Technology in the Workplace

Chapter Objectives
After completing this chapter, you will be able to:

▶ Section 18.1   *Information Technology*
- **Describe** the role of information technology in business.
- **Identify** ways that technology has changed the workplace.

▶ Section 18.2   *Internet Basics*
- **Describe** the Internet and its components.
- **Identify** tools for managing threats when using the Internet.

## Ask STANDARD &POOR'S — Fundamental Research

Q: What do I look for when researching a company whose stock interests me?

A: Since stock represents ownership in a company, the best way to gauge a stock's appeal is to research the fundamentals of the business—the company's basic financial condition. You might look at aspects such as gross margin to see how profitably a company is able to manufacture its products; at earnings and the price to earnings ratio to see how much of a premium other investors are willing to pay for a company's future earnings; and at the company's history of paying dividends to tell whether the company has been stable or growing over time. All the information you'll need to perform fundamental analysis on a publicly traded company is available to the public.

Mathematics If a company has a gross margin of 20%, what is the cost of manufacturing its products?

CONCEPT **Gross Margin** Gross margin is profit divided by net sales. It is usually expressed as a percentage.
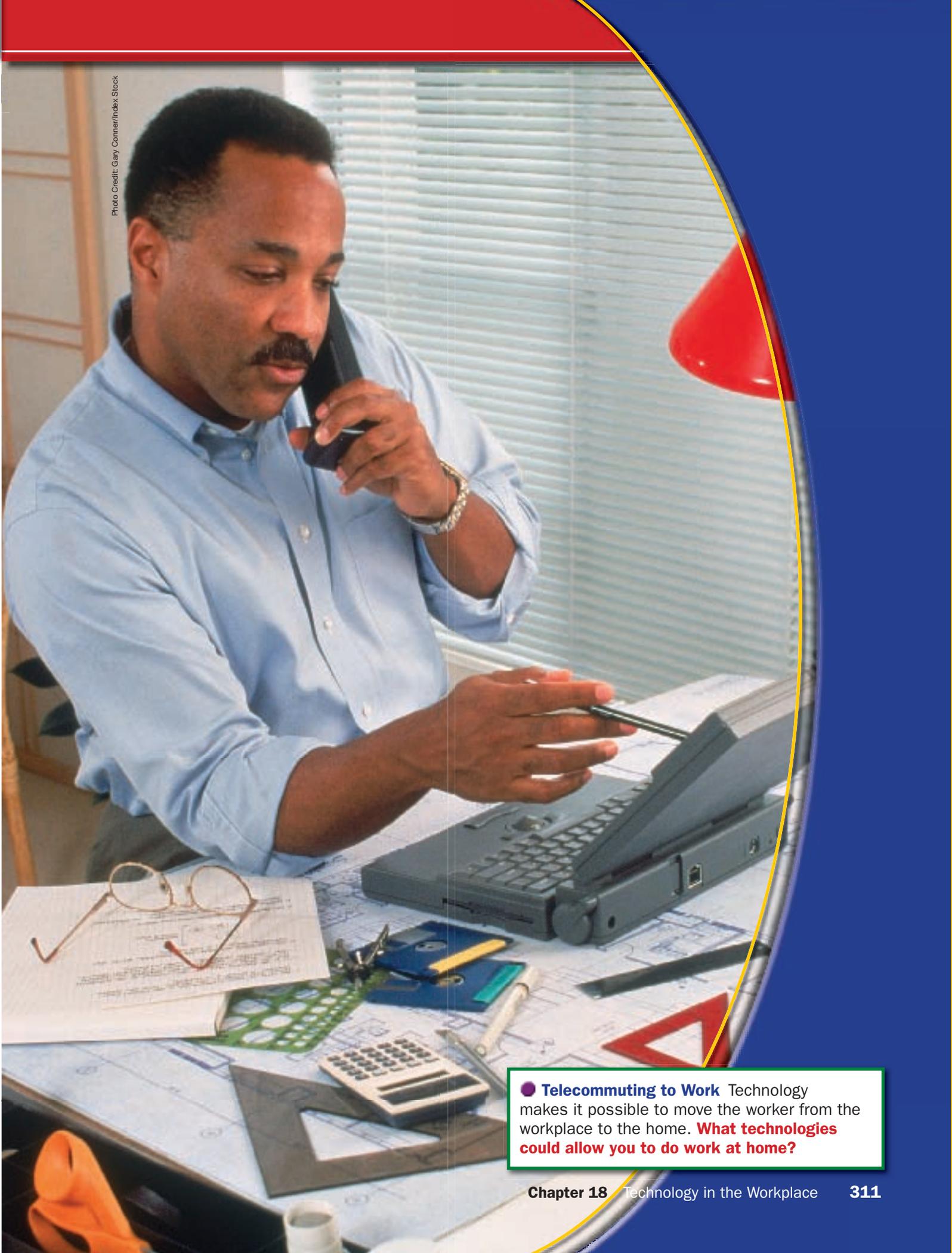
● **Telecommuting to Work** Technology makes it possible to move the worker from the workplace to the home. **What technologies could allow you to do work at home?**

