Engineers create what has never existed!

The Engineering Design Process

Steps in the Design Process

IDENTIFY PROBLEM

BRAINSTORM

DESIGN

BUILD

REDESIGN

TEST & EVALUATE

SHARE SOLUTION
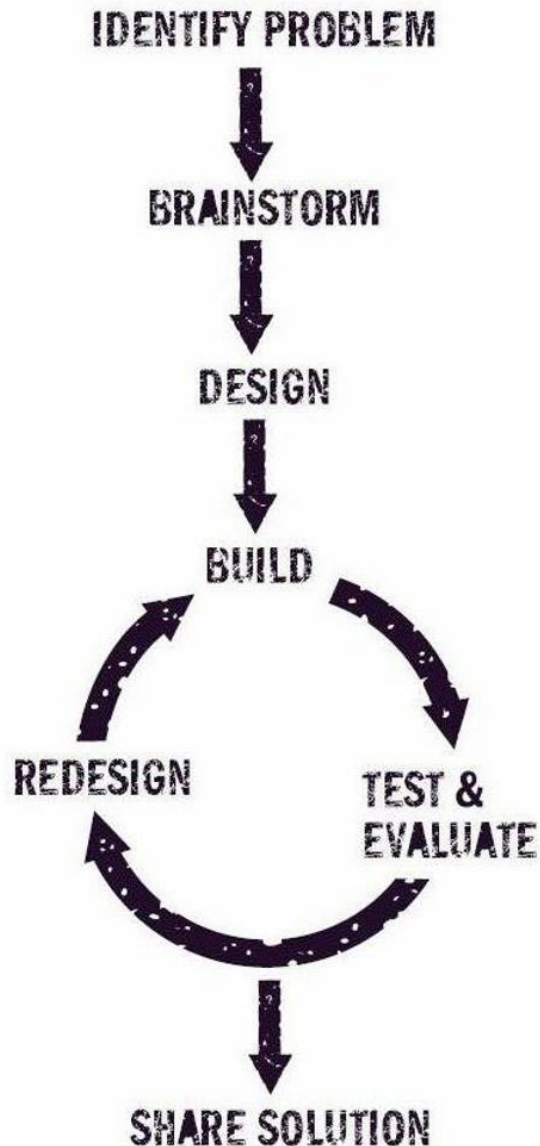
1. Define the problem
2. Come up with design ideas
   → **brainstorm!**
3. Select the most promising design
4. Communicate about and plan to build your design
5. Create & test your designed product
6. Review for improvements
7. Iterate your design (if necessary)
8. Present the solution

Define the Problem

- ❖ **What is the PROBLEM?**

- ❖ **How can it be solved?**

- ❖ **What do we need to build or create?**

- ❖ **What is our goal?**

- ❖ **Write one or two sentences defining the problem.**

Brainstorming Guidelines

"Imagination is more important than knowledge."
— Albert Einstein

- ✓ **No negative comments allowed!!!**
- ✓ **Encourage wild ideas.**
- ✓ **Record all ideas.**
- ✓ **Build on the ideas of others.**
- ✓ **Stay focused on the topic.**
- ✓ **Allow only one conversation at a time.**

Make a Decision

- ✓ **Ideas that don't get picked are NOT bad ideas!**
- ✓ **Don't let it be personal**
- ✓ **Decide as a team…**
  - ▪ **Consider all positives and negatives**
  - ▪ **Vote as a team**
- ✓ **Combine design aspects, if you want.**
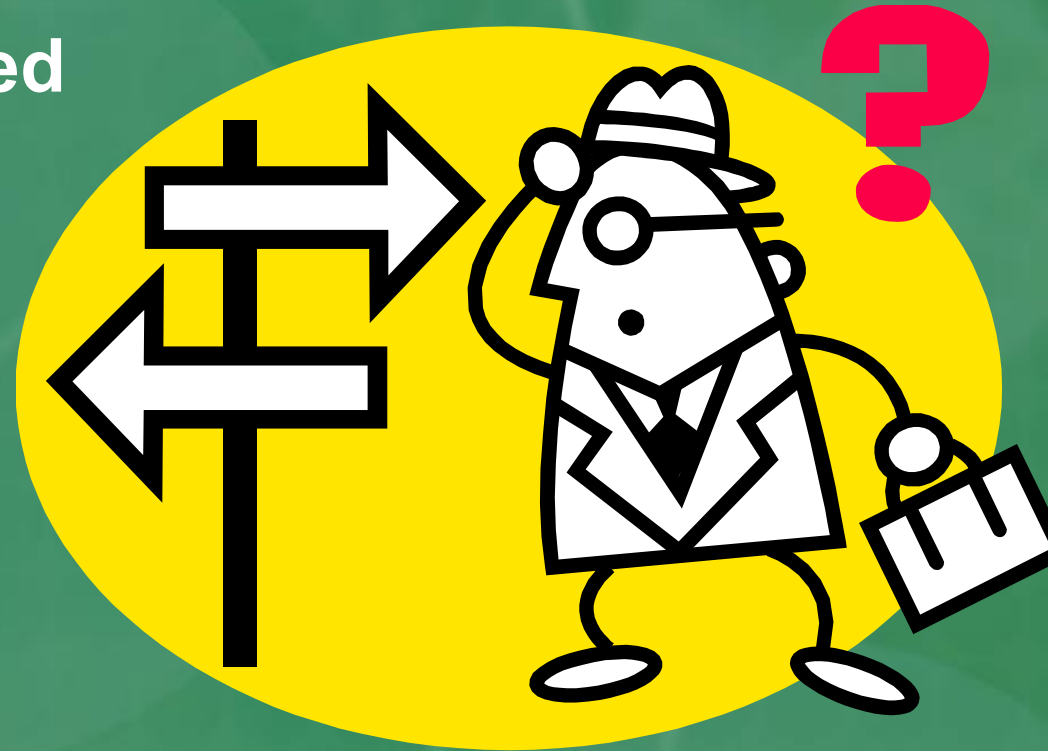
Plan to Build

