Flint Regional Science & Engineering Fair
Inspiration, Invention, Innovation

TOPIC 8: TESTING

Testing – We will…

Test Your Solution & Analyze Data
YES! | Does the Solution Meet the Requirements? | SOME-WHAT | NO

- **Test and Evaluate Prototype**
  - You will test your prototype and record results
  - Others will use/test your prototype and give you <u>*feedback*</u>.
  - Analyze: what works, what doesn't, and what could be improved.
- **By the end of this step, you will:**
  - Be able to answer the question, "*Does the Solution Meet the Criteria / Requirements*?"
  - Know what parts of your design work and what doesn't

Testing

https://www.youtube.com/watch?v=_XbEDanJAqA

Testing –
Ideas and Reminders

Test Your Solution
& Analyze Data

YES! Does the Solution Meet
the Requirements? SOME-WHAT NO

Who tested their design /project?

What problems did they find?

What suggestions were made?

How did others testing their design make for a better project?

Testing

Test Your Solution & Analyze Data

YES! Does the Solution Meet the Requirements? SOME-WHAT NO

It is the best way to learn if the solution works, *and* how end-users think and feel about your solution.

Remember, the purpose of testing is to find faults quickly (i.e., *fail quickly*), so that you can also arrive at the best solution as fast as possible!

This step is where you want to fail; find what isn't working!

Testing – part 1- you
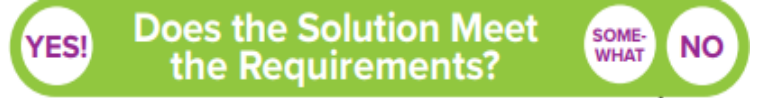
First, you should test your prototype.

- Does it meet your design criteria?
    - If it doesn't, it the problem your criteria or your design?
- What needs improvement?
- How can it be improved?
- Keep _detailed_ notes about every test, and every change you make, in log-book!!!

Testing – part 2 - others

Test Your Solution & Analyze Data
YES! Does the Solution Meet the Requirements? SOME-WHAT NO

Next, **_very early on_**, others should use your prototype.

- Observe how they interact with the prototype (no input from you)
- Ask user to give detailed feedback
  - What did they like or didn't like
  - What worked or didn't work for them
  - How would they like it work differently
  - Do they have any questions or suggestions
  - Any other input

Keep _detailed_ notes in your log-book!

Do NOT skip this!!!

Testing – pay attention to…

Test Your Solution & Analyze Data

Does the Solution Meet the Requirements?
YES!   SOME-WHAT   NO

- Ease of use
- Functionality
- Aesthetics (how it looks)
- Does it meet your criteria?
- Does it work within your constraints?
- Does it *really* solve the problem?
- Does it solve one problem but create new problems?
- Other aspects, as it applies to your project (for example, environmental or safety issues).

Testing – A/B testing

Test Your Solution
& Analyze Data

YES! Does the Solution Meet
the Requirements? SOME-
WHAT NO

When you have two options and want to know which is the better choice:

- Build two prototypes that are *exactly the same,* EXCEPT for <u>one</u> modification
- Both version are used by the same tester and rated

See which works better. This is good for differences that may affect comfort, performance, placement…

This often occurs near the end of the build – test – refine process.

Testing – Remember

- You can return to any of engineering design process steps at any time.

- Most real-life engineers find themselves jumping back and forth through the different steps until they arrive at the final product – ready for production.

Test Your Solution & Analyze Data

YES! Does the Solution Meet the Requirements? SOME-WHAT NO

Testing – Remember

Test Your Solution
& Analyze Data

YES! Does the Solution Meet
the Requirements? SOME-WHAT NO

By taking what you learn from testing and applying to your next prototype, your project is always improving – even when your test appears to be a failure. (Maybe, especially when your test fails, because you can learn a lot from a failure – much less to learn from a success!)

Prototyping – Testing – Refining - Returning to other steps, as needed - Repeat gives you valuable insight into the problem you're trying to solve, and, ultimately, a better solution!

