

ACTIVITIES 10

CROSS-CURRICULAR EXTENSIONS

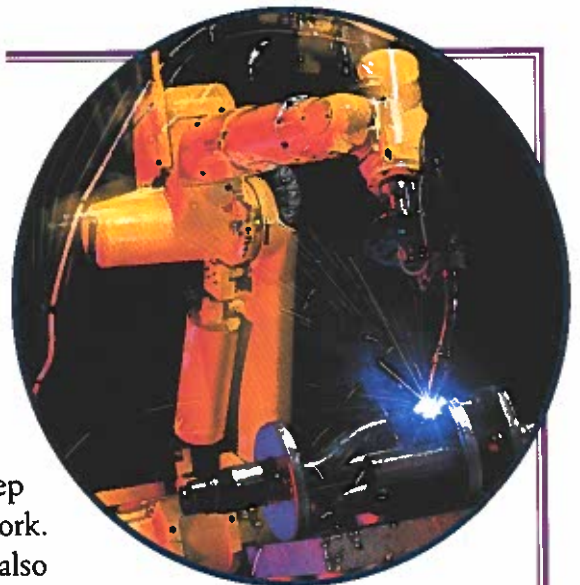
- 1. SCIENCE** Design a robotic end effector that could be used to pick up samples of soil based on size and density.
- 2. MATHEMATICS** If your company must pay \$50,000 for a plastic mold for a pen that costs less than a dollar, how does the company make money?
- 3. COMMUNICATION** Write a company such as Ford or General Motors for information on how it uses robots in the manufacture of cars.

EXPLORING CAREERS

Technology has made it easier and more efficient to perform many jobs. For example, cashiers in grocery stores no longer have to input by hand all of the prices for the products that you buy. Following are two jobs that have been affected by the increase of automation in the workplace.

Production Manager Production managers plan and organize the work necessary to manufacture products in a timely manner. They assign workers, keep projects on schedule, and monitor the quality of the work. Managers must be organized and flexible. They must also have good “people” skills in order to keep employees interested and productive.

Robotics Technician Robotics technicians program and monitor robotic equipment that is usually used for manufacturing. They must be able to set up, operate, and repair the robot if there is a mechanical problem. Technicians must have skills and knowledge in electronics and programming.



ACTIVITY

Divide into teams and select one fast food. Have each team produce enough small drawings of the item for every person in the class. Did you work well together? Were you efficient?

How Business Works

SECTION**1** What Is a Company?**2** Starting a CorporationACTION ACTIVITY **Starting a Company****3** Mass ProductionACTION ACTIVITY **Organizing a Company****4** Total Quality ImprovementACTION ACTIVITY **Making Quality Products****5** Packaging and Selling ProductsACTION ACTIVITY **Pack It Up and Sell It!**

What Is a Company?

THINGS TO EXPLORE

- Tell what a company is.
- Tell what the main goals of a company are.
- Describe three different ways to manage a company.

TechnoTerms

capital
company
corporation
dividend
entrepreneur
partnership
proprietorship

A company is an organized group of people doing business. An **entrepreneur** is someone who starts a company. Each year, almost one million new companies are started.

In a *free enterprise* system such as ours, companies are in business to sell products or services and to make a profit. They must obey laws that protect people, the nation, and the environment, but they are otherwise free to run their business without interference from the government. Another name for this system is *capitalism*.

Many companies may compete with each other. To be successful, companies must work to produce the best goods, at the best prices, for the least amount of money.

In order to get a company started, someone has to *invest* (put in) money, or **capital**. Then, after the company is organized, someone has to *manage* (run) it.

Company Management

Different ways to manage a company include

- **Proprietorship.** A proprietorship is a business owned by just one person. Fig. 11-1. It is the easiest type of business to form because you as the owner have complete control over everything, including the profits.



Sole Proprietorship



Partnership



Corporation

◀ **OPPOSITE** There are many kinds of businesses throughout the world.

Fig. 11-1. A business may be a proprietorship, a partnership, or a corporation. Which kind would you like to try someday? Why?

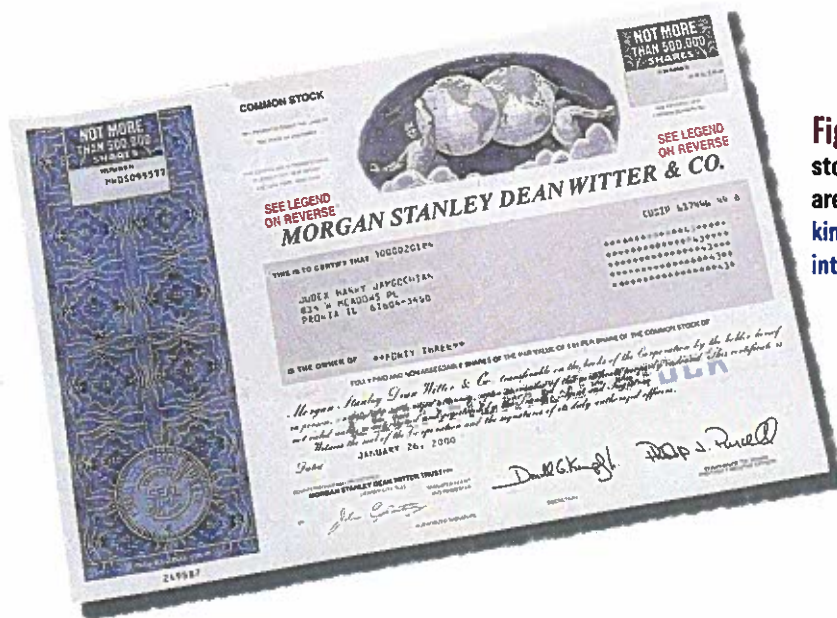


Fig. 11-2. People who own stocks, or shares, in a company are given a certificate. What kinds of companies would you be interested in investing in?

- **Partnership.** A business owned by two or more people is a partnership. It is also easy to form. The partners share the profits, the workload, and the responsibilities.
- **Corporation.** A corporation is a company organized and owned by stockholders. A *stockholder* is anyone who buys a share in a company. Fig. 11-2. Stockholders purchase stocks in companies hoping that the value of their stock will increase. While you own the stock, you also receive a dividend. A **dividend** is a payment you get as part-owner of the company. Forming a corporation is complicated. Corporations are very structured because there are so many people involved.

