

TECHNOLOGY DESIGN SKILLS

IMPORTANT TERMS

Engineer: a person who is trained to use both technological and scientific knowledge to solve practical problems

Brainstorming: a process in which an individual (or group members) freely suggest any creative solutions to a problem come to mind

Constraint: any factor (thing) that limits or restricts a design

Trade-off: an exchange in which one benefit is given up in order to obtain another

Prototype: a working model used to test a design

DESIGNING

(1) *Identify A Need. (What Problem Are You Trying To Solve)*

As a first step, you must decide exactly what need you are trying to meet. If you don't know this, you don't know what your product needs to do. What need are you trying to meet? In other words, what problem are you trying to solve?

(2) *Research The Problem*

Next, you must obtain information related to the product you are designing. For example, if you were designing a new computer mouse, it would be good to study other computer mice, researching how they are made, the parts that are used and where potential problems are occurring.

What things might be causing the problem with current technologies similar to the one you're designing?

(3) *Designing A Solution*

In this step, you must come up with ideas about how to solve the problem. Engineers weigh many possible solutions and choose the best one. Below, brainstorm 3 solution ideas. Be sure to explain each.

1. _____

2. _____

3. _____

What are 3 *constraints* that your design solutions will have? For example, does your product need to be within a certain weight limit or size? Maybe your product needs to be made of a certain material to work. Maybe it needs to be sturdy enough to withstand a fall. It might need to cost under a certain amount of money.

1. _____

2. _____

3. _____

A team must sometimes make trade-offs on some features of the design. A *trade-off* is an exchange in which one benefit is given up in order to obtain another. For example, one material may be sturdy but look ugly. Another material may be more attractive but may be weaker. The design team may decide to use the more attractive material so that the product will appeal to customers. In this case, the team would be trading off strength for appearance.

Considering the constraints and possible trade-offs, which solution – 1, 2 or 3 – will you use? _____

(4) *Building A Prototype*

At this step, you are ready to build a real model of your design. This prototype will be used to test how well it works and to identify potential problems with the design. We will not actually build a prototype, but we will draw a blueprint of your product idea so that it could be built.

Below, draw a blueprint of your product. You must include details, such as measurements, types of materials, labels, etc so that your blueprint is understandable. Builders use the blueprint to build a design exactly as you want it.



(5) *Troubleshooting and Redesigning*

Prototype tests may indicate problems with the design. At this step, you may need to redesign your product or change it entirely. It's not often, if ever, that an engineer gets the design perfect the first time.

(6) *Communicating The Solution*

Engineers must communicate to consumers how a product meets their needs. They must also communicate with those involved in bringing the product to consumers.