



Flint Regional Science & Engineering Fair

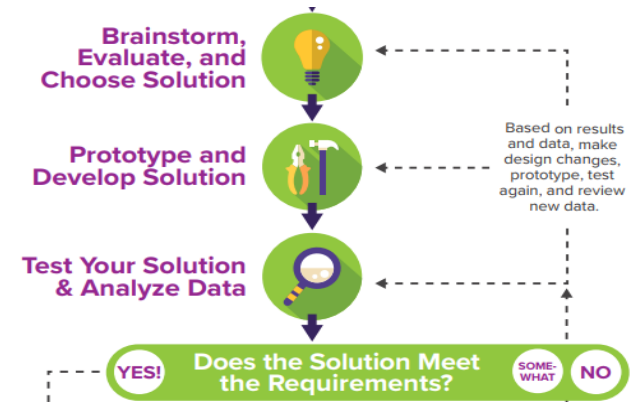
Inspiration, Invention, Innovation



TOPIC 9: REFINING



Refining – We will...



- **Refine Prototype**

- Brainstorm solution to problems identified while testing
- Redesign, if needed
- Make revisions
- Repeat process

- **By the end of this step, you will have:**

- A working prototype that solves your identified problem.

Refining

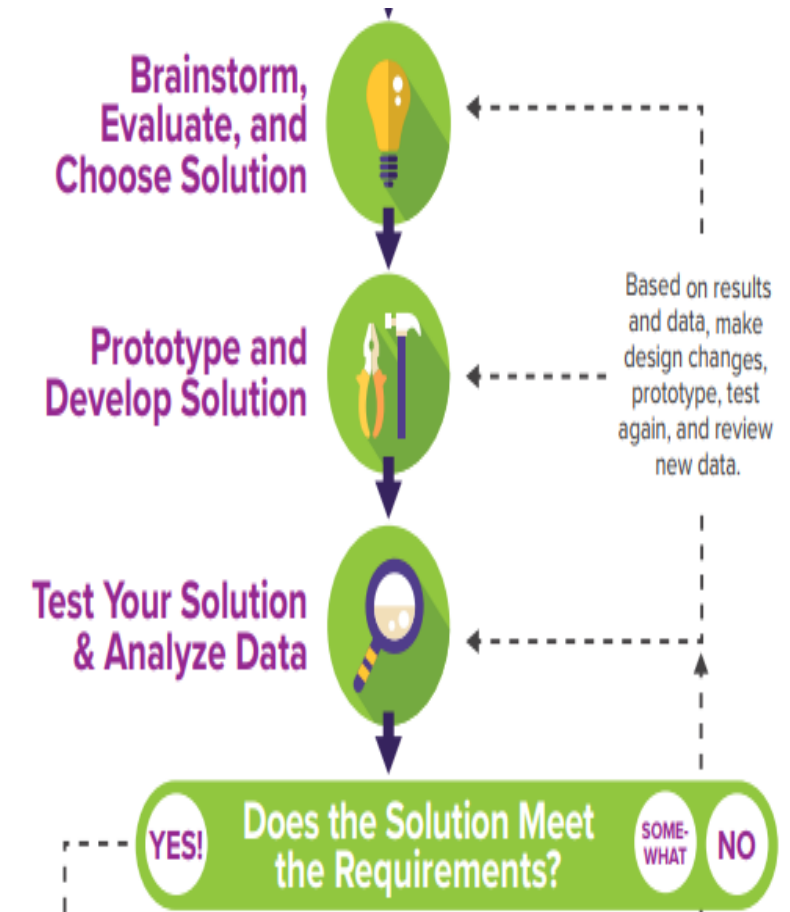
This step is also known as the **IMPROVE** step.

Take the knowledge gained from your testing to improve your prototype.

You may have to:

- Refine your criteria or constraints
- Return to the Brainstorming step to produce new ideas
- Redesign your prototype
- Build another prototype or update a previous version

Be sure these are ALL added (including drawings) to your log-book!