SECTION 1

TechCHECK

1. What is a company?
2. Describe three different ways to manage a company.
3. What is the main purpose of a company?
4. **Apply Your Knowledge.** List three companies and tell what their business is. Find out if they are corporations, proprietorships, or partnerships.

THINGS TO EXPLORE

- Identify the positions within a corporate structure.
- Explain what a company's main departments do, including human resources, research and development, production, and marketing departments.
- Design a product prototype and conduct a consumer survey.

TechnoTerms

annual
stockholder

If you wanted to start a corporation, you would first have to make out an application and get it approved by a government agency or department. After it is approved, you can sell stock to raise the capital needed to start and run the business.

Corporate Structure

After capital is available, you need to fill the positions within the corporate structure. Fig. 11-3.

- **Stockholders.** People who have bought shares in the company are the **stockholders**. They hold an **annual** (yearly) meeting. They elect the board of directors for the next year.
- **Board of directors.** Board members are elected. They set company policies and determine the main company goals. They report how the company is doing to the stockholders. The board also hires a company manager, or president, to run the company.
- **Management.** Managers run the company. They have to be good leaders and hard workers to make the company successful. Management picks the products the company will make, decides how to raise money to buy or rent buildings, locates raw materials, and determines worker salaries.
- **Administration.** The company president is the administrator in charge of the company and makes sure things are done right. The people in administration carry out the decisions made by the management department. Vice presidents are responsible for

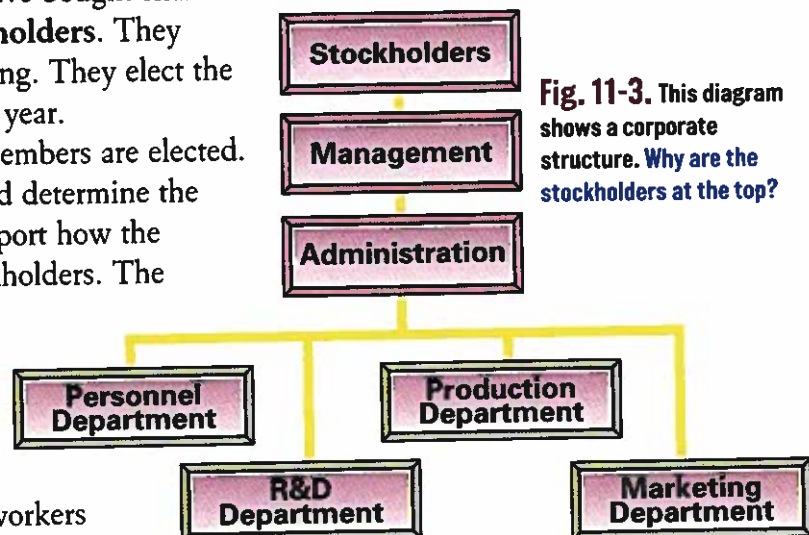


Fig. 11-3. This diagram shows a corporate structure. Why are the stockholders at the top?

certain areas in the company. In your school, for example, you might have a vice principal who has special duties to help the principal.

Main Departments in a Company

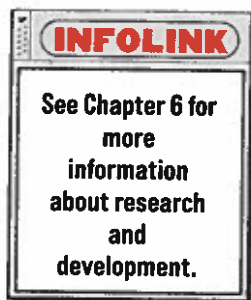
In a successful company, everyone works together to meet the company goal. Companies may have the right people and equipment to manufacture a product, but it takes even more than that to succeed. You also need to have a good production plan to produce a good product at the lowest cost.

Human Resources In some companies, the human resources department is called *personnel*. This department makes sure that the people who have the skills needed for certain jobs are hired. If extra training is needed, the human resources department makes sure workers get the training. They also make sure you are rewarded if you are a good worker.

Research and Development (R&D) The R&D department improves existing products or designs new products. Companies depend on R&D departments to find efficient ways to make products so they can save money and make a profit.

Production Department The production department is in charge of making the company's products. Production workers turn materials into parts for products and assemble the products.

Marketing Department The job of the marketing department is to sell the company's products or services. Sometimes marketing conducts consumer surveys to find out what people want, how much they are willing to pay for it, and who would probably buy it. The marketing department must also have a *marketing plan* (strategy) for advertising and selling the product or service.



SECTION 2

TechCHECK

1. Who are stockholders?
2. What is the purpose of a marketing department?
3. What positions make up a corporate structure?
4. **Apply Your Knowledge.** Your school is a business. List the main departments and positions that make it run smoothly.

Starting a Company

Real World Connection

Companies get started in order to make money providing a product or a service to you, the consumer. If the product is successful, the company may expand.

In the activities in this chapter, your class will organize into a company. Fig. A. You will sell stock, design products and advertisements, produce the product, package it, sell it, and make a profit (we hope). As in any business, there is no guarantee that there will be money left over after all the bills are paid.

Be sure to fill out your **TechNotes** and place them in your portfolio.

Design Brief

Organize your class into a company, design a product prototype, and conduct a consumer survey. Your product should be something your class can produce in your technology lab for less than \$5. It must be designed with safety in mind. Sharp edges, electrical shock hazards, or pinch points must be avoided.

Materials/Equipment

- materials needed to build a prototype
- computer with graphics and spreadsheet software
- machines and tools as needed to make a prototype

SAFETY FIRST
Follow the safety rules listed on pages 42-43 and the specific rules provided by your teacher for tools and machines.

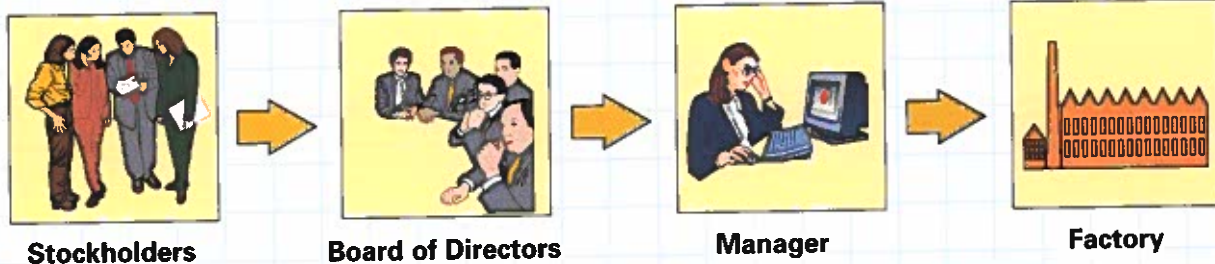


Fig. A

(Continued on next page)

**ACTION
ACTIVITY****Procedure****Part 1 • Designing the Product**

1. Consider your market—the customers who will buy your product. If your product is going to be sold in school, you might think of the students as your market. What kinds of products would they like to buy?
2. Work with your teacher to brainstorm product ideas. Make a list of possible markets and products. Your list might look like the one shown in Fig. B.
3. Vote on each of the products on your list. Find the five products your class thinks have the best chance of selling. Work as a class to refine the ideas and make plans for building them.
4. Divide the work of building a prototype for each of the product ideas among the class. Your prototype does not need to be perfect. There will be time later to improve the design.

