We Are All Engineers, Designers, & Scientists

Today you will:

1. Identify discrete steps that will lead to a solution
2. Effectively collaborate
3. Persevere through a challenge with no “right” answer
4. Discuss each others ideas using evidence

Challenge

- Time to prep for the first task…
  - Clear your desk
  - You Need:
    - 1 piece of card stock paper
    - Colored pencils/markers

Task #1

Constraints:

- Quick Activity
- Use the paper provided to make a "Name Card"
  1. Fold in ½ (hotdog style) so that is can stand up on its own
  2. On the top of the card write your FULL name as it appears in your school records
  3. Include your Preferred name underneath your full name (if needed)
  4. Draw a symbol, picture, icon, emoji, phrase or word that represents YOU in the remaining white space

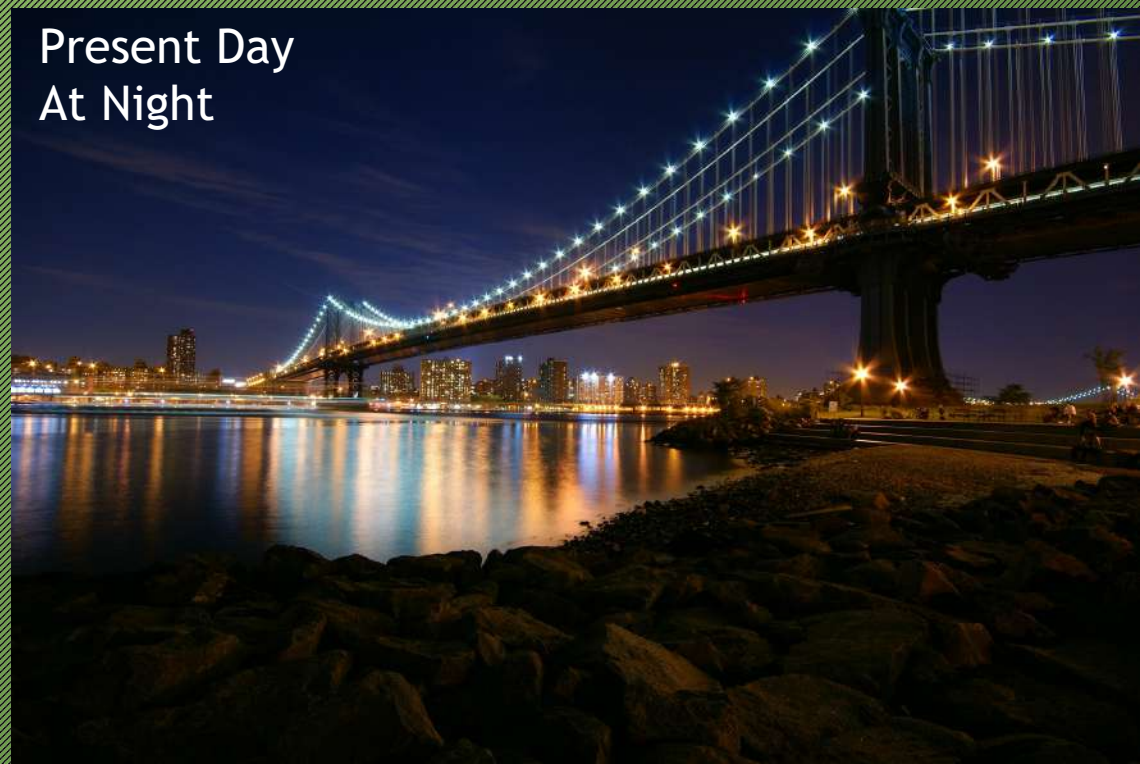
TASK #2

1. Examine the two displayed pictures of the Manhattan Bridge from two different periods in the history of New York City

1. On the back of your "Name Card" **write 3 hashtags** that explain what you observe in these two pictures

Constraints:

- Silent activity
- Hashtags are written on the back of your name card
- Hashtags must represent observations of both pictures



Task #3

Working in your group of 4…

- Share a hashtag by reading one out loud to your group
- Explain how you came up with the hashtag
- Repeat this until everyone has shared their hashtags

