



What is Design? Pre-Program Activity

Overview:

This activity will introduce the idea of solving problems systematically using the design process. You will learn more about how engineers solve problems in the videos or in the recording of the *Why Engineering?* program. It will be useful to set guidelines before the design challenge about how groups should brainstorm, communicate together, and provide helpful feedback.

Guidelines for brainstorming:

- Be respectful and hold off on judging.
- Don't shoot down ideas or talk over people.
- Build off of the ideas of other people.
- One conversation at a time. Stay focused!
- If you have trouble explaining something, try drawing it.
- The more ideas, the better.
- Wild ideas encouraged!

Guidelines for feedback:

- No personal attacks. You are commenting on ideas only, not people.
- Be comfortable with listening to constructive feedback.
- If you have a suggestion of something to change, have a reason why or a suggestion to improve it.

Preparation:

- Gather an assortment of materials, like paper clips, craft materials, paper cups, paper tubes, string, rubber bands, other odds and ends or items from a junk drawer.
- Print the product and client cards or bring them up on a screen.

Activity:

Work individually or in small groups. Each group of learners receives:

- Product card
- Client card
- Assortment of the gathered materials

Design a prototype, or model, of the product on the card for the person listed on their client card.

- They can use the materials they received to create the prototype.
- Encourage them to think creatively about what the materials represent as they brainstorm their prototype.



- They can also make drawings and sketches of their ideas.

Each group presents their solution:

- What was their product? Who is their client? How did they meet the client's needs with their final product?
- Other students can ask questions or provide feedback.

Each group should discuss and write down on the graphic organizer what steps they went through in order to come up with their solution.

- Encourage each group to think of what they did from when they first heard about the challenge to when they presented.
- In the online experience the students will learn more about how engineers solve problems and what different types of engineers there are.
- They will revisit this list in the post-activity.

Reflection:

- What was successful about their process? What was challenging?
- Based on the feedback they received what could they improve upon if they did this again?



Why Engineering? Pre-Program Activity Product Cards

<p><i>Design a...</i></p> <p>Chair</p> <p><i>for...</i></p>	<p><i>Design a...</i></p> <p>Head Rest</p> <p><i>for...</i></p>
<p><i>Design...</i></p> <p>Headphones</p> <p><i>for...</i></p>	<p><i>Design a...</i></p> <p>Bicycle</p> <p><i>for...</i></p>
<p><i>Design a...</i></p> <p>Backpack</p> <p><i>for...</i></p>	<p><i>Design a...</i></p> <p>Desk</p> <p><i>for...</i></p>
<p><i>Design a...</i></p> <p>Lamp or light</p> <p><i>for...</i></p>	<p><i>Design a...</i></p> <p>Storage trunk</p> <p><i>for...</i></p>



Why Engineering? Pre-Program Activity Client Cards

<p>A Snowboarder</p> <ul style="list-style-type: none">• I need space to display my trophies and medals.• I like to be cozy and warm.• Traveling up mountains is my least favorite part of snowboarding.	<p>A Librarian</p> <ul style="list-style-type: none">• I have a collection of 1,000 books.• I like to read wherever I go and I read very quickly.• I lose my glasses all the time.
<p>A Video Gamer</p> <ul style="list-style-type: none">• I own a lot of video games and computer games.• I like to play my games with loud volume.• I like to snack on food when I play games.	<p>A Gardener</p> <ul style="list-style-type: none">• I like bright colors and fun patterns.• I like to be outside in nature.• My hands are always dirty from gardening.
<p>A Computer Programmer</p> <ul style="list-style-type: none">• I have a laptop, two tablets, and two computers.• I work long hours and drink a lot of coffee to stay awake.• I need quiet to sleep.	<p>A Zookeeper</p> <ul style="list-style-type: none">• I love being around animals.• I have some pets that are big and small.• I collect leaves, plants, and interesting insects wherever I go.
<p>A Football Player</p> <ul style="list-style-type: none">• When I'm not playing I like to watch games on TV.• I need space to run and practice.• Sometimes my legs hurt and I need to rest them for my next game.	<p>A Scientist</p> <ul style="list-style-type: none">• I like to do experiments.• I am very organized and like to have everything in order.• I always have a notebook with me to write down ideas for my experiments.



Why Engineering? Product Design Debrief

Group Members: _____

Talk about what steps you went through to create your product. Write down at least five steps you took below and explain why it was important to your process. If you have more than 5 steps you can write them on another piece of paper.

Step 1

Step 2

Step 3

Step 4

Step 5