Part 2 • Making a Consumer Survey

1. You will need to get some information about what the people want in a product. By conducting a consumer survey (a series of questions), you can obtain feedback.

2. Create a survey form. All five of the products should be included on the form. The results of the survey will help you decide which of the prototypes will be produced by your company. Your survey might look like the one in Fig. C.
3. Give your survey to students, parents, or teachers—your market—and to other groups as well. The people you ask to complete your survey should be picked at random (by chance).
4. Evaluate the results of the survey. When you do this, you are compiling data. The data can be presented to the class in the form of a graph. It is important to evaluate the results fairly, without letting your feelings interfere with your judgment. Fig. D.
5. Make a list of the prototypes, ranking them from most popular to least popular.

Evaluation

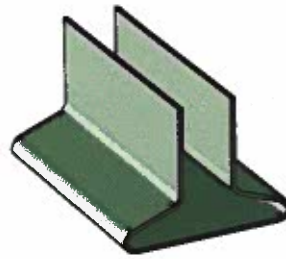
1. Could your survey have been done by phone?
2. What questions would you change?
3. Why do companies make prototypes of products?
4. **Going Beyond.** Put the consumer survey results on a spreadsheet.
5. **Going Beyond.** Design another prototype where cost is not a consideration. Let your imagination work to come up with an idea that you think could be manufactured and sold.

Market	Elementary School	Middle School	Parents	Teachers
Product	pencil holder	clipboard	clipboard	clipboard
	locker shelf	locker shelf	desk tray	desk tray
	bookmark	book holder	can holder	key chain
	toy	game	game	game
	puzzle	CD or tape holder	CD or tape holder	CD or tape holder
	picture	school logo	school logo	school logo

Fig. B

CONSUMER SURVEY

1. Are you tired of a cluttered desk?
 Yes No
2. Would you buy a plastic letter holder?
 Yes No
3. Would a letter holder make a good gift?
 Yes No
4. What color do you like best for a letter holder?
 Clear Red Blue Yellow Other _____
5. Can you think of other ways to use the letter holder?



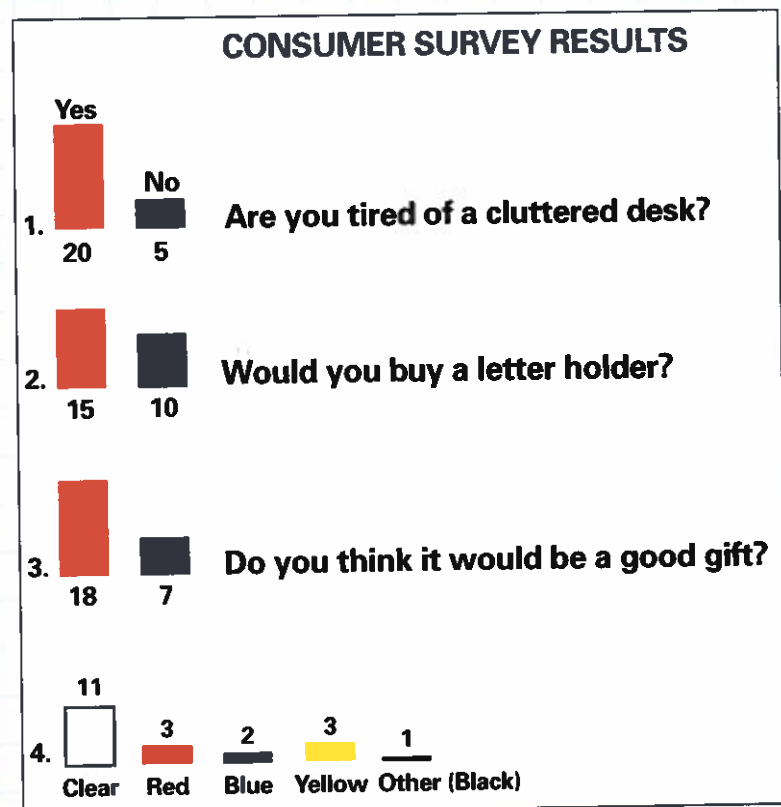
If you return this survey, you will be given a coupon for 20% off your letter holder purchase. Thank you for your help.

Fig. C

SAFETY FIRST

Remember, you must have safety instruction and a demonstration on machines before you use them. Ask your teacher for help if you have forgotten how to use a machine safely. Don't forget to wear eye protection.

Fig. D



TechnoTerms

inventory
just-in-time
manufacturing
(JIT)
synchronized
production

THINGS TO EXPLORE

- Explain mass production and tell when and why it is used.
- Explain what just-in-time manufacturing is and why it is used.
- Apply and interview for a job in a school-organized company.

Mass production enables companies to produce large quantities of parts and products within a short time. To do this, each worker in a factory assembly line is assigned only one job. Each person does the same job over and over. Mass production also makes products less expensive to produce and therefore less expensive to buy.

Did you know that your shoes are probably mass produced by machines? Fig. 11-4. One machine cuts the material, another punches holes for laces, another glues the soles, and so on, until the final product is the shoe you recognize.

Fig. 11-4. Many parts of these shoes are made by machine. Here, a worker helps assemble them. Would you want to work on an assembly line? Why or why not?

Standardized Parts

Mass production works only if all the same parts are standardized (the same size and shape). The parts must be interchangeable.

Today's automobiles are made mostly with standardized, or interchangeable, parts. If one part, like a headlight or a door handle, breaks, you can buy another one just like it from an automobile dealer.

Just-in-Time Manufacturing

Where do companies store materials and purchased parts until they are needed on the production line? Many companies order large quantities (amounts) of materials ahead of time. They then must pay for storage space in a warehouse. People must be hired or robots





Fig. 11-5. The parts for this tractor arrived at the factory just before production began. What would happen if the parts were late?

purchased to move the material to the production line. Once the finished product is made, it often spends time in a warehouse, waiting to be shipped.