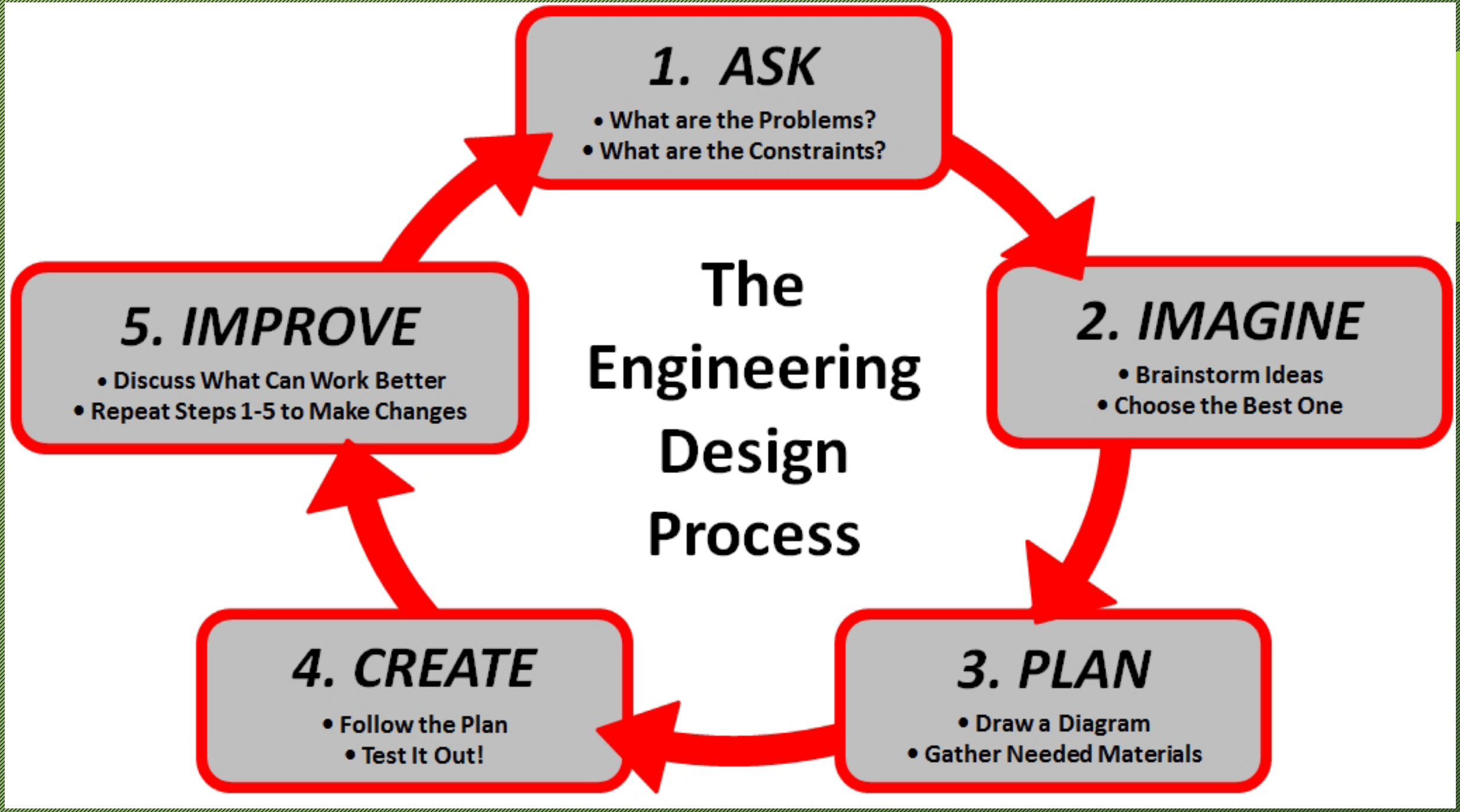
- Your group will then choose ONE hashtag that best represents the ideas from the group
- Send ONE group member to the front board to write your hashtag on the whiteboard
- You have _3_minutes!

Hashtag discussion…

- What are the similarities?
- What are the difference?
- What does this have to do with the class?

“Engineering Design Thinking”

1. What do you think this phrase means?
2. What experiences do you have with engineering or design or thinking?
3. Who thinks these are strange ideas to be talking about in a science class?


1. ASK
• What are the Problems?
• What are the Constraints?
2. IMAGINE
• Brainstorm Ideas
• Choose the Best One
3. PLAN
• Draw a Diagram
• Gather Needed Materials
4. CREATE
• Follow the Plan
• Test It Out!
5. IMPROVE
• Discuss What Can Work Better
• Repeat Steps 1-5 to Make Changes
The Engineering Design Process

How do these activities go together?