Information Technology

Reading Guide

Before You Read

Think about ways information technology is used for business and personal reasons.

Read to Learn
- Describe the role of information technology in business.
- Identify ways that technology has changed the workplace.

The Main Idea
People want instant access to information. At home and at work, they use hardware and software to create, store, and communicate information. Information technology allows people to access information from anywhere.

Key Concepts
- The Role of Information Technology
- How Technology Has Changed the Workplace

Vocabulary
Key Terms
information technology (IT)
telecommunications
telecommuting
wearable computer
computer-aided design (CAD)
virtual reality

Academic Vocabulary
You will find these words in your reading and on your tests. Make sure you know their meanings.

transmit   simulate
automatic   visual

Graphic Organizer
In a figure like the one below, list the advantages of telecommuting in the left column and the advantages of working in an office in the right column.

Advantages of Telecommuting	Advantages of Working in an Office

Go to the *Introduction to Business* Online Learning Center through **glencoe.com** for a printable graphic organizer.

Academic Standards
English Language Arts
NCTE 1 Read texts to acquire new information
Mathematics
Algebra Represent and analyze mathematical situations and structures using algebraic symbols

The Role of Information Technology

People depend on getting information quickly and easily. **Information technology (IT)** uses computing, electronics, and telecommunications to process and distribute information in digital and other forms. **Telecommunications** is the transmission of information over communication lines. This covers many technologies, including telephones and computer networks.

Computers are an important part of information technology. So are telephones, fax machines, personal digital assistants (PDAs), and other handheld devices. MP3 players digitally store music for listening anywhere. Wireless technology (wireless fidelity, or WiFi) lets people with a wireless-enabled computer or PDA connect to the Internet. Buildings wired for WiFi can transfer information from one part of a computer system to another. Computers used to design and make new products have improved the manufacturing process. Millions of employees work from home. IT makes these innovations possible.

Reading Check **Identify** What are some forms of information technology?

How Technology Has Changed the Workplace

New technology makes it possible to do tasks in different ways. When computers were first used in business, they were too big and heavy to take from the office. Today, mobile computers are light enough to take anywhere. *Electronic mail,* or e-mail, allows workers to communicate with others electronically. Wearable computers, manufacturing technology, and specialized software allow more work flexibility. Wireless phones, broadband access, and voice technology also let the workspace become mobile. For example, Capital One Financial Corp. replaces traditional offices and cubicles with mobile work areas and a casual environment. At hospitals, nurses can use a wireless computer to enter information about patients from anywhere in the facility. Through *WiFi,* the information is sent to a database available to the doctors, technicians, and others who need it.