One way to cut down on **inventory** (things in storage) and costs is to use a computer to schedule deliveries just in time. **Just-in-time manufacturing (JIT)**, also called **synchronized production**, is a method that many companies are turning to. It eliminates the need for storage space and workers to manage the inventory. All the materials and ordered parts get to the factory just in time to be used in production. Fig. 11-5. When the product is finished, it is not stored but is immediately shipped to the customer. Just-in-time manufacturing enables companies to cut back inventory as much as possible.

TechnoFact

BUSINESS IN THE 21ST CENTURY. What will business be like in the 21st century? Some business specialists say that some current trends will continue. For example, product life cycles are becoming shorter. That means products are made that will not last long. People want more new products that can be developed in a shorter time. Managers and executives need more information faster to help them make decisions more quickly.

SECTION 3

TechCHECK

1. Why do companies use mass production?
2. Why do you need standardized parts in mass production?
3. What is just-in-time manufacturing?
4. **Apply Your Knowledge.** List ten products you think are mass produced.

INFOLINK

See Chapter 4 for more information about computers.

Organizing a Company

Be sure to fill out your **TechNotes** and place them in your portfolio.

Real World Connection

In the last activity, your class decided on a product to be manufactured by your student company. Now it's time to organize your company and get down to the business of doing business. Fig. A. In this activity, you will sell stock, organize into departments, and start producing your product.

Design Brief

Organize marketing, production, bookkeeping, and human resources departments. Design a stock certificate for your company. Sell stock in your company to raise capital. Apply and interview for a job in the company. Learn your job and start work.

Materials/Equipment

- materials needed to produce your product
- equipment needed to produce your product
- computer with graphics, database, word-processing, and spreadsheet software
- conveyor system created in Chapter 10 (optional)

SAFETY FIRST

Follow the safety rules listed on pages 42-43 and the specific rules provided by your teacher for tools and machines.



Fig. A


Procedure

1. Your company must be organized into departments. First, the company will need a dependable student to be president. The president will organize and supervise all of the company's operations. Put the names of the major departments on the board. You may volunteer for any of the departments.
2. Each department will need a vice president. The vice president of each department will report to the company president for assignments.
3. Each department must complete specific jobs before production can start. The assignments for each department are as follows:
 - **All departments:** Decide on a name for your product and a name for your company. Sell stock (\$0.25 per share) to people in your company or outside of your company. Be sure to caution people that there is no guarantee of profit. Give the money and receipts to your teacher to help pay the bills for materials used to make your product.

- **Bookkeeping:** Design a company stock certificate. The certificate must have the following information: company name, stockholder's name, date, value, receipt, and number. It might look like the example shown in Fig. B. Keep track of the stockholders on a spreadsheet.
- **Production:** Refine the prototype so that the product is ready to be mass produced. Make a final drawing of the product that shows *dimensions* (sizes). Make a list of all of the parts of the product, their material, part name, and size. Make a flowchart of the production process. There should be a place on the flowchart for every operation that must be done. Your teacher will help you design and make jigs and fixtures for the machines. A *jig* holds an object and guides the tool during work. A *fixture* keeps the object in the proper place while it's being made. The jigs and fixtures will make your product easier to mass produce.

EGGSTRA SPECIAL CORPORATION

STOCK CERTIFICATE



This certifies that _____ is the owner of _____ shares of stock in the Eggstra Special Corporation. This stock is non-transferable and can be redeemed for \$0.25 per share at any time or held until liquidation.

President _____ V.P. _____

Bookkeeper _____ Stock Number _____

INFOLINK

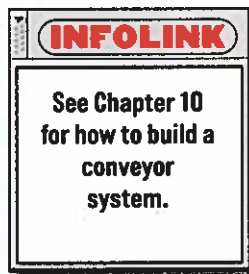
See Chapter 3 for more information about flowcharts.

Fig. B

(Continued on next page)

**ACTION
ACTIVITY**

- **Marketing:** An advertising campaign will help improve sales of your product. Your group should consider posters, flyers, announcements, demonstrations, video or audio commercials, and school newspaper ads to make your product more visible.
 - **Human resources:** Your department will place all the workers in the jobs for which they are best qualified. First, design and make copies of an application form. Then get a list of the jobs from the production department. Post a list of positions available. Have each student (including those in the personnel department) complete an application for a job. The vice president of human resources and the company president will interview the job applicants and hire people for the jobs for which they are qualified.
4. When your company is ready for production to start, each worker must know his or her specific job. If possible, set up the conveyor belt systems you made in Chapter 10. The conveyors should be placed so the movement of materials follows the flowchart made by the production department.
 5. As products are completed, they should be placed in storage for the next activity.

**Evaluation**

1. What was your specific job in the assembly line? What did you like or dislike about your job?
2. How could your job have been changed to make the production of products more efficient?
3. Design your place on the assembly line with ergonomics in mind. How far do you have to reach for parts or tools? How would you feel after doing the job all day?
4. How could the conveyor systems be changed to make them better? Make a sketch of your ideas.

SAFETY FIRST

Safety on the job is important to millions of workers. Always keep safety in mind. If a worker is hurt on the job, it costs money and slows production. Be careful!

Total Quality Improvement

SECTION 4

THINGS TO EXPLORE

- Define quality control and tell why it is important.
- Explain where inspections are done in the production cycle.
- Identify special tools and techniques used for quality control.
- Design a go-no-go gauge to use as a quality-control tool.

TechnoTerms

acceptance sampling
burn-in test
defect
quality assurance
quality control
statistical process control

Have you ever bought a new shirt only to find out after you got it home that a seam had come loose? Or maybe the zipper on your coat never worked right? Maybe you bought a compact disc (CD) or tape only to find a **defect** (something wrong) in it that ruins the way it sounds? Then you know one reason why we want quality control of products. How well it is made helps determine the *quality* of a product. Fig. 11-6. The reputation of a company can be hurt by just a few bad products.

Companies want to make high-quality products. To do this, they often set a quality standard before they make the product. **Quality assurance** means that a product is produced according to specific plans. Another name for quality assurance is **quality control (QC)**.

Production Cycle Check Points

Inspectors examine parts, materials, and processes at all stages of production. For example, in manufacturing, parts are checked for strength and to meet standards set up in the production line. Inspections often are made during three key times during the production cycle.

