

# How to Complete an Engineering Design Process Project: A Student Guide

**Introduction:** This guide will help you work through any engineering project using the engineering design process. Each step is important, so take your time and be thorough with each one!

## 1. Ask/Define the Problem

- Start by writing down:
  - What problem needs to be solved?
  - Who has this problem?
  - Why is it important to solve?
  - What must your solution do to be successful?
  - What limits do you have? (time, materials, cost, etc.)

## 2. Research Your Problem

- Look for information about:
  - Similar solutions that already exist
  - Materials you might use
  - Scientific principles involved
- Keep track of your sources
- Take good notes
- Ask experts for advice
- Make a list of important facts you learn

## 3. Imagine Solutions

- Brainstorming tips:
  - Write down ALL ideas (even crazy ones!)
  - Draw quick sketches
  - Don't judge ideas yet
  - Try to think of at least 3-5 different solutions
  - Use sticky notes or a notebook
  - Look at your research for inspiration

## 4. Plan Your Solution

- Choose your best idea by:
  - Making a pros and cons list
  - Checking if it meets all requirements
  - Considering if you can build it with available materials
- Create detailed drawings
- Make a materials list

- Write step-by-step instructions
- Get feedback from others

#### **5. Create and Build**

- Gather all materials first
- Follow your plan
- Work carefully and safely
- Take pictures of your progress
- Write down any changes you make
- Keep your workspace organized

#### **6. Test Your Solution**

- Make a testing plan:
  - What will you measure?
  - How will you measure it?
  - How many tests will you do?
- Record all results
- Take notes about what works and doesn't work
- Be honest about problems

#### **7. Improve Your Design**

- Look at your test results
- Ask yourself:
  - What could work better?
  - What parts failed?
  - What would you change?
- Make small changes one at a time
- Test after each change
- Keep track of improvements

#### **8. Share Your Work**

- Prepare to explain:
  - Your problem
  - Your solution
  - How you built it
  - Test results
  - What you learned
- Include:
  - Pictures or drawings
  - Data from testing
  - Ideas for future improvements

#### **Tips for Success:**

- Keep a project notebook
- Take lots of pictures
- Label all drawings and test results

- Stay organized
- Don't give up if something doesn't work
- Ask for help when needed
- Learn from mistakes

Remember: The engineering design process is a cycle - you might need to go back to earlier steps as you work. This is normal and helps make your solution better!