What is Design?

Below are additional sources of information on engineering and a post-program activity and hand-out.

Visit your library and check out these books:

- Rosie Revere, Engineer by Andrea Beaty
- Papa's Mechanical Fish by Candace Fleming
- The Invention of Hugo Cabret by Brian Selznick
- The Way Things Work Now by David Macaulay
- Smithsonian Maker Lab: 28 Super Cool Projects by Jack Challoner

Look at Andrea Beaty's award-winning picture books and related activities: https://www.andreabeaty.com/rosie-revere-engineer.html

Explore engineering careers at DiscoverE: http://www.discovere.org

Find out about Rube Goldberg's inventions: www.rubegoldberg.com

Watch *Dream Big: Engineering our World* in select cities: www.dreambigfilm.com

Learn more about PBS Kids' Design Squad: http://www.pbskids.org/designsquad/

Why Engineering? Post-Program Activity

Overview:

In the videos or the recording of the *Why Engineering?* program we learned about engineers and how they work together and use the design process to solve problems. This activity will review the design process that engineers use and make connections with how students already use this process in their lives.

Preparation:

- Hand out the graphic organizers from the pre-activity.
- Print outs or projection of design process.

Activity:

Each group reviews the steps they wrote as part of their product design challenge.

- Do they want to add any other steps to this process?

Review the design process and show students the design wheel:

- Define the problem
    - A client has something they want you to solve or improve.
    - Clarify design parameters and goals.
    - Talk to people to understand the design challenge
- Investigate the context
    - Research more information about the topic
    - Explore the site where your building or structure will go
    - Interview people who live or work nearby
- Generate ideas
    - Work with other people to brainstorm many possible solutions
    - Sketch or write out ideas
    - Talk to experts to get additional opinions
- Make a Plan
    - Decide on the idea you want to move forward with
    - Make a drawing, diagram, or prototype to test ideas
- Produce a solution
    - Collaborate with other designers and engineers to make sure everything works together.
    - Everyone completes their part of the project
- Evaluate
    - Give and receive constructive feedback at each step
    - Consider if you need to go back to another step

Ask students to match up the steps they wrote from their product design challenge with the steps on the design wheel.

- For example, "Drew sketches to try different ideas" could go under Generate ideas. "Asked questions to understand challenge" could go under Define the problem.
- Are there steps they do not have a match for? Thinking back, can they remember something they did or discussed that matches up with that step?

Reflection:

- Think back to the engineers you heard from in videos. How did they use this process to solve problems?
- At which parts of the design process do they think engineers need to work together? Why?
- How did they use this process in the tower challenge? How else can they use the design process in other parts of your life?
- How could they use the design process to come up with solutions to challenges in their school or neighborhood?

The Design Process