- **Delivery of materials.** Materials are inspected as they arrive. If the materials don't meet the standards, they are rejected and sent back.
- **Work in process (WIP).** Inspectors check that work is being done in the right way and that the right parts are being used.

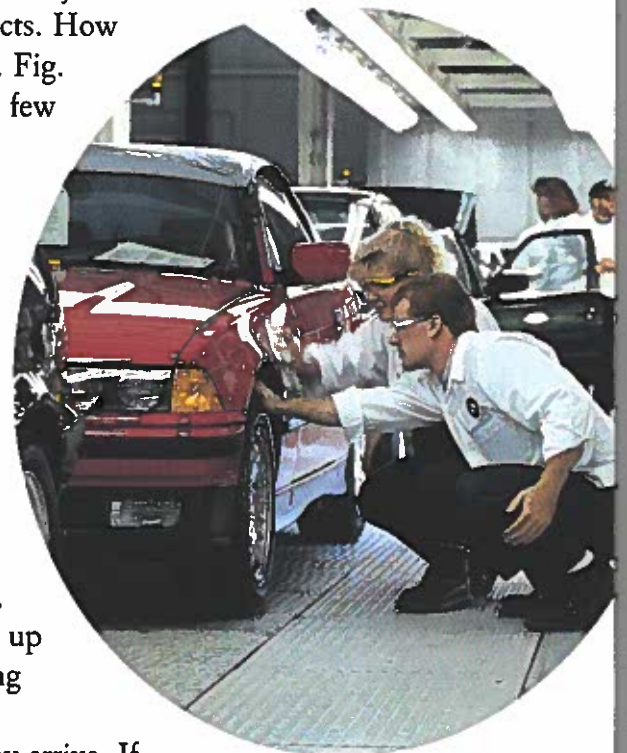


Fig. 11-6. At this BMW factory in Germany, inspectors check for possible problems. **What kinds of things might they be looking for?**

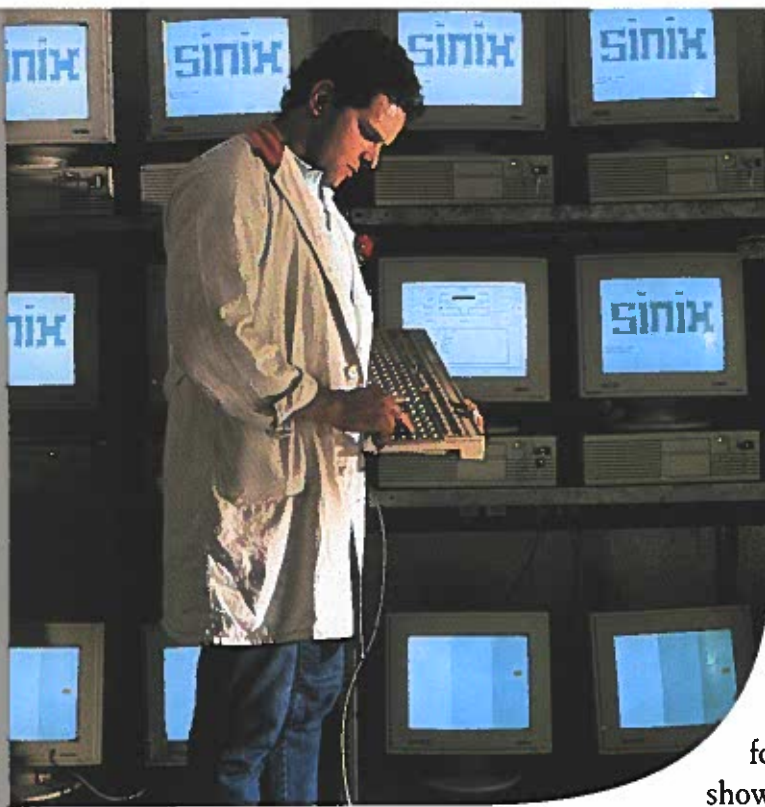


Fig. 11-7. Computers are tested to be sure they are working properly. Have you ever bought a defective product? Describe the experience.

- **Finished product.** This is the final inspection, where everything should work and look right! Fig. 11-7.

Quality Inspection Methods

Some special quality control techniques are used in manufacturing.

Measuring Parts A drawing is made for every part for a product. The drawing shows how to make the part and includes sizes in exact dimensions. Because most parts do not need to be perfect, a range of sizes is often given. For example, the range might be $1.5'' \pm 0.005''$. This range of acceptable sizes is called the *tolerance*. The part can be $0.005''$ over or $.005''$ under and still be just fine.

To check materials, parts, and products, inspectors use some special tools, such as *gauges*. A go-no-go gauge, for example, is a simple tool that does not require workers to take time to read measurements. It is made to fit a particular size part. If the part fits, it passes.

Some inspection devices emit sound waves or X-rays. Laser beams are used to make very precise (exact) measurements. New quality control techniques even make it possible for you to check inside without damaging the product.

Acceptance Sampling Many products are made in large quantities. Can you imagine how hard it would be to check every M&M candy as it passed on a conveyor belt? When it is not always possible to check each product, inspectors use a procedure called **acceptance sampling**. Acceptance sampling means that you select a few samples and inspect them to see if they meet the standards. If the samples pass inspection, then the whole batch is approved. If the samples don't pass inspection, the batch is rejected.