Internet Tools Technological innovation has changed the way people and businesses interact. **How can a business use technology to improve sales?**

Photo Credit: Mark Richards\PhotoEdit

Telecommuting

Telecommuting is an arrangement that allows employees to work at home while communicating with the workplace by phone, fax, or modem. Telecommuting has advantages. It decreases traffic in busy areas since workers spend less time traveling. It allows for flexible work hours. Companies also find that the quality of work often improves for telecommuters. Many employees are absent less often than when they worked full-time at the office.

Telecommuting also has disadvantages. Some employees dislike the lack of contact with other workers. Many miss the social part of the office. Some also find that they get distracted at home and cannot get their work done. For employers, a major problem is supervising an employee at a remote site. Telecommuters must have computers and other equipment to do their work. In many cases, this adds to company expenses. **Figure 18.1** shows that younger people use computers more frequently than older people.

Wearable Computers

Ever more portable computers are being developed by the IT industry. One goal is to make more wearable computers. A **wearable computer** is a small portable computer designed to be used while it is worn on the body. Some can be worn as wristbands; others work as headsets or clip onto a belt or backpack. For example, portable music players may be able to understand and record speech by workers who need to take dictation.

Real World

Open-Source Systems An *operating system* is the basic set of programs and utilities that make your computer run. Users can modify and redistribute open-source operating systems such as Linux®. *What are some issues that computer users should consider before using open-source systems?*

Technology in Manufacturing

Computers have also made a difference in the way products are designed and made. **Computer-aided design (CAD)** is software for designing products with a computer. With CAD, engineers can design without paper. They can change designs quickly and easily. By using CAD and computer-aided manufacturing (CAM) programs together, companies can custom-design and make products.

Most manufacturing plants are partly automated. Robots and computer-controlled machine tools do much of the work. They can do many of the hard or monotonous jobs that were done by people in the past, freeing workers to direct the robots and machine tools. Workers usually receive technical training to do these jobs.

Electronic Information Transfer

Electronic information transfer allows tasks to be done quicker. For example, many companies electronically transfer paychecks to employees' bank accounts. A national sales manager uses electronic mail to transmit sales figures to regional managers. Consumers use electronic information transfer, too. They can use an automatic teller machine (ATM) or their own computer to transfer funds from one bank account to another.

Figure 18.1 — *Computer Users by Age Group*

Source: *Time Almanac*, "Computer Usage in the U.S."
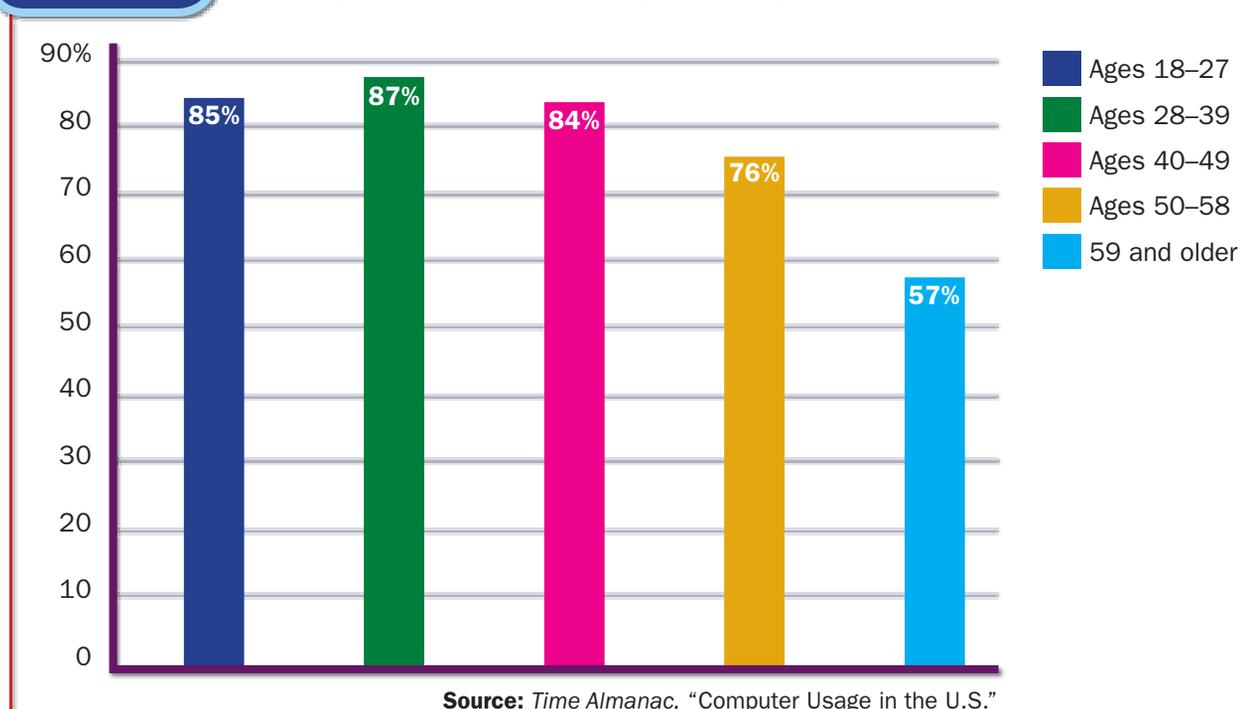
🟣 **Tools for Everyone** This chart shows the percentages of people in the United States who used computers in a recent year. **What changes do you predict will happen over the next several years in these figures?**