- ✓ **Communication is key!**
- ✓ **Make a plan:**
  - ▪ **Design**
  - ▪ **Drawings**
  - ▪ **Details**
- ✓ **What is the order of steps to take?**
- ✓ **Split up task**
- ✓ **Stay focused as a team**

Build... Test... Redesign

1. Build a prototype
2. Test it to see how it works
3. Redesign parts, if necessary, and
4. Build it again

✓ **Iteration** – Each design builds on the previous, until the desired accuracy is achieved

✓ Does it work?

✓ What could be improved?

✓ Lets make it better!
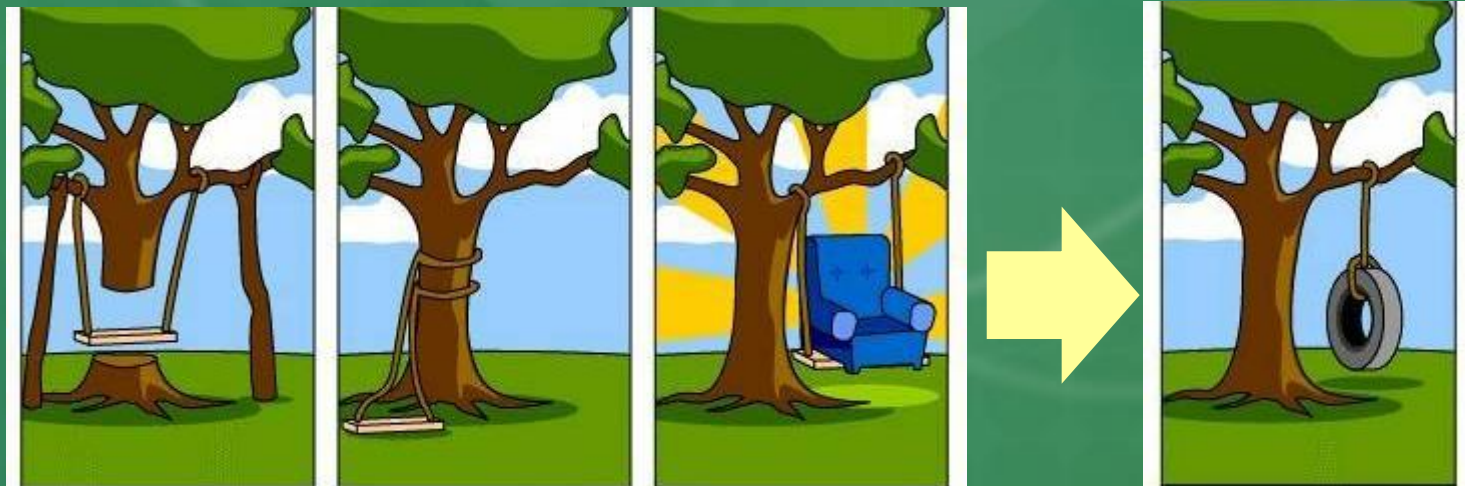
Prototype

"An original, full-scale and usually working model of a new product or new version of an existing product."