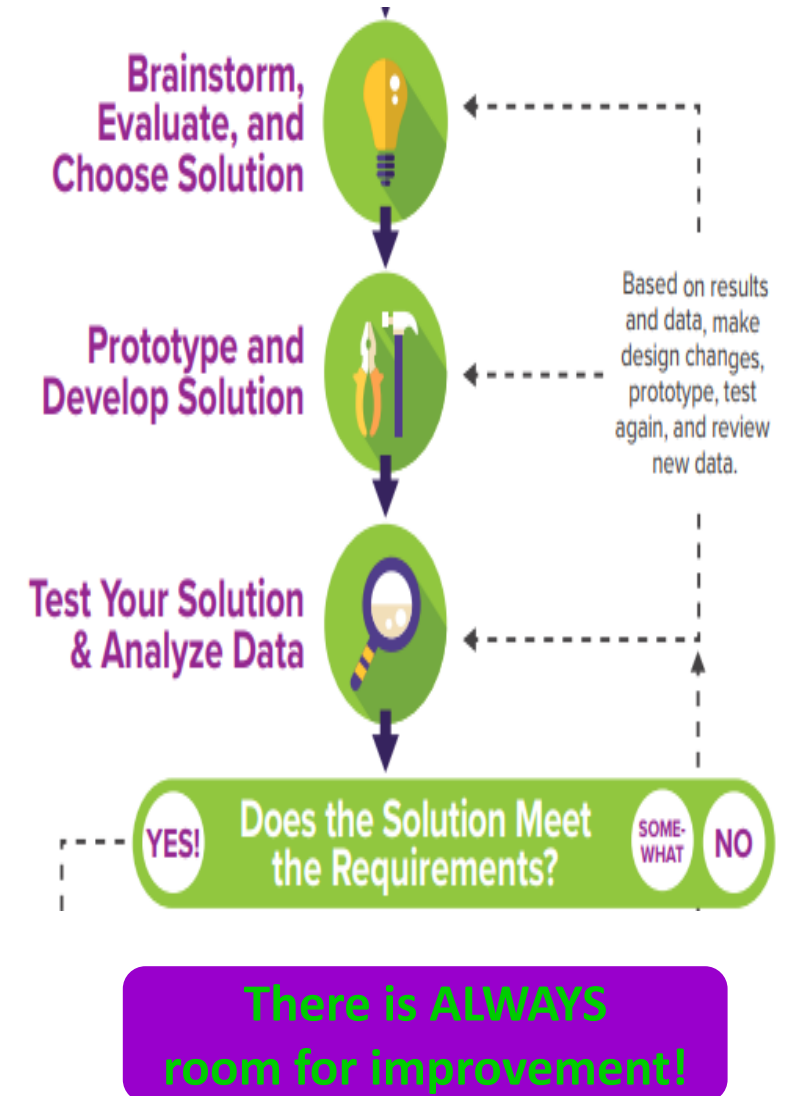
Refining - Iterative

This process is **ITERATIVE**.

Iterative - the repetition of a process

You will go through these step many times until you have arrived at the project you will present.

NOTE: I did NOT use the words 'final project'. Your project may or may not be finished. You will be judged on how well you followed the Engineering Process, your knowledge of the topic, creativity is solving the problem..., not if you finished or not.





OUR GREATEST WEAKNESS
LIES IN GIVING UP. THE MOST
CERTAIN WAY TO SUCCEED
IS ALWAYS TO TRY JUST
ONE MORE TIME.

