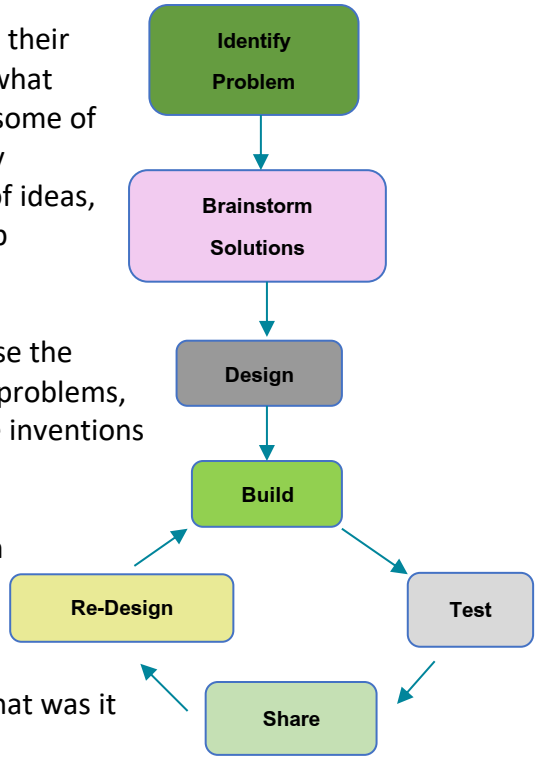
Digital Design Challenge



1. Let students know that they will be working as engineers in their challenge. Invite students to pair share their ideas around what engineers DO and what SKILLS they use. Tell students that some of the things that engineers do include: ask questions, identify problems, use creativity, come up with wild ideas, try lots of ideas, work in teams, solve problems, know it's ok to fail, and help people and the world!

2. Talk about engineering as a process. Everyday, engineers use the design process to explore solutions to complex, real-world problems, enabled by brainstorming to devise creative and innovative inventions and processes.

3. Tell students that the challenge (**PROBLEM**) that their team will work to solve is building **the tallest weight bearing structure possible**. Show students some pictures of different tall structures and ask them what they see, think and wonder? Have any of them been in a tall structure? What was it like?

4. Let students know that in building their own tall structures, they will have some constraints. They will only be able to use the limited number of materials provided and they must use ONE extended digit (finger). Additionally, they must complete the building part of the challenge in just **6 minutes**. Students may ask questions during this time.

5. Have students get into groups of four. Before they begin building, their team must spend 5 minutes **BRAINSTORM**ING **DESIGN** solutions for their structure and then sketch out their ideas for a build.

6. Once students are done with the design phase, it is time to **BUILD** their structure. Remind students of their constraints, they have a limited number of materials, the structure must be attached to only one outstretched finger (palm should be facing down), AND it must hold the weight of a ping pong ball without the ball touching the finger. Their team will have **6 minutes** and before their time is up, groups must **TEST** their structure by placing the Ping Pong ball on the top.

Goals/Rules:

- Build the tallest structure possible
- The structure will hold the weight of a ping pong ball
- The ball will not touch the finger

- The ball must not be damaged
- The mailing label must not be attached to the ball
- Height of the structure will be measured vertically from the finger upward

Points:

Each group can receive:

- 2 points for each inch of vertical height
- 15 points if the structure holds the ping pong ball without touching your finger
- Up to 20 points for creative use of the materials in the design of the structure

Materials:

- 1 pipe cleaner
- 1 straw
- 1 mailing label- 3x0.5”
- 1 ping pong ball
- 1 index card

7. Once the build time is up, have each group **SHARE** their structures and talk about what worked and what they would do differently in a RE-BUILD. If time allows, have groups make changes and build again.

DEBRIEF QUESTIONS

- How similar was your design to the actual structure you built?
- If you found you needed to make changes during the construction phase, describe why your team decided to make revisions.
- Describe the shape or construction of the structure that was the tallest and won the challenge? How was this tower different from yours, if yours did not win?
- If you had a chance to do this project again, what would your team have done differently?
- What did you like about being part of a team? What was difficult? How did you contribute?