● **As You Read**

Think about computer games that use virtual reality and how they might help you in the business world.

Virtual Training

Virtual training allows people to **simulate** a real situation using a computer. For instance, a computer-run flight simulation program allows pilots to learn how to fly aircraft. Pilots enter a room equipped with cockpit controls and a video screen, and practice flying the "aircraft." The screen shows them the results of their actions. The entire room is movable, with its motion controlled by a computer. In this case, virtual training offers pilots a safe way to learn to fly. Schools use computer-based science labs. Students try different science experiments using a computer. Menus allow them to choose chemicals to combine and tell them the amounts to use. Experiments done on computers are safe, with no danger involved if students make mistakes.

Virtual reality is also used in training. **Virtual reality** is an artificial, three-dimensional **visual** world created by a computer. In a *virtual world,* the computer re-creates places and actions that seem real. Users wear special goggles and fiber-optic gloves called data gloves. They enter and move about, and interact with objects as if inside the virtual world. The data gloves are the input devices, relaying movements of the user's hand to the computer. The senses of sight, sound, motion, and touch give the illusion of real objects or places. For example, in medical training, computers allow surgeons to practice procedures without real patients.

Section 18.1

● **After You Read**

Review Key Concepts
1. What are some forms of information technology?
2. How has technology, especially mobile technology, changed the workplace?
3. What are some of the pros and cons of telecommuting?

Academic Skills
4. **Mathematics** At a Silicon Valley computer networking company, 17,000 people, or 47% of its workforce, telecommute for part or all of the workday. Write a sentence or two describing how you could determine the number of employees who do not telecommute.

CONCEPT **Proportions** A proportion is an equation stating that two ratios are equivalent.

Math For math help, go to the Math Appendix.

@ Go to the *Introduction to Business* Online Learning Center through **glencoe.com** to check your answers.

Internet Basics

Reading Guide

● Before You Read

Think about how the Internet and its components are used to access and communicate information.

Read to Learn
- Describe the Internet and its components.
- Identify tools for managing threats when using the Internet.

The Main Idea
The Internet has changed the way business is done. However, it poses risks to the information that is stored on computers. Companies and people must protect their computers from threats.

