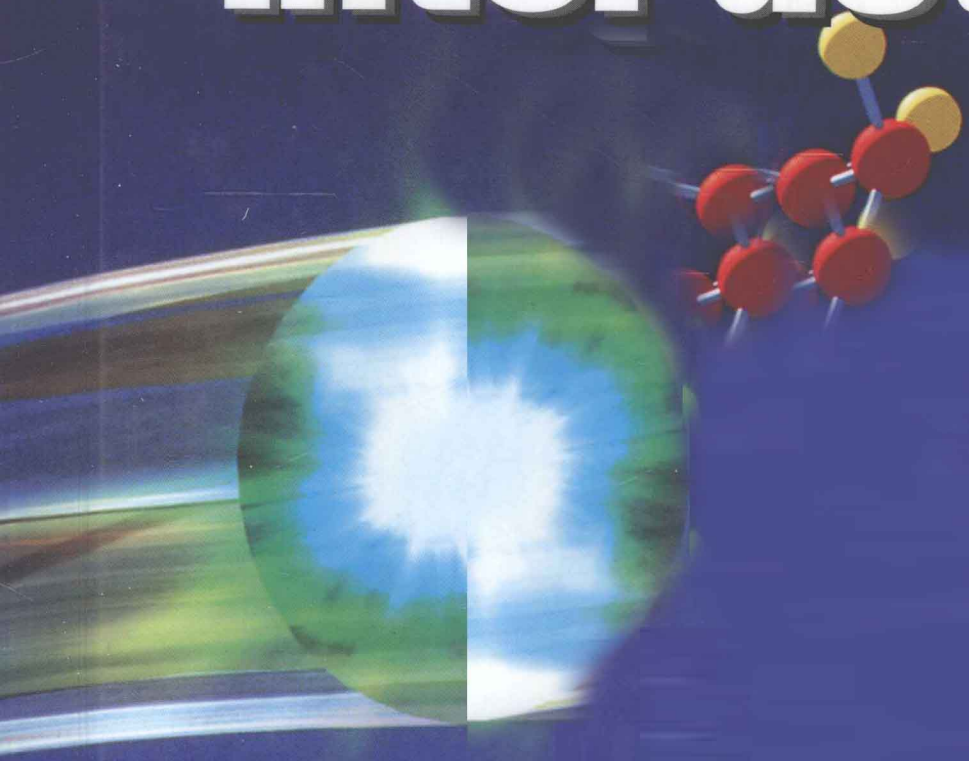
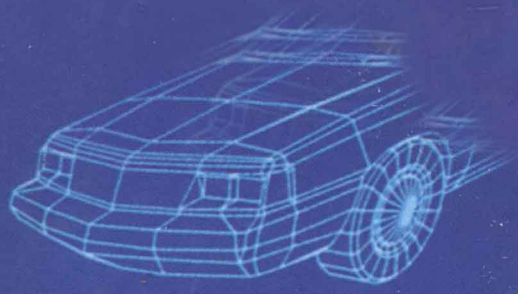
Technology Interactions





Technology Interactions

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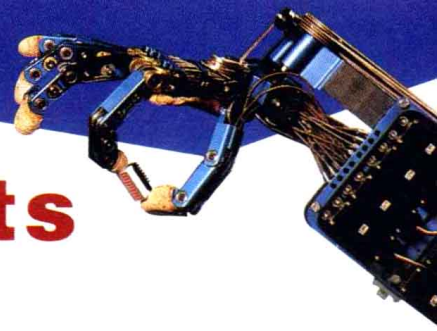

