

NOTES on Chapter 1: Introduction to Physical Science

1.4 What is Technology?

Technology : a way of changing the natural world to meet human needs or solve problems.

In science, we study the natural world in order to understand it.

How does that differ from the goal of science?

An engineer is someone that is trained to use both **technology** and **scientific** knowledge to solve practical problems, oftentimes using a set of steps called the **technology design process**.



The Mouse Problem

Step 1: Identifying a Need

Early versions of the mouse were expensive. Dirt would get in it, preventing it from working. It also “slipped”, meaning the cursor wouldn’t move when the mouse did.

2. Researching the Problem

Performing experiments related to the technology that is being designed.

Regarding the mouse: The scientists found out the ball inside the mouse was being held by very sensitive and expensive parts. If any dirt would get inside, it would jam it up. Each piece would have to be cleaned.

3. Designing a Solution

This stage is where different ways to solve the problem takes place.

Several possibilities are discussed before choosing one to pursue.



A way to generate ideas is **brainstorming**. This is where the individuals suggest creative ways to solve the problem.

Engineers will try to select the one that meets the needs and has the fewest negative characteristics. Oftentimes, they will draw sketches or build models to help them with their decision.

They must consider any **constraints**, or factors, that may limit or restrict a design.

Some constraints may include the durability of the material, the cost, the size, and the overall look of the finished product.

Sometimes the team must make **trade-offs**. This is where one benefit is given up in order to get another.



Example: stronger materials might make it more expensive and ugly

4. Building a Prototype



This is a working model used to test a design. Some can be full size while others could even be “virtual”, or computer generate.

5. Troubleshooting and Redesigning



Troubleshooting means to identify and analyze the causes of any problem and to redesign the product .

6. Communicating the Solution



Engineers must communicate to consumers how this product satisfies their need as well as to those who would bring the product to the public.

Technology as a System

All systems are made of **parts that work together**.

What are some systems that you are familiar with?

Let's compare a technological system to the respiratory system.

Technological systems are designed to achieve a goal or purpose.

An input is something that is put into a system to reach that goal.

The process is the sequence of actions that system undergoes.

The output is a result of the product, which should match the goal.

Some systems will have feedback, which will help the system to adjust itself to meet the goal.