When you have
exhausted **all** possibilities,
remember this: **you haven't**.

- *Thomas Edison*

To Do:

Test Your Solution & Analyze Data
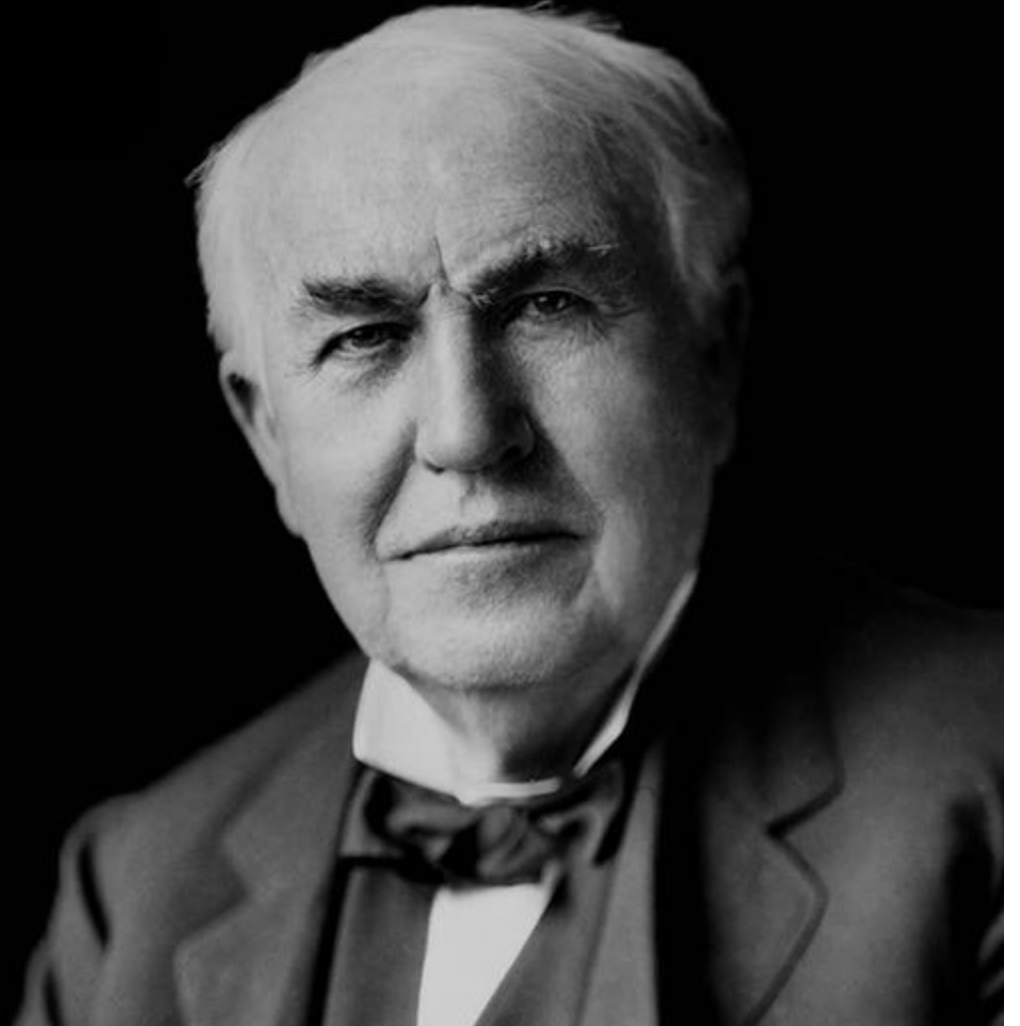
YES! Does the Solution Meet the Requirements? SOME-WHAT NO

- Test your prototype (you and others – especially with people willing provide _constructive criticism_)

- Record all work on project in your log-book, **especially:**

  - how your prototype worked when you tested it

  - what others thought of your project – did it work or not, positive and negative comments, and their thoughts on how it could be improved

  - what changes you will make to your next prototype (including all the ideas you brainstormed, or others provided, even if you didn't use them!).