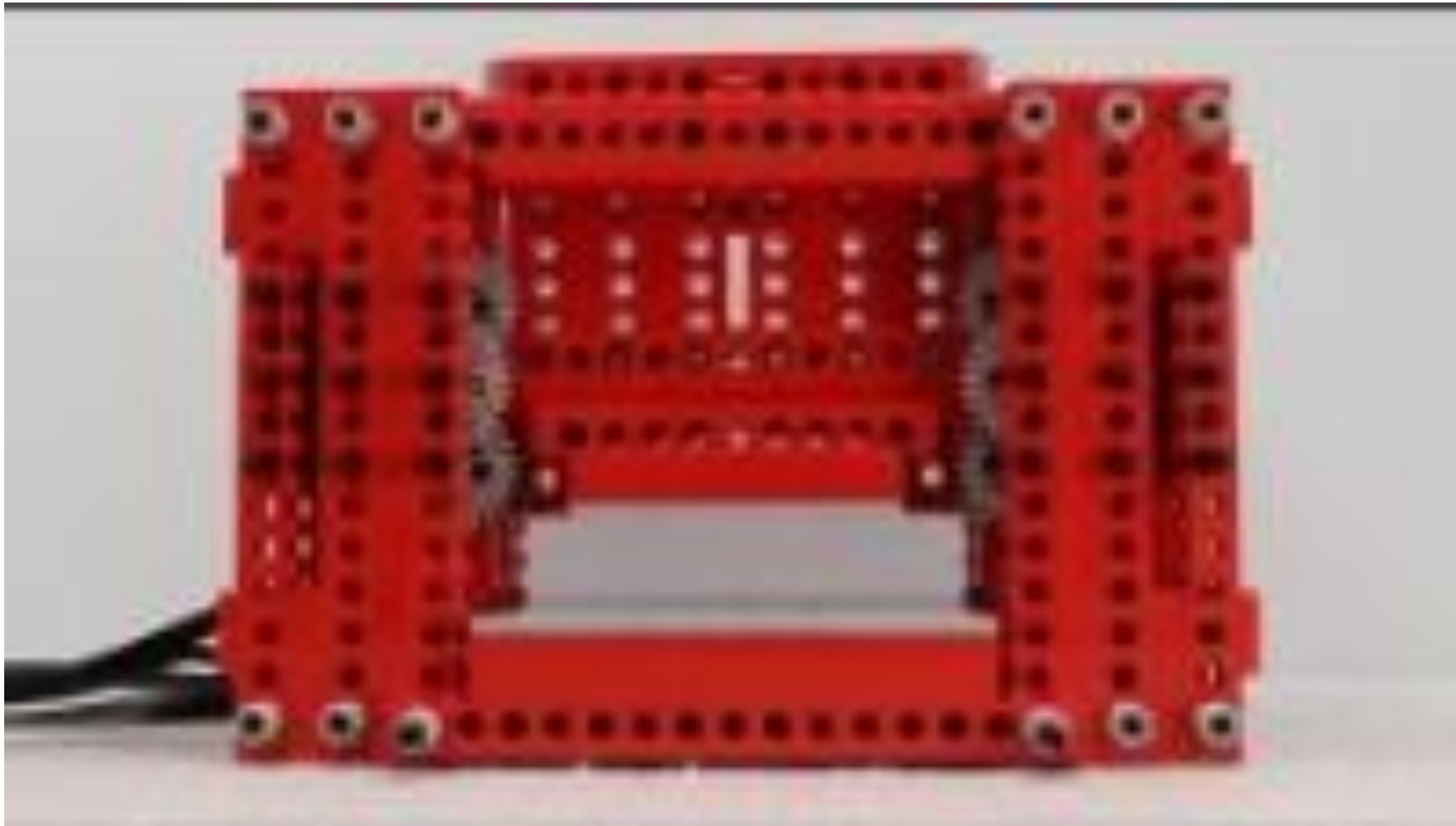
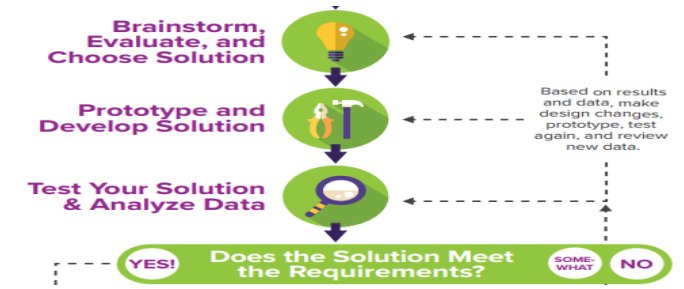
Thomas Edison



OUR GREATEST WEAKNESS
LIES IN GIVING UP. THE MOST
CERTAIN WAY TO SUCCEED
IS ALWAYS TO TRY JUST
ONE MORE TIME. MANY OF
LIFE'S FAILURES ARE PEOPLE
WHO DID NOT REALIZE HOW
CLOSE THEY WERE TO
SUCCESS WHEN THEY GAVE UP.

