Engineering Virtual Learning

HS Intro to Engineering Design Lesson #6

April 13, 2020

Objective/Learning Target:
Students will build a “Sling It” machine
out of household items and
test it for accuracy and precision.
(This is a 4 day project.)

Bell-work:

Sometimes problems are easy to solve using string, glue or tape. Other ideas take months or years to solve all the “bugs” before they can be mass produced. Today you are going to design and build a simple machine to **throw a cotton ball.**

Have you ever used a sling-shot or just a rubber band to launch an object into the air? What is the difference in that type of machine and a hot air type balloon to move an object?

Write a reflection of the similarities and differences in your engineers notebook.

Title this activity **“Sling It” Machine**

Let's Get Started:

These videos show how to create a Trebuchet, Catapult or Sling-shot

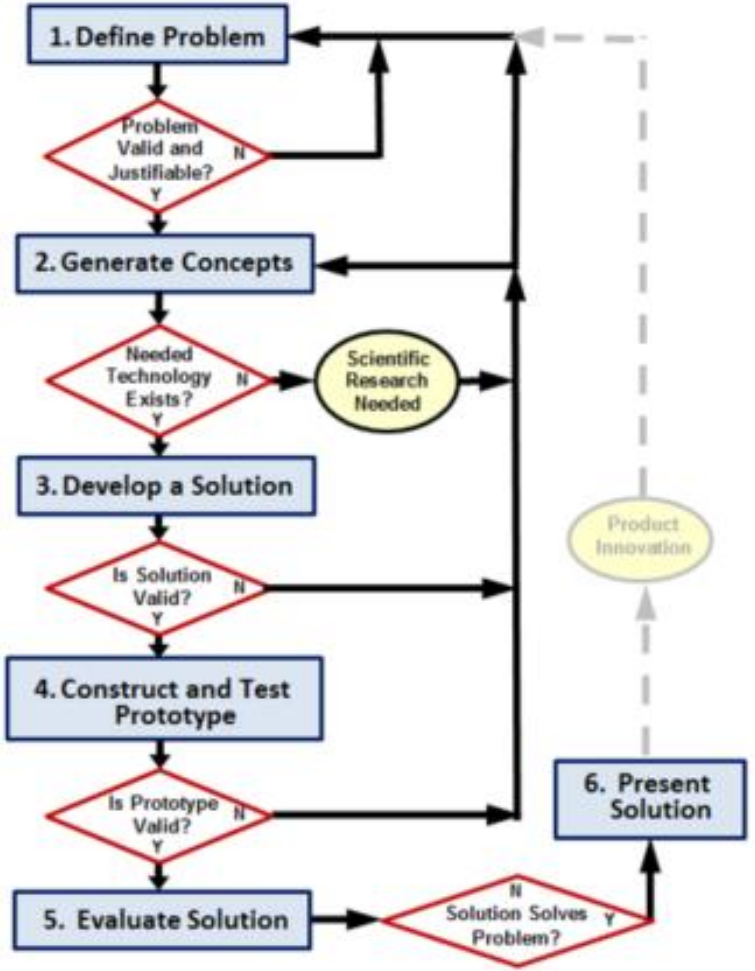
https://www.youtube.com/watch?v=9-Hwxw4fgqk

https://www.youtube.com/watch?v=EFxeVO3AfaA

Research these designs and others for the machine you might want to build. Notice how they documented their design and "re-designs" with drawings and documentation.

Make sure you follow the Design Process.

1. Define the Problem
2. Generate Concepts
3. Develop a Solution
4. Construct and Test a Prototype
5. Evaluate the Solution
6. Present the Solution



Household supplies needed:

Experiment Recording Supplies:

Paper or Engineers notebook, Pencil, Measuring Device (tape measure or ruler)

Building Supplies: (items may vary)

2 cotton balls (or paper wad), 1 small balloon, 2 corks, 1 rubber band,
2 paper clips,1 piece aluminum foil, 1 grocery store bag, 2 pop sickle sticks,
2 straws, 2 pipe cleaners, 1 cardboard cereal box

You can use as much tape (masking, clear, duct) as you need.
You may also substitute items from around your house.

Activity:

Learning Practice:

You may use 6 items from the list above or other items that you find around your house.
(Example: 2 paper clips is one item, but if you do not have 2 paper clips you can use 2 twist ties.)
Using these items you will design and build a machine to throw a cotton ball as far as possible.

Step 1: Brainstorm solutions to the challenge. Record all your ideas with sketches in your engineer's notebook or on other paper. Try to get at least 10 solutions. Feel free to research on the internet. Organize your data into a chart listing the pros and cons of your top 4 ideas so you can narrow it down to the best choice.

Step 2: Using your 6 items, build a prototype and test your idea. Make any adjustments or revisions to your machine to solve problems encountered till you are ready to demonstrate your solution. Make sure you record your revisions in your engineer's notebook.

Step 3: When you are ready to demonstrate your machine, find another family member to come and watch your presentation. Describe the initial problem, "how to throw a cotton ball with a simple machine" and tell how you have solved that problem. Now demonstrate by using your machine to throw a cotton ball.

Step 4: Record your results and reflect on what went right and what could have gone better.

Check For Understanding:

Do you think you could have done the same job with less materials?

How would your machine handle a small rubber ball instead of a cotton ball?

Do you think you could hit a target with your machine?

Learning Resource Links:

https://www.youtube.com/watch?v=9-Hwxw4fgqk
https://www.youtube.com/watch?v=EFxeVO3AfaA
https://www.youtube.com/watch?v=JTDxIBPme_0

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