TechnoFact

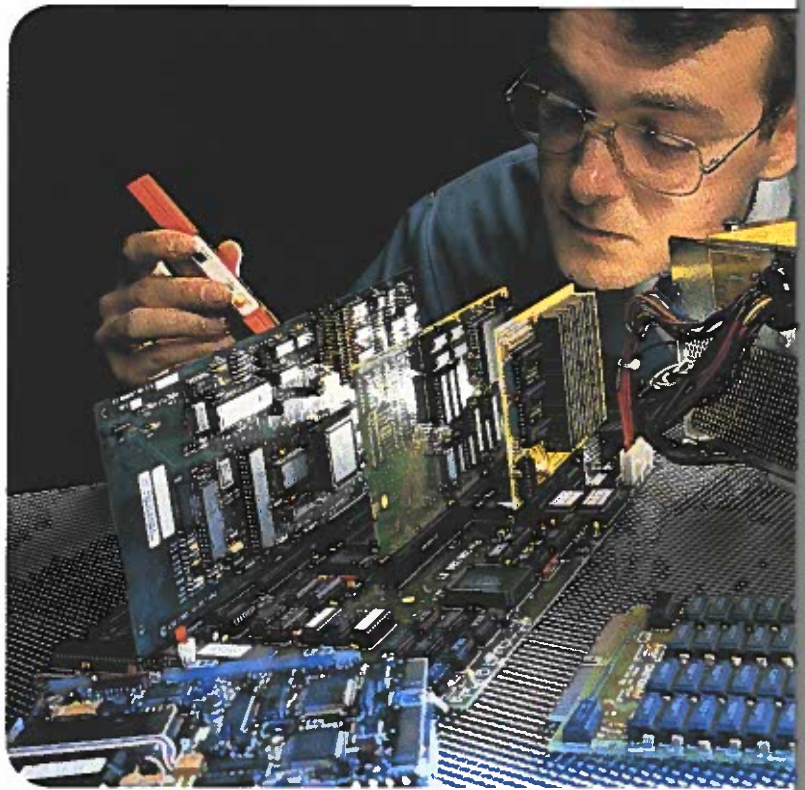
INSIDE STORY You used to have to take an engine apart to look at its insides. Today you can use a *boroscope*. A boroscope is an optical inspection device that goes inside a machine so specialists can look around. Some special boroscopes are used in medicine to inspect the human body.

Fig. 11-8. Because the circuit board is the heart of a computer, it must work right.

Statistical Process Control Statistical process control (SPC) is used to make sure that a process is being done right. If the process is correct, then the product itself doesn't need to be inspected.

Suppose you have a certain machine that automatically fills empty boxes with crackers. Although the box label says it contains 12 ounces of crackers, not all the boxes are filled exactly the same. The machine is set to fill each box within certain limits—from 11.5 ounces to 12.5 ounces. A control chart on a computer keeps track of each box so if the machine goes over or under the limit, the workers can stop and adjust the machine.

Burn-in Tests The burn-in test is another quality assurance method. It is done mostly on electronic products like computers. Fig. 11-8. Usually if a computer is going to fail, it does so during the first few hours of operation. For this reason, manufacturers let every computer run for a couple of hours as the burn-in test. Computers that don't pass the burn-in test are repaired if possible.



TechnoFact

CLOSE ENOUGH One of the problems with the production of a product may be that the parts are not the same size. There is no way to make every part exactly the same. Fortunately, most parts do not require extreme accuracy. Accuracy adds to production costs. Most machined parts can be a few thousandths of an inch off and still work. Wood or plastic parts may work just fine if they are as much as one-sixteenth inch off the desired size.

SECTION 4

TechCHECK

1. What is meant by quality assurance?
2. When are inspections made during the production cycle?
3. Name some quality control tools and methods.
4. **Apply Your Knowledge.** Compare the number of cookies in two boxes of the same brand.

Making Quality Products

Be sure to fill out your **TechNotes** and place them in your portfolio.

Real World Connection

Now that you have some products made, it's time to try to sell them. It is important that every product sold be of the highest quality possible. For example, Fig. A shows two women inspecting french fries. In this activity, you will design ways to test the quality of your products to ensure customer satisfaction.

Design Brief

As a team, design and perfect a method of quality control that will help to make your products better.

Materials/Equipment

- wood or acrylic (Plexiglas)
- machines and tools, as needed

SAFETY FIRST

Follow the safety rules listed on pages 42-43 and the specific rules provided by your teacher for tools and machines.

Fig. A



Procedure

1. The accuracy of each part you make directly affects the quality of your product. Your task is to invent a way to ensure quality. Work in groups of four or five to analyze the jobs in the assembly line. Look for ways to improve quality.
2. Decide on the acceptable tolerance for each of your product's dimensions.
3. Design and make a go-no-go gauge for the parts of your product. Your gauge might look like the one in Fig. B.
4. To use the gauge in the assembly line, all you have to do is put the part next to the gauge. If the part is smaller than the "no-go" side or larger than the "go" side, it is not acceptable.
5. Your product may have parts that are difficult to measure with a go-no-go gauge. Your group should then design and build a testing device that will test your parts for accuracy.
6. Your president and the vice presidents of the departments should decide if some of the workers on the assembly line could be put into a new department called quality control.

Evaluation

1. Have you ever purchased a product and found that it was defective? What was the problem?
2. What happens to the quality of products when workers are tired, bored, or mad at their boss?
3. How could the quality of your product be improved?
4. **Going Beyond.** Visit a factory, and ask how the quality of the product is measured.
5. **Going Beyond.** How do you think modern automation and robotics in factories have changed product quality? Do you think a car built by robots is better than one built by people? Explain.
6. **Going Beyond.** Can you think of ways to use robots or automation to inspect the quality of products? Explain.

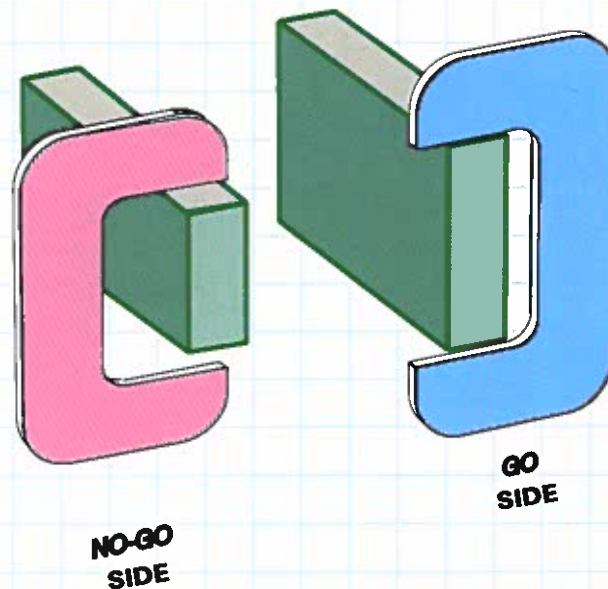


Fig. B. The part on the left is too small. The part on the right is too big.

Packaging and Selling Products

TechnoTerms

direct sales
distribution
marketing plan
retail sales
sales forecast
wholesale sales

THINGS TO EXPLORE

- Explain why packaging is important.
- Tell what a marketing plan is.
- Identify the three ways to sell a product.
- Design a package and advertise a product.

There are many reasons for packaging products. This section will explore several. As you read this section, think about how it applies to the product your class is making.

Why Are Products Packaged?