Name Card

- You needed to develop a solution for me to learn you name and if you had another nickname
- You had to define yourself through an image

Manhattan Bridge

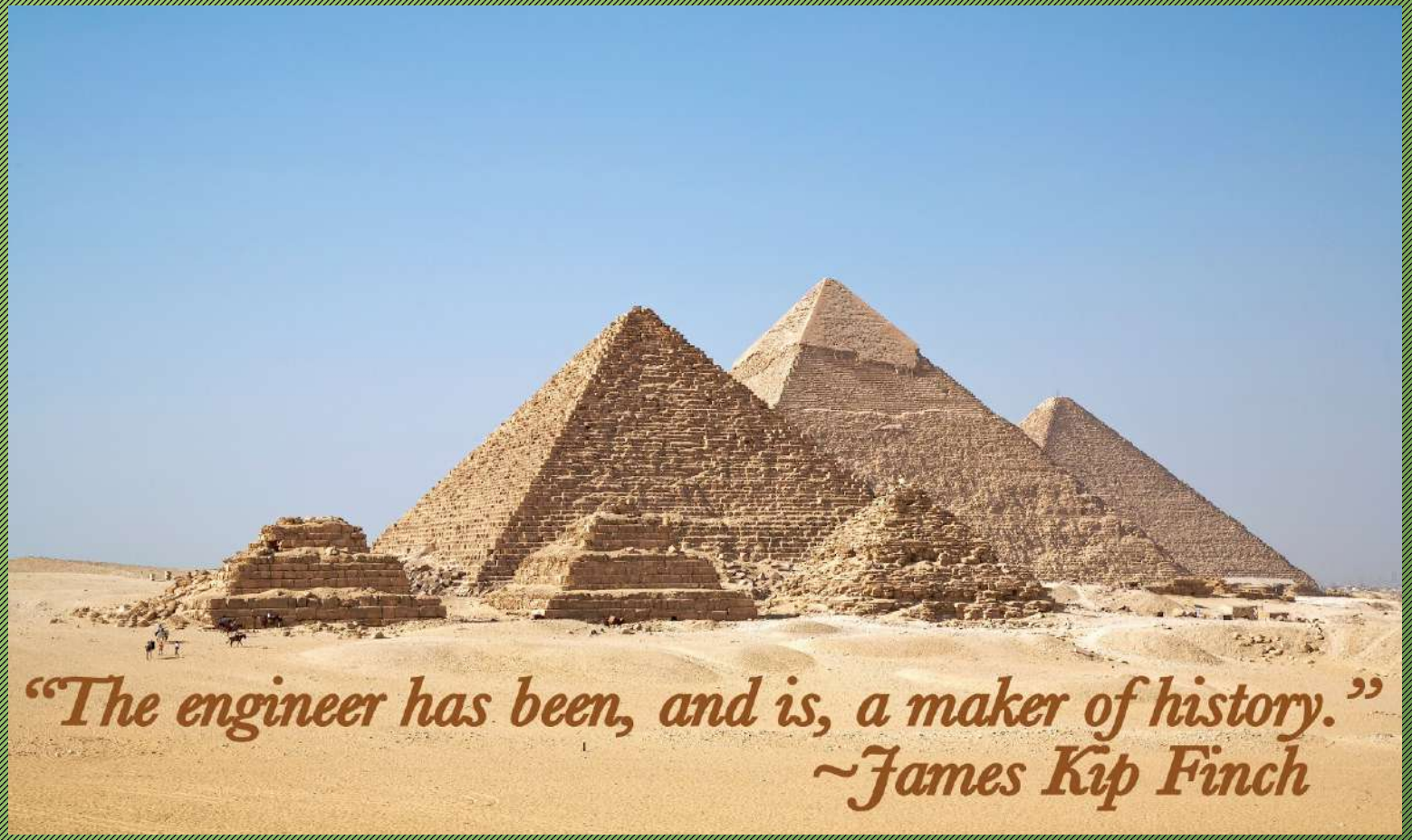
- Engineers had to develop a solution for connecting Manhattan and Brooklyn
- Engineers are defined by what they build, how it looks, and how it functions

