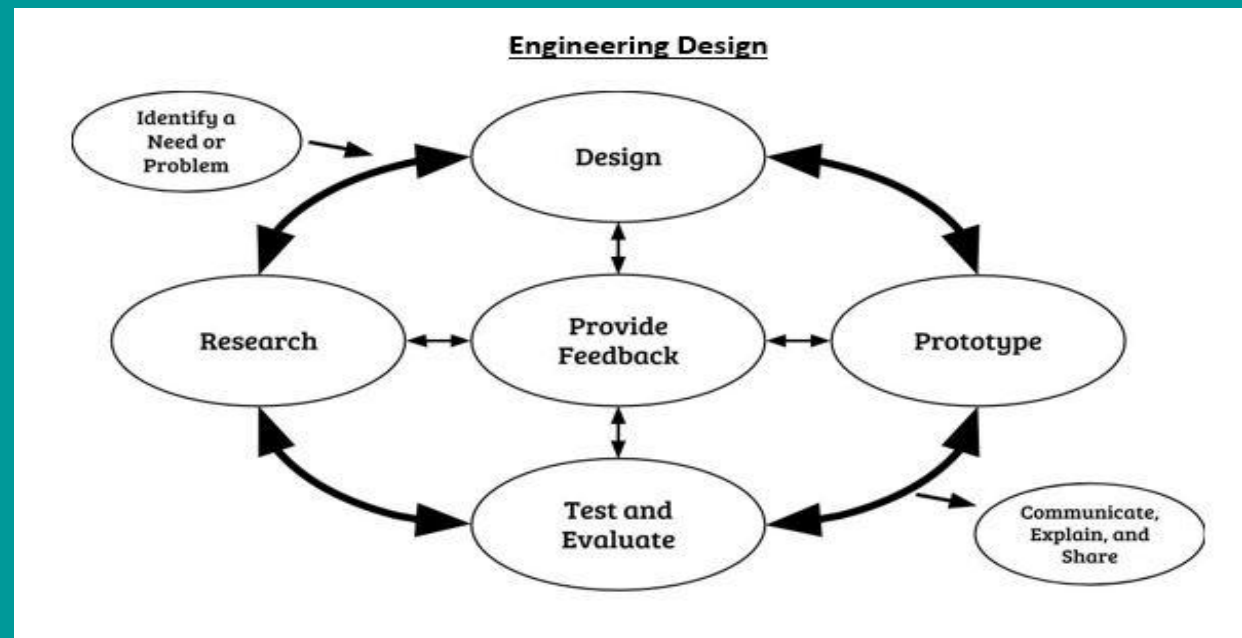
Evidence : Add slide and describe what you already know about the problem. This helps to build an understanding of the problem

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

The problem we are facing is the second steepness of the ramp. The tires seem to skid and not get a full grip on the board

In order to get up the next ramps climb we will need to add more weight to the robot. Putting more weight will cause more force pushing down on the bot to give it's tires a better grip on the board

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

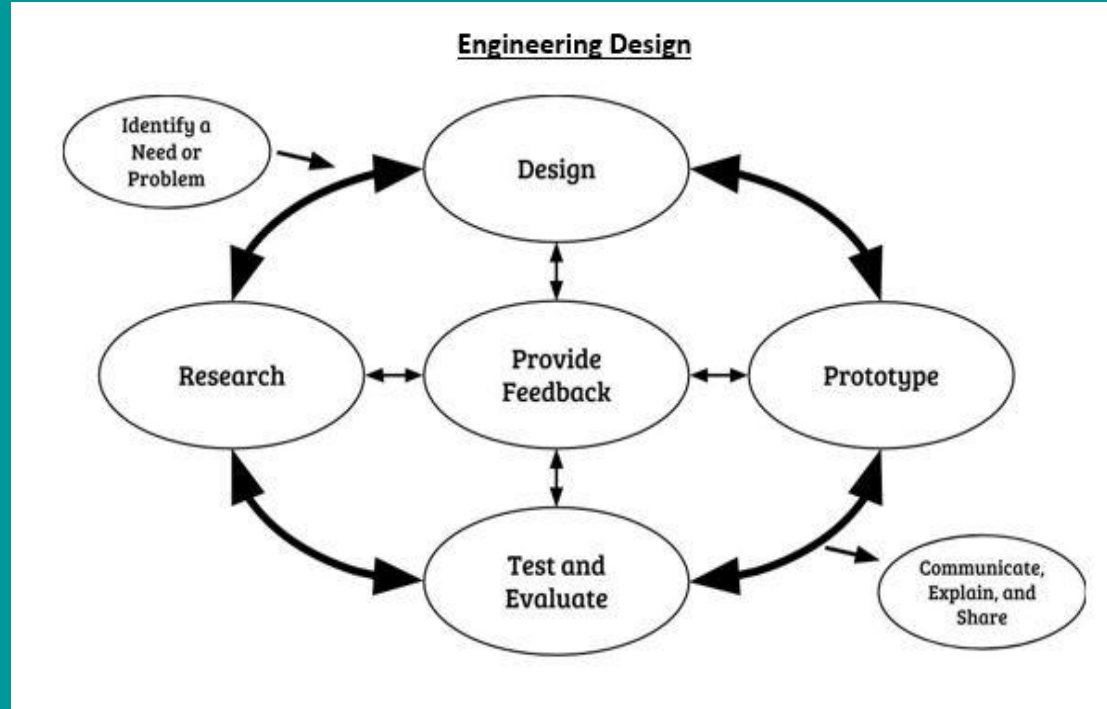
Analyze the information gathered and its sources.

