

LET'S THINK LIKE ENGINEERS!

Introduction

THINK BOX #1:

Let's think like engineers! List three challenges you would expect in the design of a solar powered airplane, such as the Solar Impulse, and how you think these challenges were overcome.

Challenges	Design Solutions

DESIGN

A CAR IS:

- “A vehicle that has four wheels and an engine and that is used for carrying passengers on roads”.¹
- “A road vehicle powered by a motor (usually an internal-combustion engine), especially one designed to carry a driver and a small number of passengers”.²

FOR YOUR FIRST MODEL CAR, YOU NEED SOMETHING THAT WILL:

- Roll to serve as wheels (3+)
- Support your motor
- Support your solar panel
- Transfer rotational energy from motor to car
- Attach wheels to car, while allowing wheels to spin
- Additional materials to solve design problems that arise

¹ Dictionary Definition: Car. Merriam Webster. <http://www.merriam-webster.com/>

² Dictionary Definition: Automobile. Oxford English Dictionary. <http://www.oed.com/>

On your own, sketch a design for what your car might look like. Remember, this sketch is a design idea, which means that it should include labels that will help you or someone else to actually attempt to build it.



Discuss your ideas with your friends and come up with one design that you will attempt to build.

<u>Team Design</u>	<u>Materials Needed</u>	<u>QTY</u>

DESIGN EXPLANATION:

Did you collaborate? What problems are you foreseeing and attempting to solve with your design?

DESIGN CHALLENGES:

In the initial building of your vehicle, you may encounter some unexpected challenges or problems. Any data or observations should be noted by the scientist, and design changes should be noted by the appropriate team member (e.g. adding materials = logistics). Materials used should be tracked using a separate paper, which could also include a "materials damaged" or "defective materials" section, so that defective or broken materials are kept separate from inventory.

Data and Observations that led to deviations from initial design

PREPARATION FOR TESTING

What problems or difficulties do you envision you might discover when testing your car?

What data do you want to collect?

<u>Data</u>	<u>Observations</u>
<u>Anticipated Challenges?</u>	

REDESIGN

Write three changes you will be making to your car to improve upon your previous results. Explain why you made each change. Use illustrations where possible. Note: Both quantitative and qualitative data is welcome here

<u>Change #1</u>	<u>Reasoning</u>
<u>Change #2</u>	<u>Reasoning</u>
<u>Change #3</u>	<u>Reasoning</u>

TESTING PART II

What data will you collect? What improvements are you hoping to see?

Enter data here or on a separate data collection sheet

<u>Data</u>	<u>Observations</u>

REFLECTION

After round two of testing, answer the following questions:

1. Did your redesign effectively meet the goals that you identified?

1. What surprised you the most about the whole process?

1. How did you effectively work on this project?

DISCUSSION

1. At each stage, identify how this activity fits into the engineering design cycle.

1. Which stages of this cycle could be more present in our activity? How would this be accomplished.

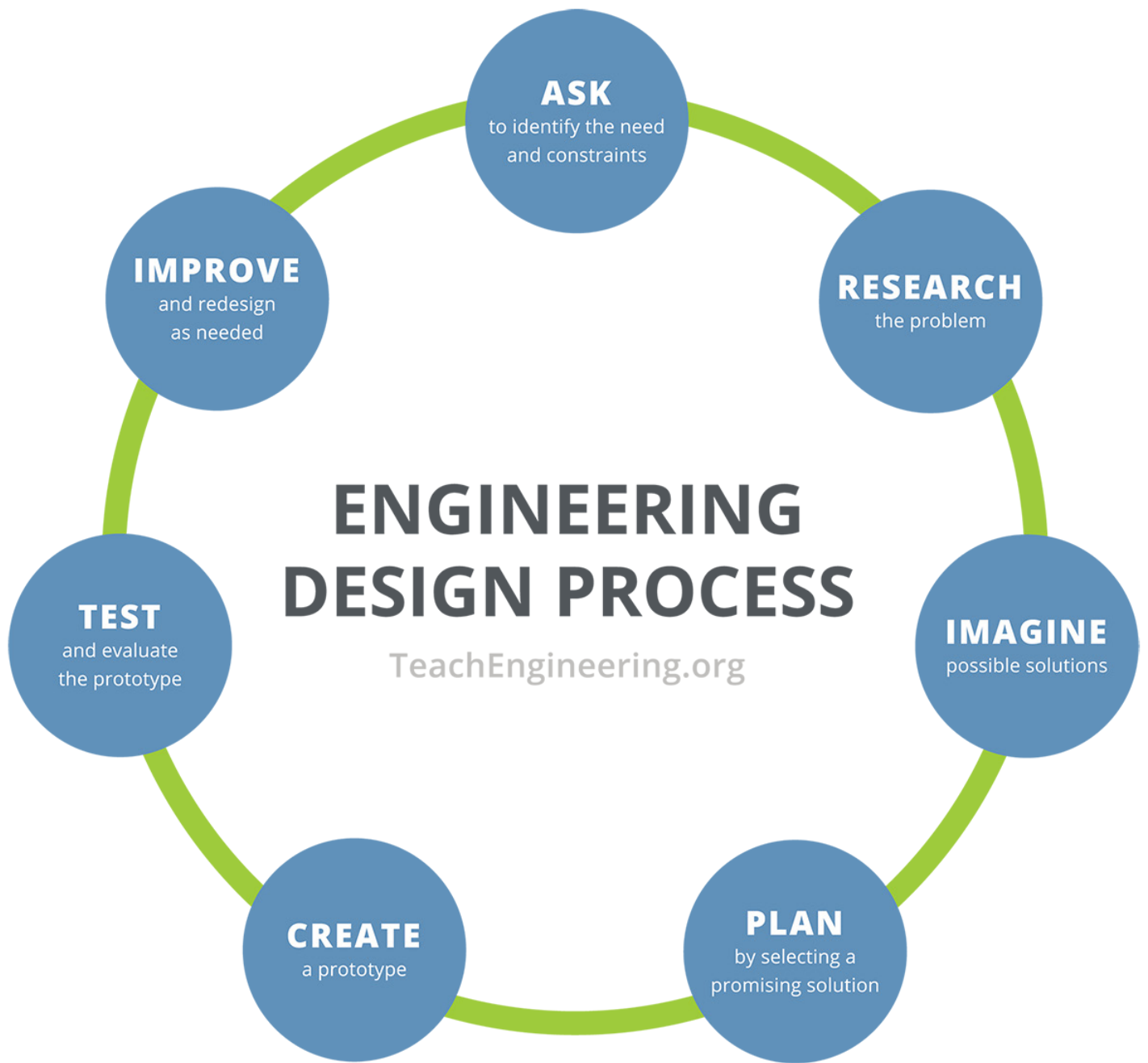


Figure 1. Engineering Design Process. <http://www.teachengineering.org>