Have you ever ordered an item from a catalog and, when it arrived, it looked like a truck ran over it? One purpose of packaging is to ensure that a product gets from one place to another without a lot of damage. Packaging also protects the product from damage while it is on the store shelf.

Sometimes products need more than one package. Think of a bandage or a piece of chewing gum. To keep it clean and safe to use, each one is individually wrapped and packaged inside a larger package. Small parts are often packaged in larger containers to make them easier to keep track of in a store. If your product is a liquid, then the packaging has to contain the liquid safely. Packaging can be a way of making your product more attractive and appealing to customers. Packaging also helps prevent theft. Fig. 11-9.

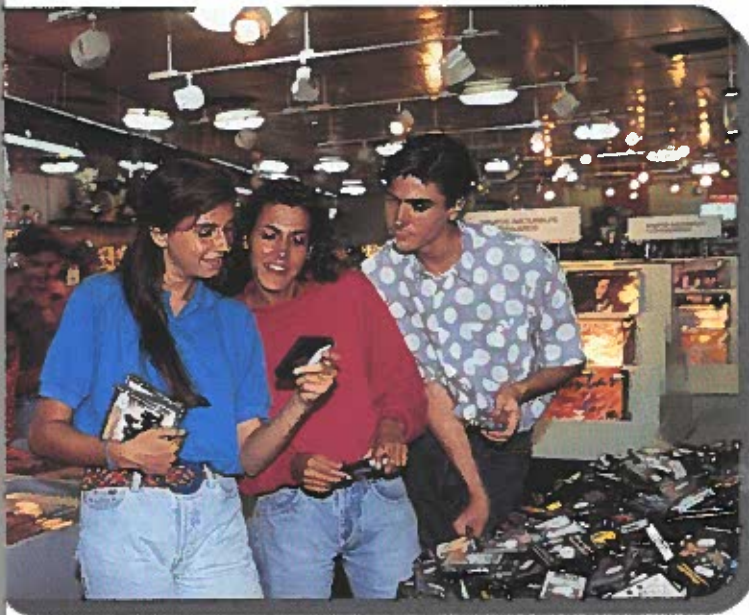


Fig. 11-9. Because they're small, music CDs are targets for theft. How does packaging help prevent theft?

Packaging is done at the end of the assembly process. Most companies buy packages from a package manufacturer. The package might already be printed with the company symbol, or logo. You may often buy products, like Nike shoes, Apple computers, or Coca Cola and Pepsi soft drinks, just because you recognize their special logos. Fig. 11-10. Do you know what these company logos look like? Companies want to build an image that you recognize and can remember easily.

Marketing and Advertising Products

Before a company begins to sell a product or service, the marketing department makes a special **marketing plan**, or strategy. The plan might include a **sales forecast** (prediction of how many products the company will sell). If the market research is not accurate, the company could lose a lot of money. Can you imagine making thousands of products but selling only a few hundred?

Have you ever bought something just because an ad caught your attention? Companies count on that happening. The main goal of advertising is to make the product familiar to the public and to convince customers that they need the product or service. Trade names like McDonald's, Honda, Disney, and Hershey make it easier to sell products. People already know the name, so if something new comes out from that company, you are quick to notice it.

Lots of companies try different advertising methods, such as television and radio commercials, billboards, and ads in magazines, newspapers, and on the Internet.

Fig. 11-10. Logos make products easy to recognize. Design a logo for a new soft drink.



TechnoFact

HOW MUCH DO YOU LOVE CARS? Some companies do some interesting advertising to get their products recognized. One automobile dealer held a "Kiss the Car" contest. The person who could kiss a car for the longest time would win the car. The winner lasted two and a half days, but the others puckered out!

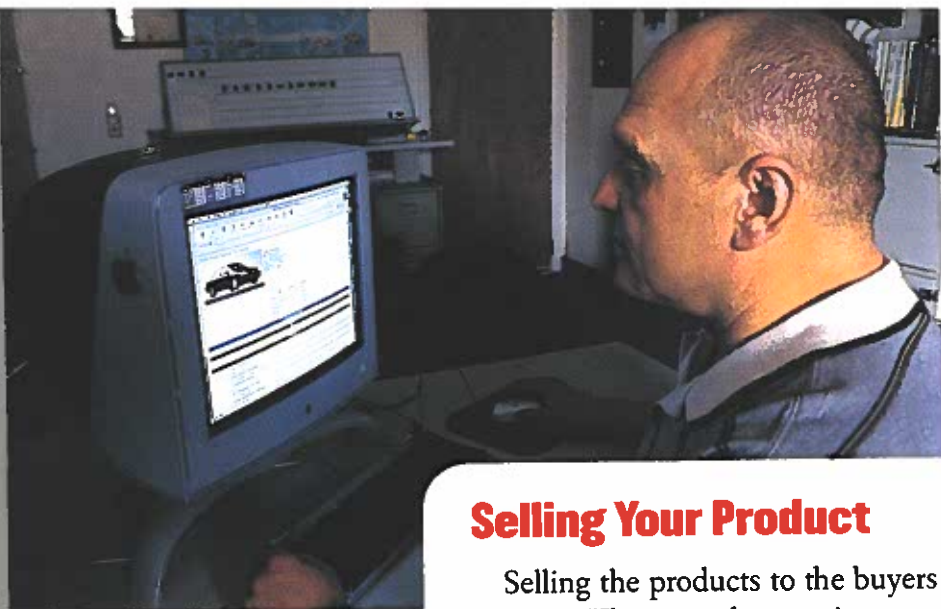


Fig. 11-11. One form of direct sales is to sell items from a company website. Some websites can even help you locate a car to buy at a local dealership.

Selling Your Product

Selling the products to the buyers is part of a marketing strategy. There are three main ways to sell your product. Fig. 11-11.

- **Direct sales.** Direct sales means selling a product directly to the customer. Usually a company will have salespeople who make a *commission* (certain percentage) on the amount they sell.
- **Wholesale sales.** Wholesalers are people or companies that buy large quantities of products from manufacturers. Then they sell the products to other businesses in large quantities.
- **Retail sales.** Retailers buy products either from wholesalers or directly from the manufacturer. Then they sell them to you at discount stores or large department stores.

MATHEMATICS CONNECTION

Figuring the Profits

Companies need to find out if they are making a profit by calculating the *break-even point*. To calculate the break-even point, you need to make a graph that shows your sales and costs. It might look like the one shown in this feature.