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***

For research we mostly used trial and error but our big research help was Mr. Croak's robotics web page and following the steps to design said bot.

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.

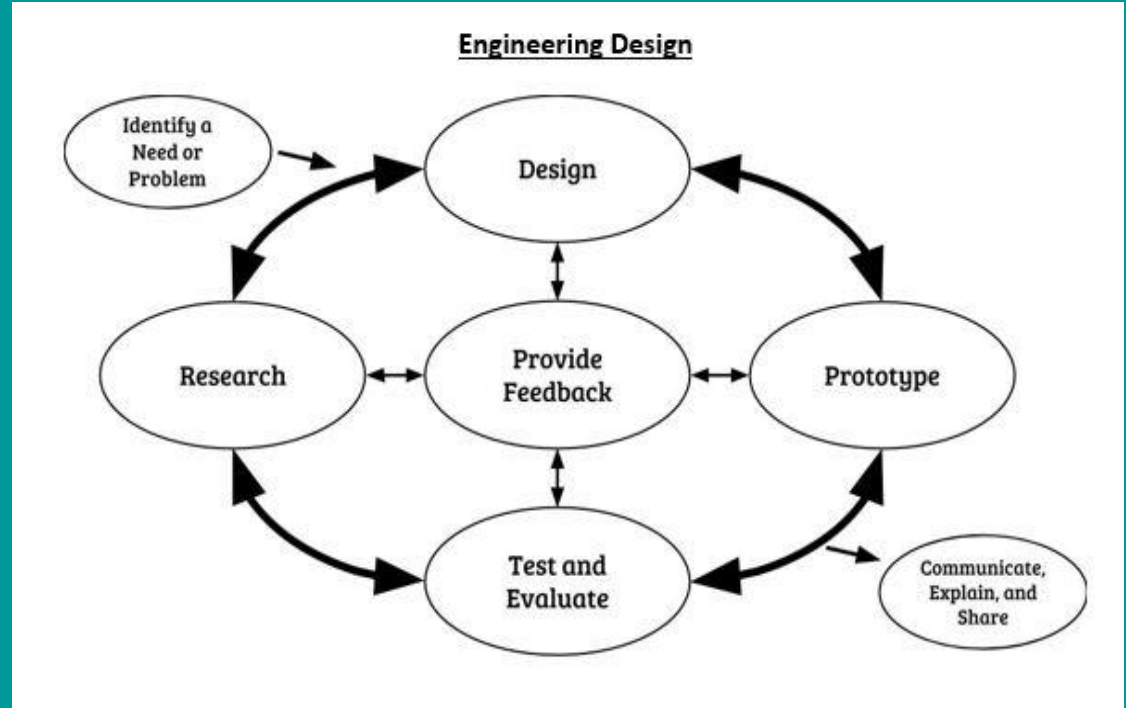
Evidence: Clarify the roles of each team member, taking advantage of individual strengths.
List the role of each member on the team

Both Evan and I are working together to upgrade, advance, and complete our robot to successfully climb the next ramp incline