Key Concepts
- The Internet
- Managing Technology Threats

Vocabulary
Key Terms
Internet
World Wide Web
Web browser
search engine
intranet
extranet
hacker
cookies
virus

### Academic Vocabulary
You will find these words in your reading and on your tests. Make sure you know their meanings.

guidelines   reject
authorized   insert

Graphic Organizer
In a figure like the one below, define intranet in the left circle and extranet in the right circle. Write notes about similarities among intranets and extranets in the area where the two circles overlap.
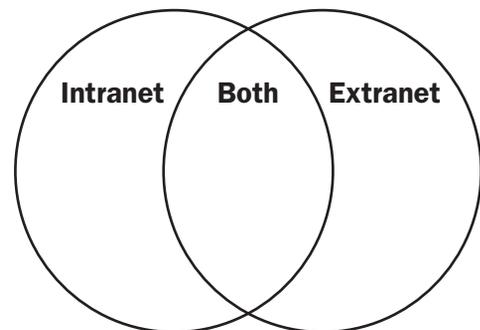
Intranet   Both   Extranet

@ Go to the *Introduction to Business* Online Learning Center through **glencoe.com** for a printable graphic organizer.

Academic Standards

English Language Arts

NCTE 1 Read texts to acquire new information

NCTE 5 Use different writing process elements to communicate effectively

NCTE 8 Use information resources to gather information and communicate knowledge

Science

Content Standard F Students should develop understanding of personal and community health

The Internet

The **Internet** is a global computer network. It connects many computer networks, allowing information to flow freely around the world. People access the Internet through their telephone lines or digital subscriber line (DSL) service, which provides a high-speed connection. Other high-speed connections can be established over cable or Ethernet connections. These connections are possible through modems, devices used to send data from one computer to another.

✔ Reading Check **Explain** What is the Internet?

The World Wide Web

The World Wide Web is part of the Internet. The **World Wide Web** (or simply the Web) is a system for accessing, changing, and downloading a large set of hypertext-linked documents and other files located on computers connected through the Internet. *Hypertext* is a computer language that allows Internet users to access stored images, text, and other files. It enables direct links to related text, images, sound, and other data.

BusinessWeek *Reader and Case Study*

Math Will Rock Your World

Neal Goldman is a math entrepreneur. He works on Wall Street, where numbers rule. But he's focusing his analytic tools on a different realm altogether: the world of words.

Goldman's start-up, Inform Technologies LLC, is a robotic librarian. Every day it combs through thousands of press articles and blog posts in English. It reads them and groups them with related pieces. Inform doesn't do this work alphabetically or by keywords. It uses algorithms to analyze each article by its language and context. It then sends customized news feeds to its users, who also exist in Inform's system as—you guessed it—math.

How do you convert written words into math? Goldman says it takes a combination of algebra and geometry. Imagine an object floating in space that has an edge for every known scrap of information. It's called a polytope and it has near-infinite dimensions, almost impossible to conjure up in our earthbound minds. It contains every topic written about in the press. And every article that Inform processes becomes a single line within it. Each line has a series of relationships.

@ **CASE STUDY** Go to the *Introduction to Business* Online Learning Center through **glencoe.com** for the *BusinessWeek* Reader Case Study.

Active Learning

Ciphers are another method of turning words into math. One of the simplest types of ciphers turns each letter into a corresponding number. ASCII (pronounced askey) code is just such a cipher type—and is the way computers and communications devices process words. Research the ASCII code symbols and write your name in ASCII code.

Ergonomics

Ergonomics is the understanding of how the interaction of humans and other elements in a system or setting affects people's health. The study of ergonomics goes back to the 1700s, when Italian physician Bernardino Ramazzinni published "De Morbis Artificum (Diseases of Workers)." During World War II, ergonomics was first used in the design of products to reduce workplace medical issues. At that time, ergonomically designed cockpit controls were invented and greatly reduced the sort of pilot error that led to plane crashes. In the time since WWII, the study of ergonomics has grown a great deal. With so many people using computers today, new health challenges have surfaced. It is the task of the designers to create technological tools that not only accomplish their purpose but also keep us healthy.