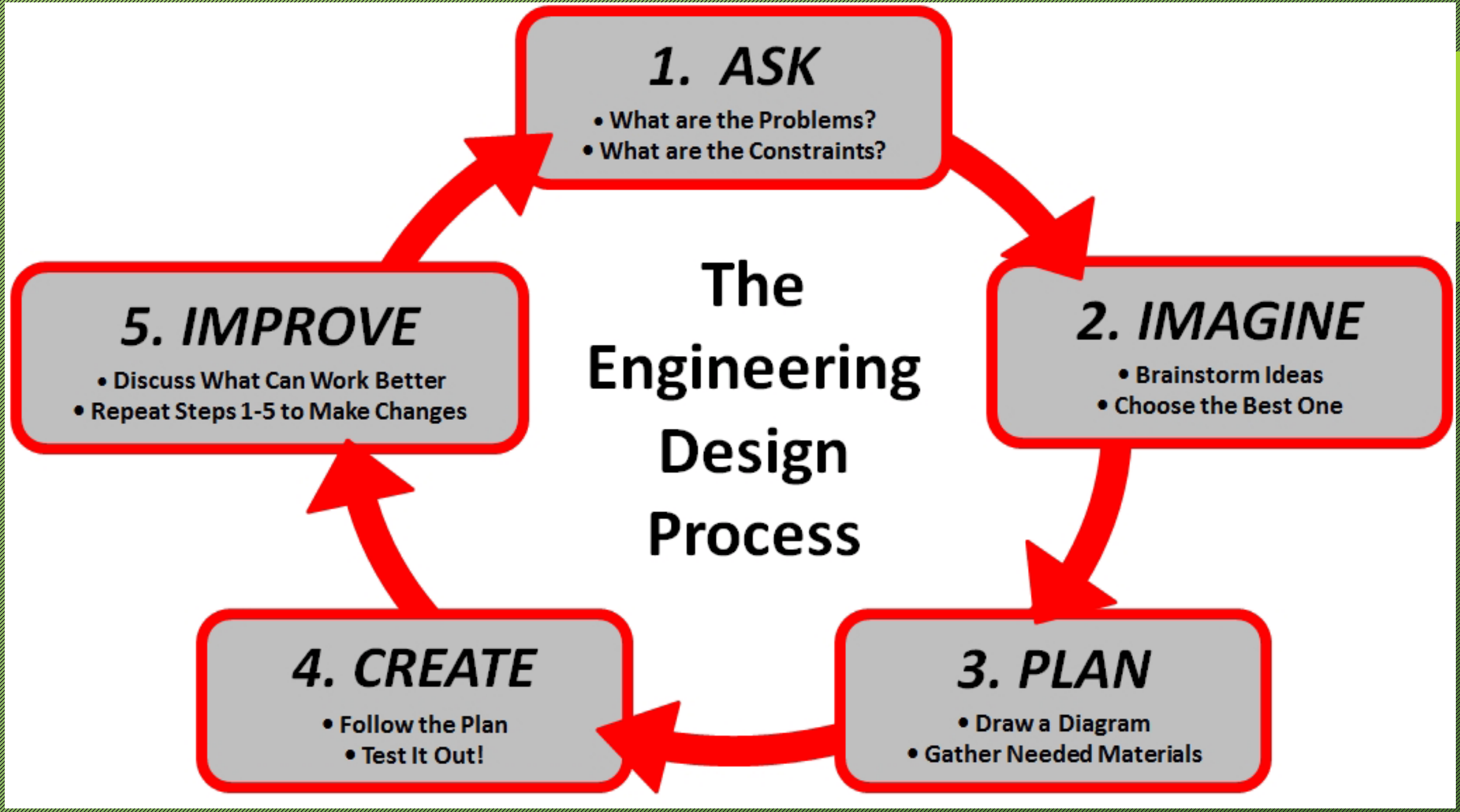
Both are elegant solutions to a problem… ☺

Can We Eat the Marshmallow Now?

Engineering Activity

“We are all engineers, designers, and scientists.”

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Activity: Marshmallow Tower

Overview

- Work in your assigned group of 4 students
- Supplies:
  - Scissors
  - Tape
  - Paper bag with…
    - 20 pieces of spaghetti
    - 1 meter of string
    - 1 Marshmallow

Constraints

- Build the TALLEST freestanding structure
- A marshmallow must be on TOP of your structure
- Use a much or as little of your kit –
- May break up the spaghetti, tape, paper bag or string as needed

Time to Debrief! ☺

- Time to measure the towers!!
- The winner is…..