Evan: Bot design and research

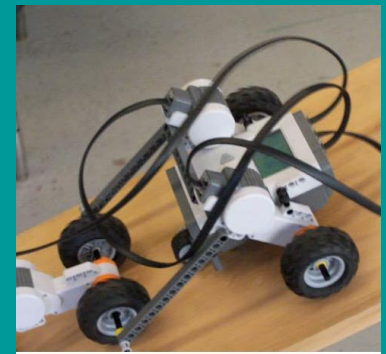
Keith(me): Bot design and research

Prototype



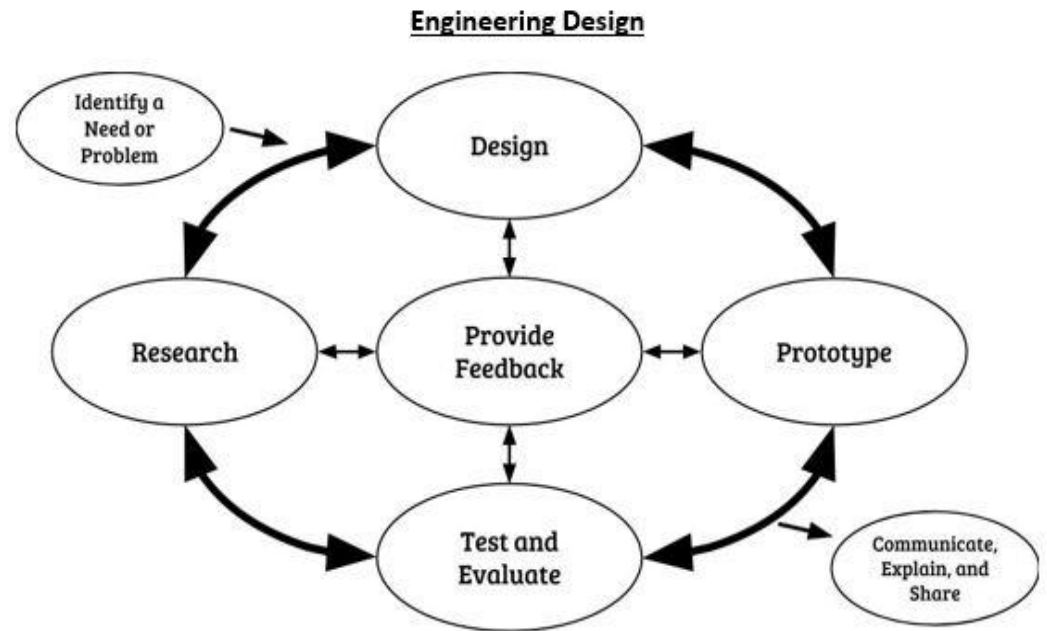
A prototype is constructed based on the design model(s) and used to test the proposed solution. A prototype can be a physical, computer, mathematical, or conceptual instantiation of the model that can be manipulated and tested.

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



Our original plan was to go with the base model on the robotics website, then improving from there if need be. We are now on ramp two and must improve grip of the wheels by adding weight to our bot to really push the tires down and get a grip on the board

Test and evaluate



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

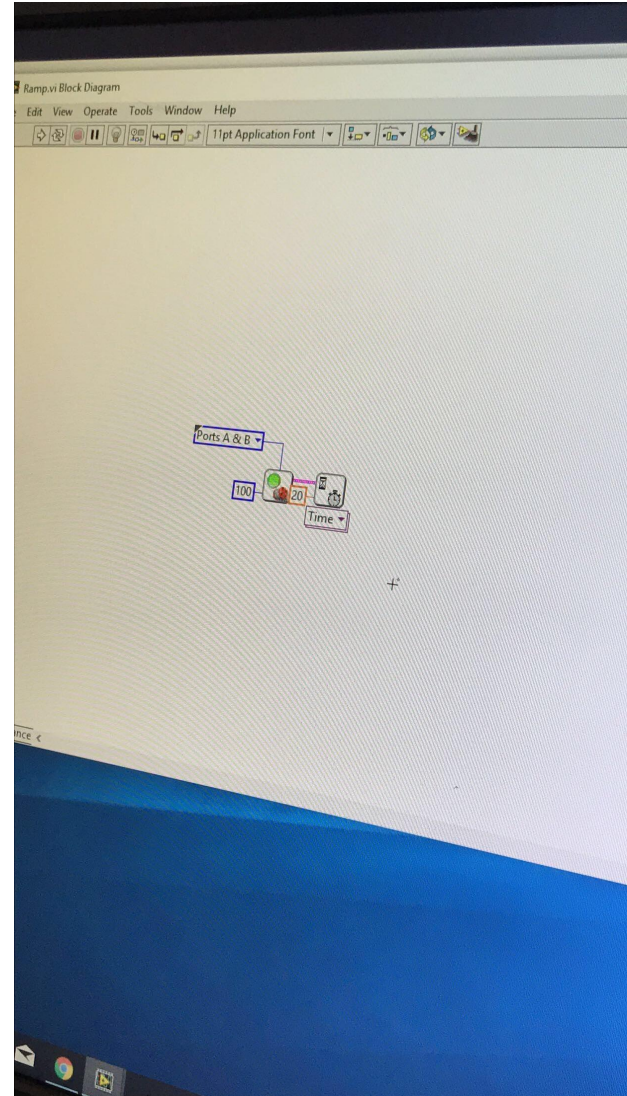
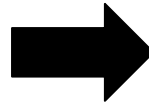
Collaboratively decide whether the solution needs more work and repeat previous phases as needed.