Thomas Edison

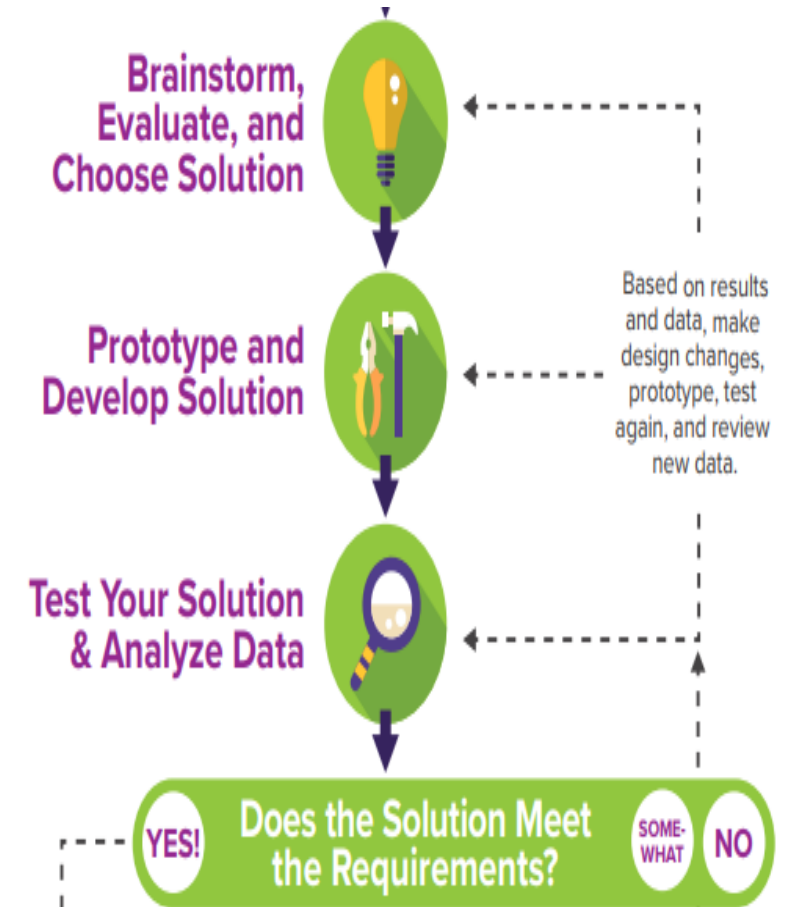
Refine – Test & Refine



<https://www.youtube.com/watch?v=DLxw6x9ITwM>

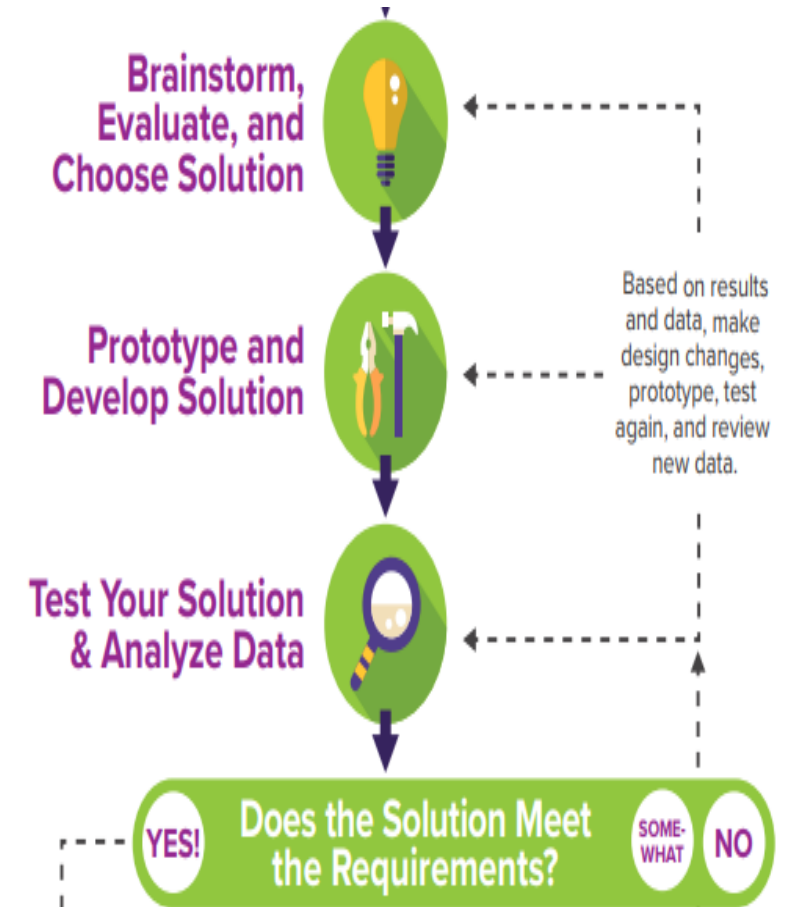
Refine – Test & Refine

- Where did you see brainstorming ideas (or where do you think that happened)?
- What kinds of minor revisions did they make?
- What kind of major revisions did they make?
- How should these revisions be handled in their log-book?