Web Quest

Go to the *Introduction to Business* Online Learning Center through **glencoe.com** for links to Web sites where you can research the different ways that ergonomics can be applied in the design of products. Look at examples of things in various fields. Write a few paragraphs about how items are designed ergonomically and the health concerns they are intended to affect.

Who Sets Standards for the Internet? The Internet is not owned or controlled by any one person or country. The World Wide Web Consortium (W3C) is an international association in which member organizations, a full-time staff, and the public work together to develop Web standards. The group oversees research and sets standards and **guidelines** for many areas of the Internet. More than 500 organizations from around the world are members of W3C.

The Web connects sources of information. However, there are too many Web sites for people to visit. To access the information they need, computer users use Web browsers and search engines.

A **Web browser** is a program used for displaying and viewing pages on the Web. The inclusion of design, graphics, and sound on the Web makes it more enjoyable to *surf,* or search for information. Browsers include Mozilla Firefox®, Netscape®, and Microsoft Internet Explorer®. A **search engine** is a computer program that can produce a list of documents related to a given topic. Users find information that they need by giving the search engine a key word. The search engine then sifts through countless Web pages and creates a list of documents related to the key word. Some search engines are Yahoo!®, MSN®, and Lycos®.

Intranets and Extranets

Unlike the Internet, an intranet is closed to access by the public. An **intranet** is a computer network used by an organization. It works like the Internet, but its access is restricted to **authorized** users. A company might keep its employee directory and code of ethics on an intranet. An **extranet** is an extension of the intranet of a company or organization. It gives authorized users controlled access to the intranet. This semi-private network allows more than one company to access the same information. With an extranet, companies can share information and collaborate.

✔ Reading Check **Contrast** What is the difference between an intranet and an extranet?

Managing Technology Threats

Privacy and security risks are threats to users of computer technology. A **hacker** is a person who illegally gains access to and sometimes tampers with information in a computer system. Internet users are especially open to security risks. To avoid privacy and security threats, do not click on pop-up ads unless you know and trust the company. These ads may not be secure.

Privacy Issues

Companies use software tools to track computer users online. Many Web sites that users visit send cookies to their computer. **Cookies** are bits of information about a computer user that are stored on that computer's hard drive. The information is accessed by a server when the user revisits a Web site. Users who visit online stores can have their personal information stored even if they do not buy anything. Some computer users see cookies as a convenience. Others see them as an invasion of privacy. Those who do not want companies to store and use their personal information must **reject** or delete cookies.

● Computer Protection As more companies' computer networks are connected to the Internet, the need for computer security has become increasingly important. **What types of protection does this software offer?**

Photo Credit: Chris Leslie Smith\PhotoEdit

Protection for Data A computer **virus** is a program that can **insert** copies of itself into a computer without the user's knowledge, often damaging stored data. Viruses are a problem for computer users. They may do little harm, or they may destroy computer files. A worm is a special virus that invades a computer network and multiplies itself as it spreads throughout the network. Security programs such as anti-virus software protect against different types of viruses. New viruses are created every day, so updates of anti-virus software must be installed regularly.

Spyware is software that tracks what a user does on the Internet. Users can download free software or buy special software to prevent spyware. Some software packages offer several kinds of protection.

Software packages can protect users from other types of security threats. A *firewall* is computer software that prevents unauthorized access to system software or data on a user's computer. It acts as a security wall between your computer and the Internet. Firewalls can also reduce spam. *Spam* is unwanted e-mail.

A security breach occurs when someone manages to obtain unauthorized access to your system. Finding and fixing the security breach can be time-consuming and costly.

Section 18.2

After You Read

Review Key Concepts

1. How would you describe the Internet and the World Wide Web?
2. How does a search engine work?
3. How can a computer user protect against spam, viruses, worms, and spyware?

Academic Skills

4. **English Language Arts** Choose a type of technology that is important to business such as cell phones, telecommuting, WiFi, wearable computers, or expert systems. Research the technology so that you can describe how it is used in a business setting, the solutions it offers, and how you think it will develop in the future. Present a brief oral presentation or write a three- or four-paragraph paper about your topic.