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

- Yes our bot works
- It did not work expectedly for the second ramp
- Adding weight to improve grip of the wheels
- Yes, it got up the first ramp no problem
- Yes our bot is safe
- Yes, we gave recommendations about what wheels to use to a different group and to add weight to their bot

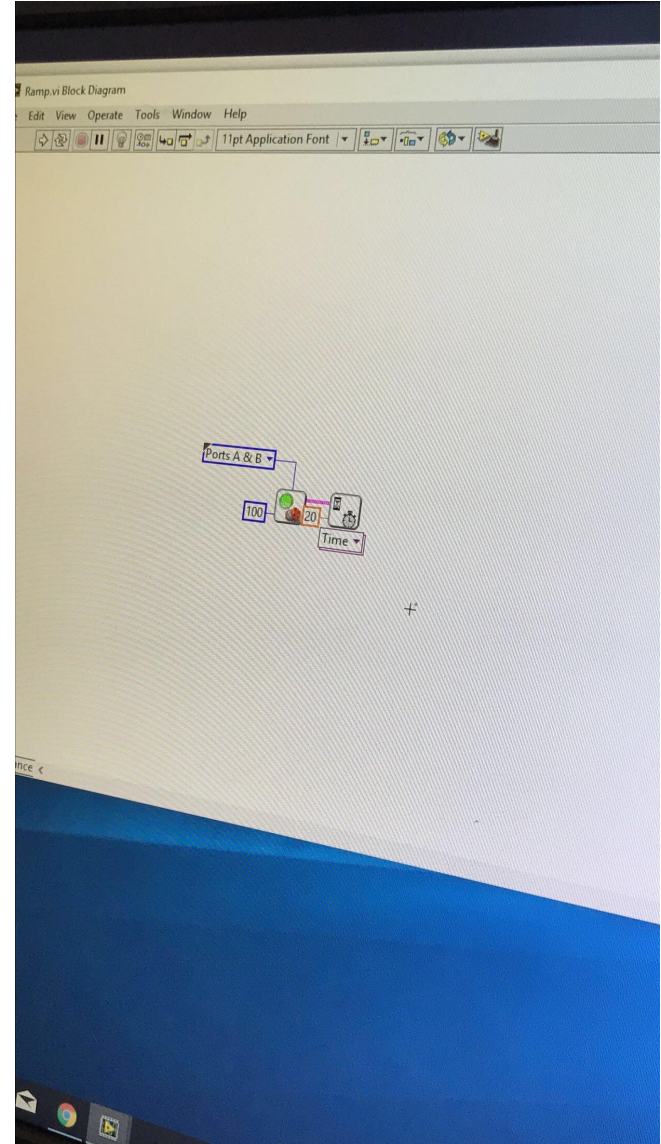
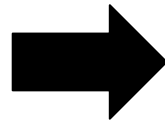
Evidence

modified prototype picture and computer program



Evidence

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 :

Youtube Link:

[Ramp Bot vs Ramp 1](#)

[Ramp Bot vs Ramp 2](#)

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.

- Realizing a problem
- Problem solving
- Trial and Error

These traits will all be helpful for when I'm doing labs for Physics and need to problem solve and come up with solutions for those problems.

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,
If you're struggling with a problem you can't solve it's okay. It's okay to fail and it's okay admit you failed. It's NOT okay, however, to not get back up on your feet and to stop trying to. By putting in your best effort you will eventually get by whatever problem you're stuck with. It took me over 10 classes just to climb up the second height of the ramp, but i finally did it because I kept persevering.

Good Luck,

Robotics student of 2018

What metacognitive strategies are you using?

Metacognitive strategies i'm using are staying positive, learning from mistakes, Realizing failure in trial and error, and brainstorming before doing.

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