Chart Paper:

Use the markers provided at each chart to answer the following questions…

1. Was it more important for your group to win or work together? Why?
2. Were you doing science in this activity? Explain with evidence!
3. What did you learn about yourself as a leader?
4. What role did you naturally take? Why?

Chart Debrief…

1. Do we notice any trends in the data? *(answers to questions)*

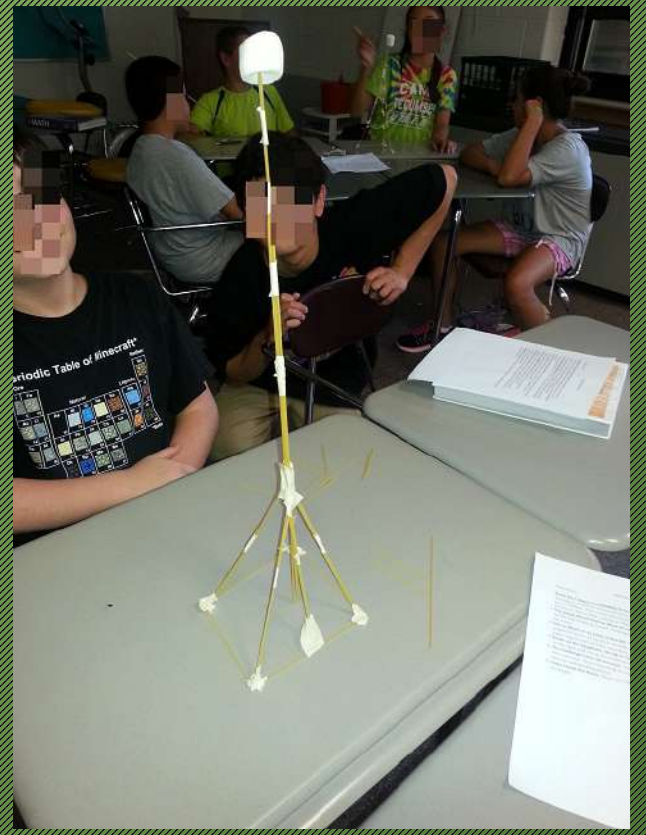
1. Did fellow students disagree on any of the questions?

1. Why do you think there was disagreement to any of the questions?

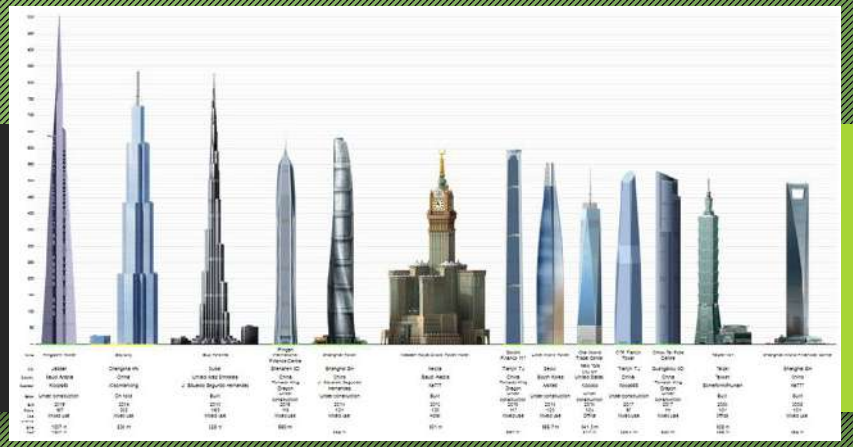
1. Were any of these questions uncomfortable to answer?

1. What is the purpose of doing this type of debrief activity?

Examples…



“Engineering Design Thinking”



- Engineering Design Thinking is a collaborative process that depends on each individual’s participation and unique dynamics of each group
- It is a process for solving solutions
- It is an opportunity to learn to work together more effectively
- Our goal is to develop great solutions, but great solutions will only emerge after many other solutions have failed

We learn from our mistakes and this gives us an opportunity to achieve even greater solutions.

Follow – Up

- Questions about the marshmallow tower challenge…
  - What are the collaborative habits of engineering design thinking? Include evidence from your experiences today and explain your thinking in as much detail as possible.
  - What is YOUR marshmallow for this year?