

Understanding Technology

Reading Preview

Key Concepts

- What is the goal of technology?
- How does technology differ from science?
- How does technology affect society?

Key Terms

- technology • engineer

Target Reading Skill

Previewing Visuals When you preview, you look ahead at the material to be read. Preview Figure 12. Then write two questions you have about the diagram. As you read, answer your questions.

Science and Technology

Q. What does technology have to do with science?

A.

Q.

Lab
zone

Discover Activity

What Are Some Examples of Technology?

1. Look at the objects in the photographs.
2. With a partner, discuss whether or not each object is an example of technology. Write your reasons for each decision.

Think It Over

Forming Operational Definitions On what basis did you and your partner decide whether an object was an example of technology? What is your definition of the term *technology*?



In the fourth quarter of a football game between San Jose State and Nevada, the crowd went wild. Neil Parry had just joined the San Jose players on the field. Cries of “PAR-ry, PAR-ry, PAR-ry” filled the stadium.

It was Neil’s first football game after his right leg below the knee had been amputated, or removed in an operation. Neil now has an artificial leg, or prosthesis. Because of his determination and hard work, Neil Parry can play football again. His ability to run and tackle is also due to the design of his artificial leg.

◀ Neil Parry plays football.



Lab zone Skills Activity

Predicting

Choose a type of technology, such as medical technology or video technology. Talk to older people about how this type of technology has changed during their lives. Then predict how this technology may continue to change.

What Is Technology?

Artificial legs are examples of technology. So are football helmets, shoulder pads, and shoes with cleats. When you see or hear the word *technology*, you may think of such things as electronic scoreboards, computers, and DVD players. But technology consists of more than modern inventions. **Technology** is how people change the world around them to meet their needs and solve practical problems.

Technology includes things people make, such as computers. It also consists of the knowledge needed to design those products. Finally, technology includes the processes, such as manufacturing and transportation, that get products to the people who use them. Figure 11 shows examples of technology.

The goal of technology is to improve the way people live. Your refrigerator, for example, improves your life by making food stay fresh longer. If you wear glasses or contact lenses, you know that they help people see better. A medical thermometer makes it easier to determine whether you are sick.



What are some examples of technology?

FIGURE 11

Examples of Technology

Technology includes things people make to meet their needs. **Applying Concepts** How does farm machinery help people meet their needs?

▼ Farm machinery

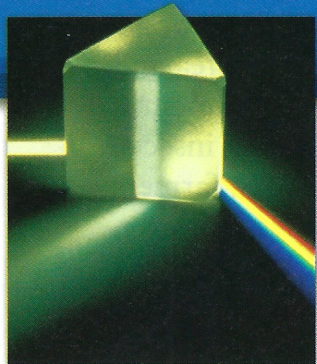


▼ Heart monitor



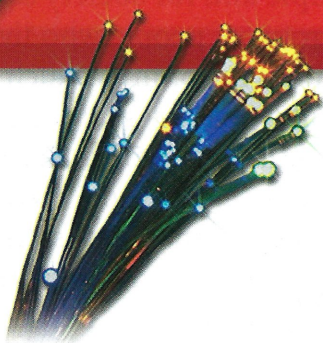
Science

Scientists learn how light moves through substances.



Technology

Engineers develop optical fibers, thin tubes that carry light. Optical fibers are used in communication networks and medicine.



Science

Doctors use optical fibers to learn more about how the heart functions.



Comparing Technology and Science

Science and technology are related, but they are not the same thing. **Science is the study of the natural world to understand how it functions. Technology, on the other hand, changes, or modifies, the natural world to meet human needs or solve problems.**

To understand this difference, contrast the ways in which a biologist and an engineer might study insects. (An **engineer** is a person who is trained to use both technological and scientific knowledge to solve practical problems.) The biologist might investigate the structure of insects' bodies and how insects obtain oxygen. The engineer might study insects to learn how to keep them from damaging crops. In other words, a scientist studies something to learn about the topic itself. An engineer studies a topic to solve a problem or develop a process or product for human use.

Often, advances in science and technology depend on one another, as shown in Figure 12. Endoscopes are tiny medical instruments that allow doctors to view organs within the human body. Endoscopes transmit light using long, thin strands of glass called optical fibers. The design of these fibers would not have been possible without the work of scientists. Once scientists understood how light travels through substances, technologists were able to use this knowledge to design optical fibers and endoscopes. Endoscopes, in turn, have helped scientists learn more about the human body.



What is an endoscope?

FIGURE 12

Science and Technology

Advances in science contribute to advances in technology, which in turn can contribute to science. Understanding the characteristics of light (science) led to the development of optical fibers and endoscopes (technology).

Relating Cause and Effect *How might endoscopes help scientists learn more about the human body?*



For: Links on technology
Visit: www.SciLinks.org
Web Code: scn-1631

Impact on Society

When you read stories like that of Neil Parry, you might think that technology always benefits people. **However, technology can have both positive and negative consequences for individual people and for society as a whole.** The term *society* refers to any group of people who live together in an area and have certain things in common, such as form of government.

For example, pesticides are chemicals that kill insects, including those that eat crops. Because of pesticides, farmers can produce more crops and feed more people. However, humans and other animals can sometimes be harmed if they eat food containing pesticides. Also, rain can wash pesticides into rivers, streams, and water supplies. The pesticides can then affect plants and animals that live in the water, as well as people who depend on the water supply.

Technology does not provide perfect solutions to the problems it helps solve. People must make informed decisions to use technology wisely.

FIGURE 13
Spraying Pesticide
The airplane is spraying pesticide on a field.



What are pesticides?

Section 3 Assessment

Target Reading Skill Previewing Visuals Refer to your questions and answers about Figure 12 to help you answer Question 2 below.

Reviewing Key Concepts

1. a. **Defining** What is technology?
b. **Explaining** Explain why a toothbrush is an example of technology.
c. **Applying Concepts** What is the goal of technology? Explain how a toothbrush achieves this goal.
2. a. **Comparing and Contrasting** Compare science and technology.
b. **Explaining** Is a human leg prosthesis an example of science or technology? Explain.
c. **Relating Cause and Effect** Explain how both science and technology must have been involved in the development of a leg prosthesis.

3. a. **Listing** List the positive consequences of using pesticides. Then list the negative consequences.
b. **Explaining** Explain the following statement: "Technology does not provide perfect solutions to problems." Use pesticides as an example.

Writing in Science

Technology and You Choose an example of technology that has had an important impact on your life. Describe the technology and explain how it has affected you.