5. **English Language Arts** Imagine that the company you work for has grown, and your manager has decided to switch from an older system of independent computers to one in which each worker's computer is linked to a network with Internet access. Write a list of the advantages a network offers and the precautions to take to keep company information secure.

Go to the *Introduction to Business* Online Learning Center through **glencoe.com** to check your answers.

Section 18.1 *Summary*

Information Technology Information technology (IT) has changed the way business is done. Computers are an important part of IT. So are telephones, fax machines, PDAs, and other handheld devices. Wireless technology lets people with a wireless-enabled computer or PDA connect to the Internet. E-mail lets them communicate with others electronically. Wearable computers help workers to become more mobile. All of these technologies enable business to be done more quickly and easily. Telecommuting can help employees decrease their travel time. Virtual training lets people simulate real situations using a computer to help them learn new tasks.

Section 18.2 *Summary*

Internet Basics The Internet connects many computer networks. It allows information to flow freely around the world. The World Wide Web is part of the Internet. The Web consists of stored files and images. A Web browser is a program that displays Web pages. Users find information they need by giving key words to a search engine, which produces a list of Web pages related to the key words. Some companies use intranets and extranets as ways of communicating with their employees. Computers can be threatened by privacy and security risks. Security programs such as anti-virus software protect against threats.

Vocabulary Review

1. On a sheet of paper, use each of these key terms and academic vocabulary terms in a sentence.

Key Terms		Academic Vocabulary
information technology (IT)	Web browser	transmit
telecommunications	search engine	automatic
telecommuting	intranet	simulate
wearable computer	extranet	visual
computer-aided design (CAD)	hacker	guidelines
virtual reality	cookies	authorized
Internet	virus	reject
World Wide Web		insert

Review Key Concepts

2. Describe the role of information technology in business.

3. Identify ways that technology has changed the workplace.

4. Describe the Internet and its components.

5. Identify tools for managing threats when using the Internet.

Critical Thinking

6. Wireless technology, which makes it possible to transfer information without cables, is less secure than wired technology. What risks do people take when they use wireless technology?

7. What are some reasons why a company might encourage an employee to telecommute?

8. How is the workforce affected by technical advances developed for manufacturing processes?

9. The electronic transfer of information has replaced much of the paper used in offices. What are some benefits of using less paper in the office?

10. Virtual reality is used by business for training. What is another way that virtual reality is used?

11. What kinds of technology are involved in tracking an online order?

12. Computer users can delete cookies from their machines. When do you think you would delete cookies?

13. Suppose you are hired to work in an office that uses the latest technology related to its business. How would you prepare to use new technology?

Write About It

14. With mobile technology, workers can be in touch with their workplace all the time. Write an e-mail to your teacher about the pros and cons of mobile technology.

15. Research the work of a computer software engineer. Write a one-page report that describes this career.

16. Look up future trends in technology that will affect the workplace. Write a 500-word article for your school newspaper on the impact some of these trends may have on the business world.

17. People who work with computers in business are often referred to as knowledge workers. Write at least two paragraphs describing the relationship between computers and knowledge in business.

18. Telephones are often used in customer service. Write a skit that involves using the telephone to resolve a customer complaint. Present your skit in class.

19. Research the different types of electronic communications that businesses use, including videoconferencing and telephone conferencing. Write a one-page report on your findings.

Technology Applications

Research Security Software

20. Using the Internet, research companies that provide security software packages. These companies include Symantec®, McAfee®, Trend Micro™, and Kaspersky Lab®. Use the information you collect to develop a database of software information. Include prices and facts about the types of security risks each company's products address.

Business Ethics

Ethical Computer Use

21. Explain why the following statements about the ethical use of computers are true. (1) Computer users should respect the privacy of other users' computer files. (2) You do not have a right to share software with your friends. (3) It is your responsibility to secure your computer. (4) Information on a Web site does not always belong to the Web site owner.