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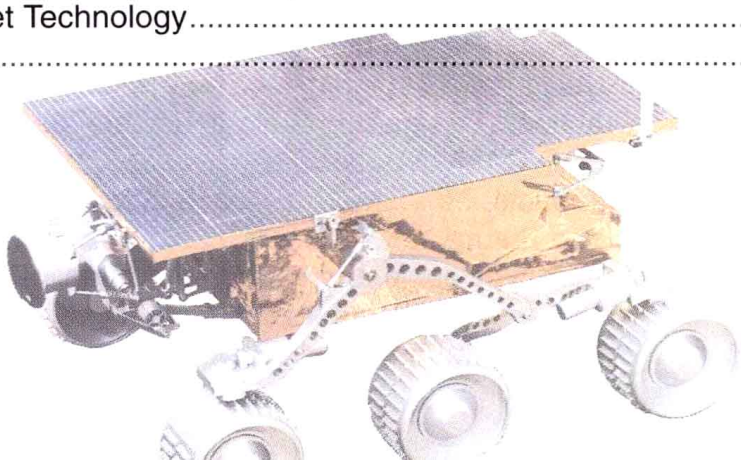
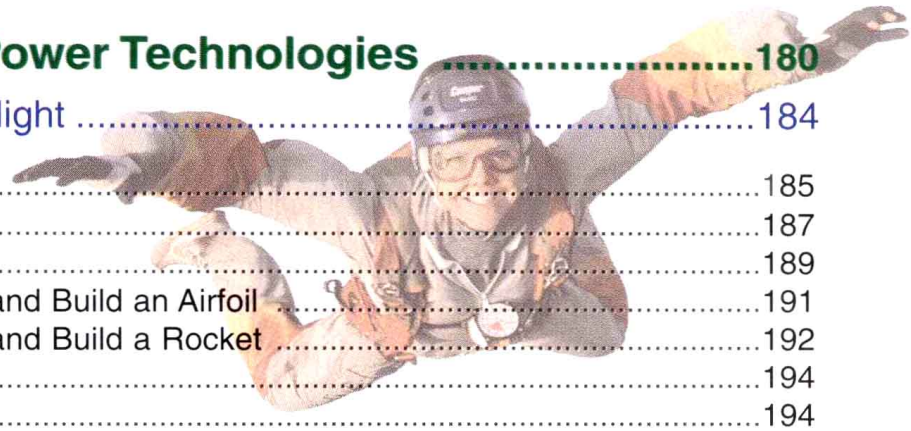
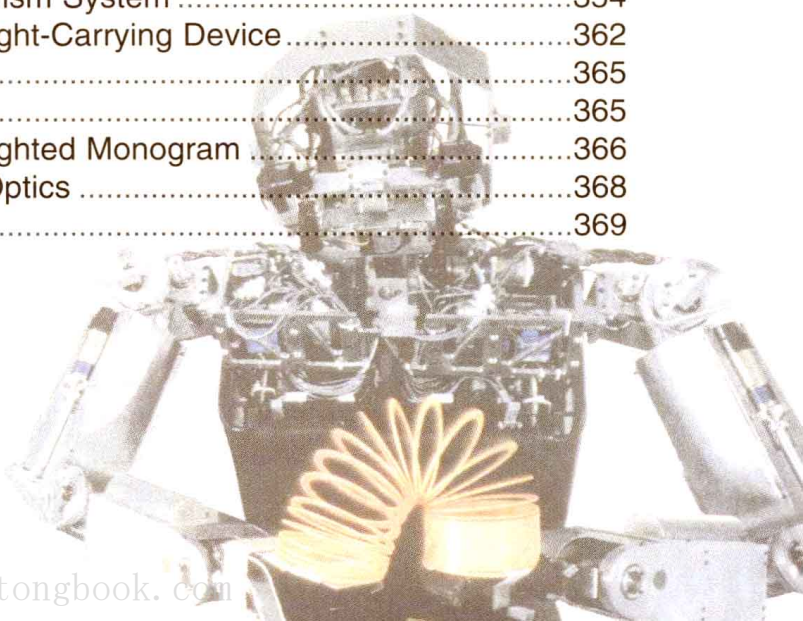






SECTION 1

Introduction to Technology

Technology depends on design and problem solving. To complete a design or to solve a problem, you need resources. The chapters in this section will introduce you to the resources of technology. They will also show you how you can use these resources to create the tools you will need to solve problems. Design and problem solving are important in technology. They are also important in life.

Technology and Society

Solving One Problem Can Create New Problems

Henry Ford applied the process of mass production to automobile assembly. He invented the automobile assembly line in 1913.