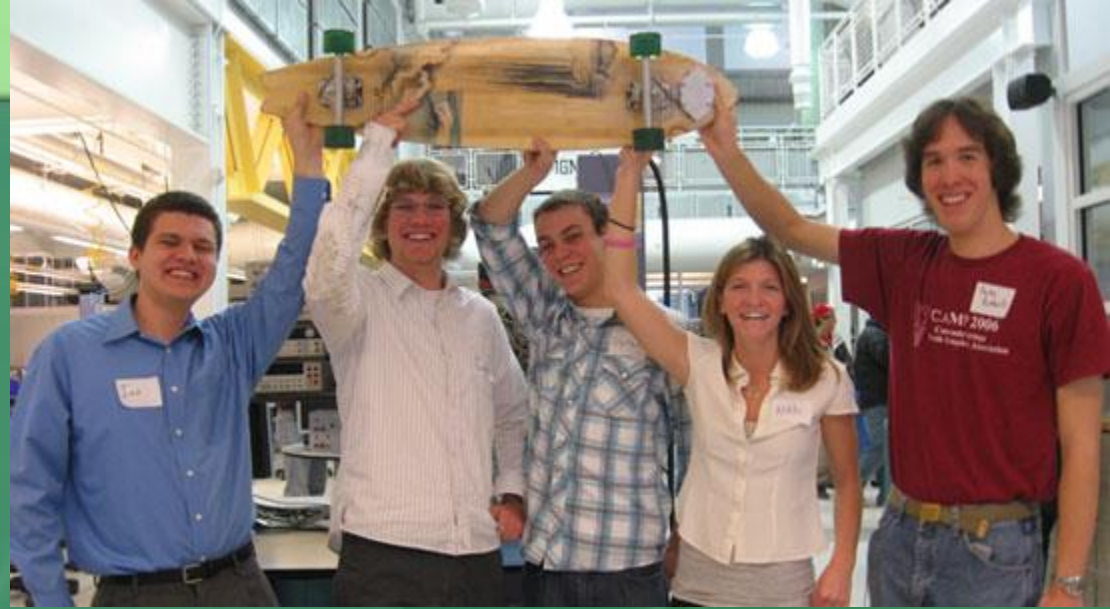-American Heritage Dictionary

✓ **A functional model**

✓ **Does the idea work?**

✓ **How can it be improved?**
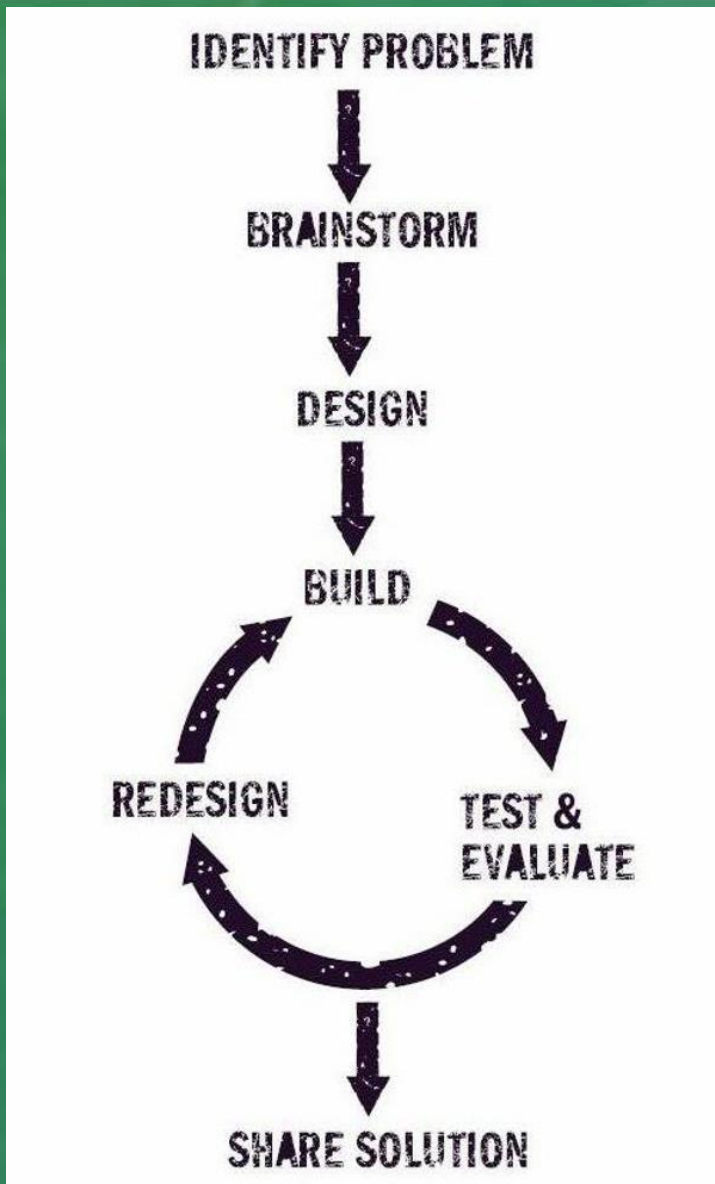
✓ **What aspects should we keep?**

Present the Solution

- ✓ **Be clear**
- ✓ **Highlight the best features**
- ✓ **How does the design solve the problem?**

- ✓ **How could the design best be used?**
- ✓ **What improvements could be made in future iterations?**

Engineering Design Process

IDENTIFY PROBLEM

BRAINSTORM

DESIGN

BUILD

REDESIGN

TEST & EVALUATE

SHARE SOLUTION

1. Define the problem
2. Brainstorm
3. Pick a design
4. Plan to build
5. Build…
   Test…
   Redesign
6. Present the solution