Applying Academics to Business

English Language Arts

22. As new technologies come into use, new words are added to the English language to describe them. Below are several terms that have come into common usage in recent years. Write a definition for each, and tell something about its origin.

blog   dodgy   domain   hot spot

Mathematics

23. An executive at a large telecommunications company claimed that $1.9 billion in operating expenses could be saved if the company merged with a competitor. What is the place value of the 9 in 1.9 billion? Write your answer in two ways.

CONCEPT **Place Value** In the base 10 number system we use most often, each place in a number has a value that is a power of 10. The value of a number in the ones place is 10^0; the value of a number in the tens place is 10^1; the value of a number in the hundreds place is 10^2, and so on.

English Language Arts

24. An appositive describes words or phrases that refer to the same person or thing and have the same relationship to other parts of the sentence. Combine each pair of sentences below by using an appositive. Use commas correctly.

Microsoft Internet Explorer is a program that makes it easier to search for information on the Internet. Microsoft Internet Explorer is a Web browser.

Expert systems are applications that store the kind of knowledge that humans use. Expert systems are used in many businesses.

Mathematics

25. A cell tower has an effective range of between 0.5 mile and 5 miles. What is the minimum and maximum coverage area for the cell tower?

CONCEPT **Area** The range represents the radius and is the distance from the center of a circle to any point on the circle. To find the minimum and maximum areas, find the area of the circles. The area of a circle can be found using the formula $A = \pi r^2$.

Active Learning

Create a Computer-Use Policy

26. Many companies develop a policy on the personal use of computers at work. Rules that restrict workers from visiting certain Web sites or downloading software help to protect computer networks from security risks. Pair up with a classmate. Imagine that you are the co-owners of a small delivery service. Write a policy on employees' use of computers at work. Be sure to consider telecommuters.

Business in the Real World

Technology's Effect on Business

27. Interview a small-business owner in your community to learn how technology affects his or her business. What changes have been made because of information technology? What additional expenses were incurred? Is the Internet used for business? If so, how? After the interview, prepare a summary of your results, and share it with your class.

Real LIFE · skills

TELECOMMUTING HABITS AND SKILLS

28. Some employees choose to telecommute. Telecommuters usually work at home at least one day a week. Create a list of habits and skills that you think are important to a technical writer who telecommutes. Include the personal characteristics and technical skills that would be important for someone who works at home. Be prepared to share your list in class.

Cool Business CAREERS

FIND YOUR DREAM JOB

29. Go to the *Introduction to Business* Online Learning Center through **glencoe.com** for a link to the Occupational Outlook Handbook Web site. Click on the "OOH Search/A-Z Index" link and enter the job title "computer systems analysts." Then write a one-page report about this type of occupation. Conclude your report with a list of things you could do now to prepare yourself to pursue the occupation.

Role Play

USING THE INTERNET SAFELY

30. Situation You have been asked to give a short presentation to a group of consumers about proper procedures for shopping online. Most of your audience members have not used the Internet for online shopping.

Activity Prepare an outline of your presentation, stressing ways to use the Internet. Give your audience some "do's and don'ts" about Internet use.

Evaluation You will be evaluated on how well you meet the following performance indicators:

- Explain the advantages and disadvantages of shopping online.
- Explain concepts such as security software, a secure Web site, a Web site shopping cart, cookies, and online payment.
- List at least three guidelines to follow when shopping online.
- Prepare a written outline of your presentation.

Standardized Test Practice

Directions Choose the letter of the best answer. Write the letter for the answer on a separate piece of paper.

1. Which is a synonym for *virtual*?

A   secondary
B   actual
C   precise
D   near

> **TEST-TAKING TIP** Real learning occurs through studying that takes place over a period of time. Relate the information you are learning to what you already know, and you will be better able to understand and retain it. Plan more than one review session.

READING Go to the *Introduction to Business* Online Learning Center through **glencoe.com** for a list of outside reading suggestions.