Refine – Test & Refine

- How do you think they felt during this process?
- Do you think they may have wanted to quit?
- How could they overcome these feeling (desire to quit) to complete the project?



Refine – Phones



1870 – Top Box



1880 – Gower-Bell



1905 - Chicago upright desk set



1905 - Strowger 11-digit desk telephone



1920s - Magnavox anti-noise desk set



1925 - Frankfurt "Bauhaus" Telephone



1950 - Rotary phone



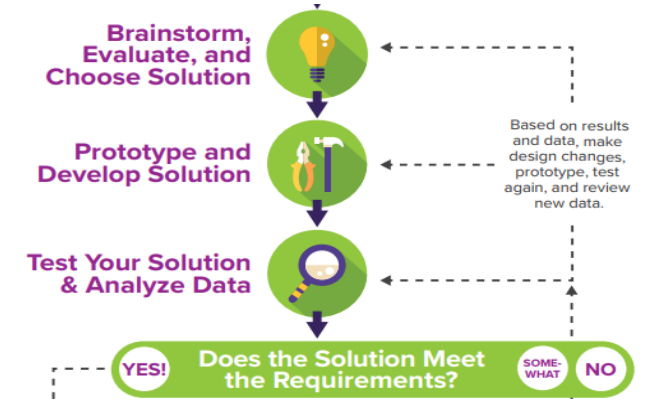
1970s & 80s – Princess phone



1980s – Touch-tone phones



1990s – Cordless phones



(NOTE: There is a point where the revision is 'good enough'. Each of these phones was a revision/refinement that was brought to market, sold millions and made the company that sold them lots of money.)

Refine – Cell Phones/SmartPhones

1980s - First MOBILE phones



AEG Telecar CD

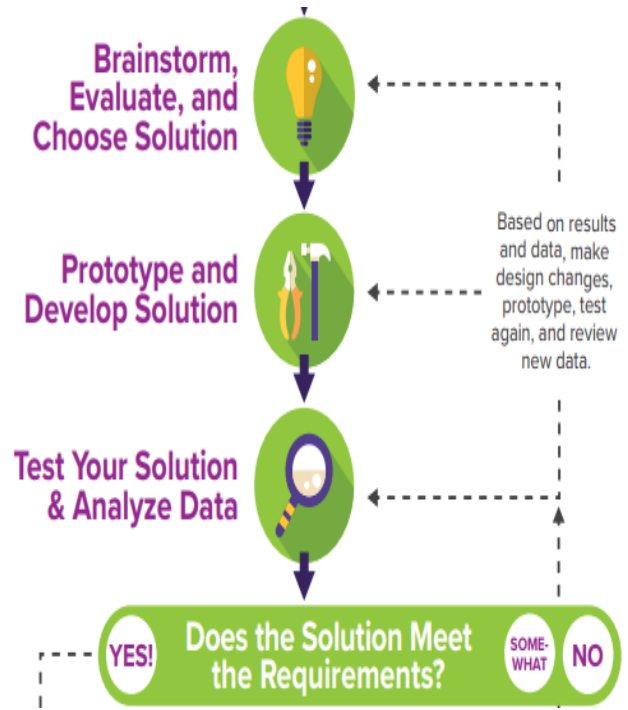


Motorola DynaTAC 8000X

1990s – Flip phones



1996 – Motorola StarTA



2007 - First iPhone
First SmartPhone



2008 - BlackBerry Storm
First touch screen



2008 - T-Mobile G1
First Android
(Also, the first Google phone)



2011 - Nokia Lumia 800
First Windows Phone
Out of business 2017

To Do:

- Refine Project:
 - Repeat the Brainstorming, Design/Build, and Test steps until you have a finished project.
 - A project isn't finished until it meets all the criteria stated, and, hopefully, people like it, and it is aesthetically pleasing (i.e., looks good). Or, you have run out of time to work on it (hit a hard due date).
 - Remember: There is always room for improvement!
- Record all work on project in your log-book – every day!