It now seems obvious that Ford's improvement to auto-making technology would greatly increase the number of cars on the road. This, of course, would increase the possibility of traffic accidents.

By the 1970s, Americans were dying in car accidents at a rate of 45,000 to 50,000 per year.

The Blowup Over Air Bags

Air bags were introduced in the early 1990s. It seemed that this new technology could help lower the traffic accident death rate.

Air bags, stowed in the steering column and dashboard, inflate within one-tenth of a second after an impact. They provide a cushion for people in the front seats. Holes in the air bags allow them to deflate barely one second later. The bags "give" and absorb the energy of a too-sudden stop.

By the mid-1990s accident reports showed that air bags were causing severe injuries. More than fifty deaths were linked to air bags, according to the National Highway Traffic Safety Administration.

In most instances, however, air bags did the job they were designed to do. By the mid-1990s, they had saved an estimated 1,500 lives.

Modifications to air bags will reduce their force of inflation. This will help reduce the risk of injury or death from too-rapid inflation. However, an air bag will still hit harder than the worst shot you ever took in a pillow fight.

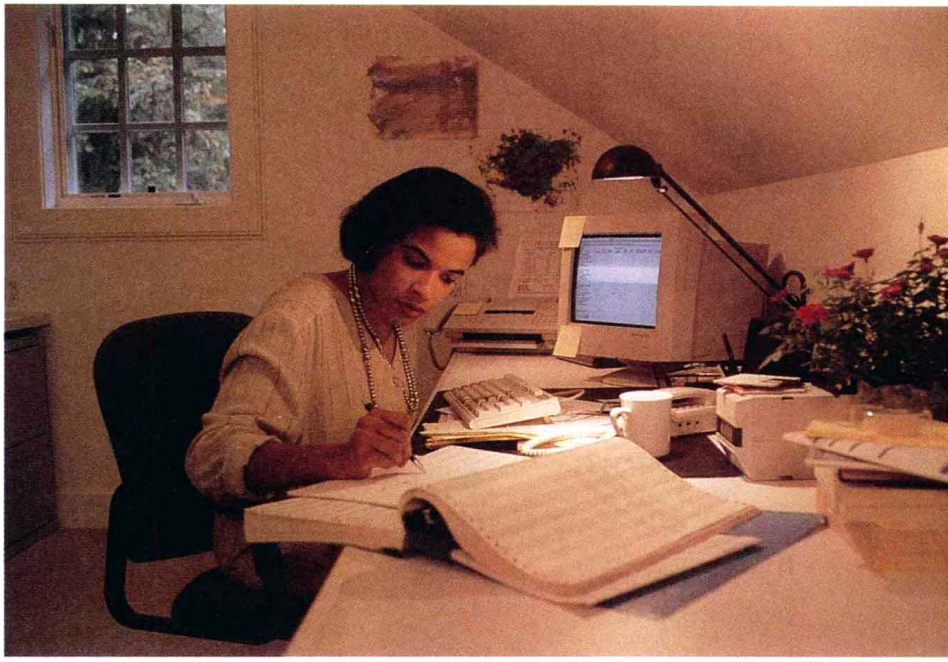
Make a list of three inventions and the new problems they caused. What changes to the technology could solve the problems?

Linking to the COMMUNITY

Research the number of traffic accidents in your community within the past year. How many of the accidents resulted in death or injury? Did air bags prevent death or injury in any of the accidents?

CHAPTER 1

How Technology Works



OBJECTIVES

- identify the basic needs and wants.
- identify the seven resources upon which all technologies depend.
- describe and give examples of manufacturing, construction, transportation, communication, and bio-related technologies.
- explain the similarities shared by all technological systems.
- describe and give examples of technological impacts.

KEY TERMS

feedback
input
output
process
system
technology

A man sits by a fire. In one hand, he holds a large rock. In the other, he holds a small stone. He uses the small stone to strike chips from the large rock. After a short time, he holds the sharpened head of a stone axhead. He fastens the axhead to a short piece of wood. He now has a tool that he can use for many tasks.

In our own time, a woman sits in her home preparing a message that she will fax to her business partner 3,000 miles away. Rather than traveling to an office each day, the woman works at home. Her home has become an *electronic cottage*. It has become a place where she can work and still be close to her family. Here, she designs computer software that is used to control robots in a factory.

TOOLS OF TECHNOLOGY

Technology is using knowledge to develop products and systems that satisfy needs, solve problems, and increase our capabilities. All problem-solving tasks have much in common. This is true whether the task is making an ax head or writing a computer program. Technology is the link that ties various tasks together. Fig. 1-1.

A *tool* is an object used in carrying on work. Tools are the instruments of technology. A tool may be simple, such as an ax. It may be complex, such as a computer program. Tools help us satisfy our needs and wants. Fig. 1-2. All people have needs and wants. These include food, water, shelter, communication, protection, recreation, transportation, and health care.

The prehistoric man made his stone ax to meet various needs. Using the ax, he could hunt animals. In so doing, he could satisfy his need for food. He could also use the ax for protection and as a construction tool. The man used a simple technology to help meet his basic needs.

Over time, people settled in villages. Their activities centered around farming and the raising of livestock. Agriculture changed how people lived and worked. New technologies were developed to satisfy new wants and needs. The hoe, plow, and sickle were the tools of this *Agricultural Age*.

FASCINATING FACTS

Toolmakers have always searched for stronger tool materials and ways to make sharper edges. Early stone tools were crudely chipped to give them an edge. As toolmaking skills developed, the chips became smaller and the tool edge became sharper. Today, archaeologists can date many stone tools by the pattern in which chips have been struck from the stone.

Fig. 1-1 In technology, the effectiveness of any tool can be judged by how well it can focus energy. Note that the shape of these arrowheads will focus energy at the point.

Fig. 1-2 These electronic parts are tools. Like the arrowheads on the left, they allow energy to be focused. In this case, the energy is electronic. The parts will be used in an electronic circuit.

To be usable, most raw materials need to be processed. This led to the development of tools that could be used to process such materials. The loom is one example of such a tool. The loom was used to weave fabric from natural fibers such as wool.

As people learned more about their world, they undertook more complex tasks. Their needs and wants also became more complex. As trade developed, the need for transportation increased. To make transportation easier, transportation systems were developed and slowly improved.

Bridges and better roads made travel easier. They also allowed people to move products more quickly from one village to another. These early transportation systems were crude. However, they provided a base for new technologies that would make transportation more efficient.

New needs and wants continued to emerge as daily life became more complex. In the 1700s, new technologies and products exploded onto the scene during the *Industrial Age*. The steam engine enabled factories to satisfy consumer demand for new products. Transportation systems were improved to transport goods and people more rapidly.

Trade became more important. It became necessary to communicate more quickly and reliably. The technologies that led to the telegraph, telephone, and radio were developed in the Industrial Age.

Are we still in the Industrial Age? What makes a way of life change so much from one era to another? The answer lies in what people need. When the needs of people change, they develop new systems and new technologies. Today we live in the *Information Age*.

The Information Age began in the 1950s. It was brought about by the need to gather, organize, store, and share information. The Information Age was built upon the development of the transistor and the computer. The electronics of the Information Age improved all technologies. It made them faster and more reliable.

The technologies of the Information Age touch on all aspects of modern life. These technologies, for example, fuel the research that has advanced medicine. This research has helped us meet our need for health care. Doctors can now diagnose and treat illnesses that previously could not be cured.

Video games, portable stereos, CD players, videocassette recorders, and in-line skates are all products of technology. These items help us satisfy our need for recreation and relaxation.

People have always had the same basic needs and wants. What has changed through the ages is how we satisfy them. Technology is the process we use to create the products and services we use to meet our needs and wants. Fig. 1-3.

RESOURCES OF TECHNOLOGY

How would you make a stone ax? How would you write a computer program that controls industrial robots? You would rely on many resources to complete both tasks. *Resources* are all the things you may need to produce a product, provide a service, or solve a problem. Would you believe that it takes many of the same types of resources to produce a stone ax as it does to write a computer program?