After all the products are sold or everyone in the class has tried to sell the product, it is time for your company to come to an end. In business, closing out a company is called *liquidation*. The profit that your company makes will then be divided among the shareholders. Here is the formula for calculating the profit per share.

profit per share = total profit \div total number of shares sold

Distributing Your Product

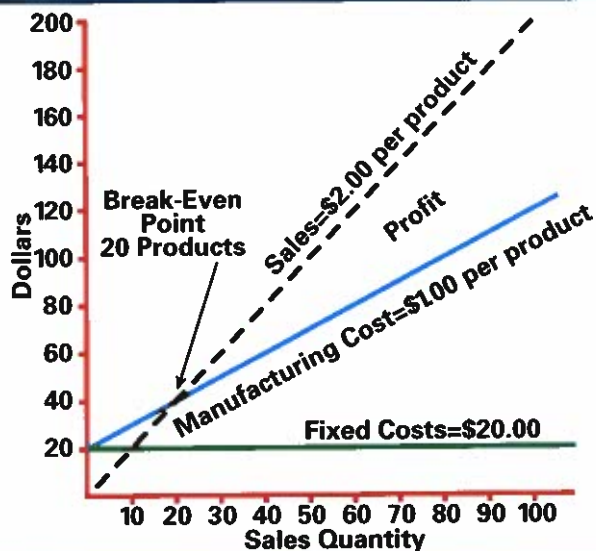
In addition to selling their products, companies must have ways to get their goods to the buyers. This is called **distribution**. Sometimes the distribution path for a product can be short, as in direct sales. Sometimes products must be temporarily stored in warehouses until the right time for distribution.

At some point, transportation is involved in distributing the products. Depending on the product or the need, different kinds of transportation, such as air freight, trucks, trains, or ships, might be used. Most of the "18-wheelers" you see on the highways are carrying products to wholesalers or retail stores.

SECTION 5

TechCHECK

1. Name three ways to sell a product.
2. Give at least three reasons for packaging.
3. What is a marketing plan?
4. **Apply Your Knowledge.** Pick five products that you think have exciting or interesting ads. Why do you like the ads for these products?



ACTIVITY

Your teacher will provide the cost of materials for your product. Calculate the break-even point for your company or for another product you sell at a school store.

Pack It Up and Sell It!

Be sure to fill out your **TechNotes** and place them in your portfolio.

Real World Connection

Now your company is well on its way to making a profit. Your products are being made with quality in mind, and your company is ready to roll. The next step is to package and sell your products. In this activity, you will design a package for your product.

Design Brief

Design a package for your product that will include the specifications listed below. Your package idea should

- Protect the product from being damaged
- Provide information about the cost of the product
- Include instructions on the safe use of the product
- Help prevent theft by shoplifting
- Be attractive and eye-catching
- Be environmentally safe and biodegradable

Materials/Equipment

- packaging materials
- packaging equipment such as a heat gun and plastic film sealer (optional)
- silk screen printing equipment (optional) Fig. A.
- computer with graphics software (optional)

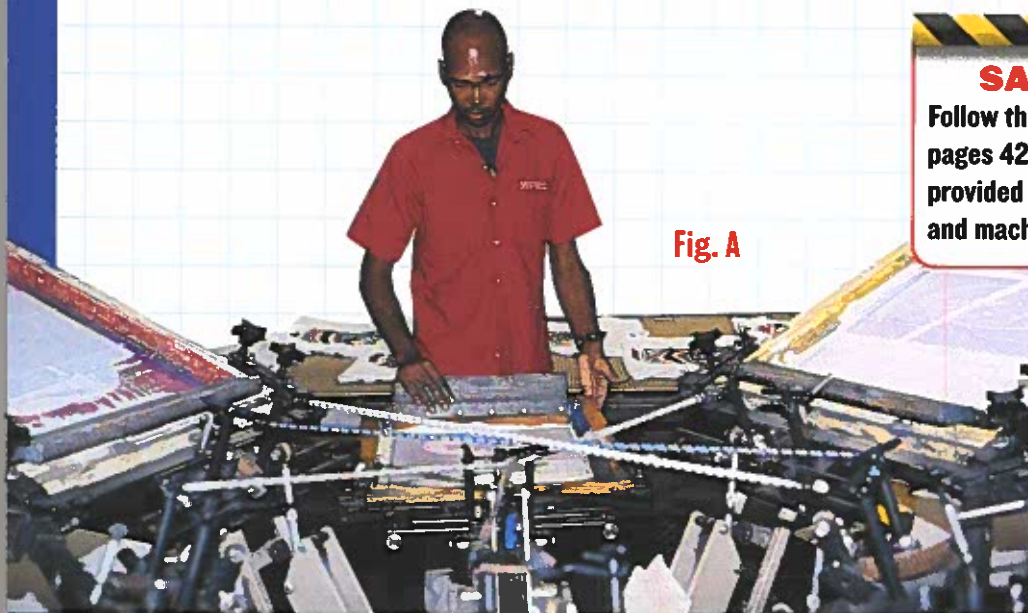


Fig. A

SAFETY FIRST

Follow the safety rules listed on pages 42-43 and the specific rules provided by your teacher for tools and machines.

Procedure

1. Work in groups of four or five to brainstorm ideas for possible package designs. Your design will depend on the product and the type of package desired. Your package might be in the form of a box, card, bag, label, or other device. Your group may decide to print graphics or extra instructions on your package. Most packages are thrown away after they are opened. You have a responsibility to design a package that will either decompose in a landfill, be recycled, or be reused.
2. Choose the idea that you think best meets the requirements listed in the design brief. Fig. B. The package you design must be produced in the same quantities as your product. Keep your design simple so that most of the company's effort can be directed toward making a quality product.
3. Sketch your design on paper, or make a preliminary, or first draft, computer drawing.
4. As a team, make a sample package.
5. As a group, present your package idea to the class.
6. Evaluate each of the packages on the basis of the design brief requirements. Use the most appropriate design for packaging your product.

Evaluation

1. How will your package protect your product?
2. When you walk through a grocery store aisle, which products catch your eye? Can you explain why?
3. What products have you purchased that seemed to be "overpackaged"?
4. **Going Beyond.** Evaluate five packages of products you have at home, using the design brief specifications.
5. **Going Beyond.** List five products that have packages that are heavier than the product.
6. **Going Beyond.** What do you think packages will look like in the future?

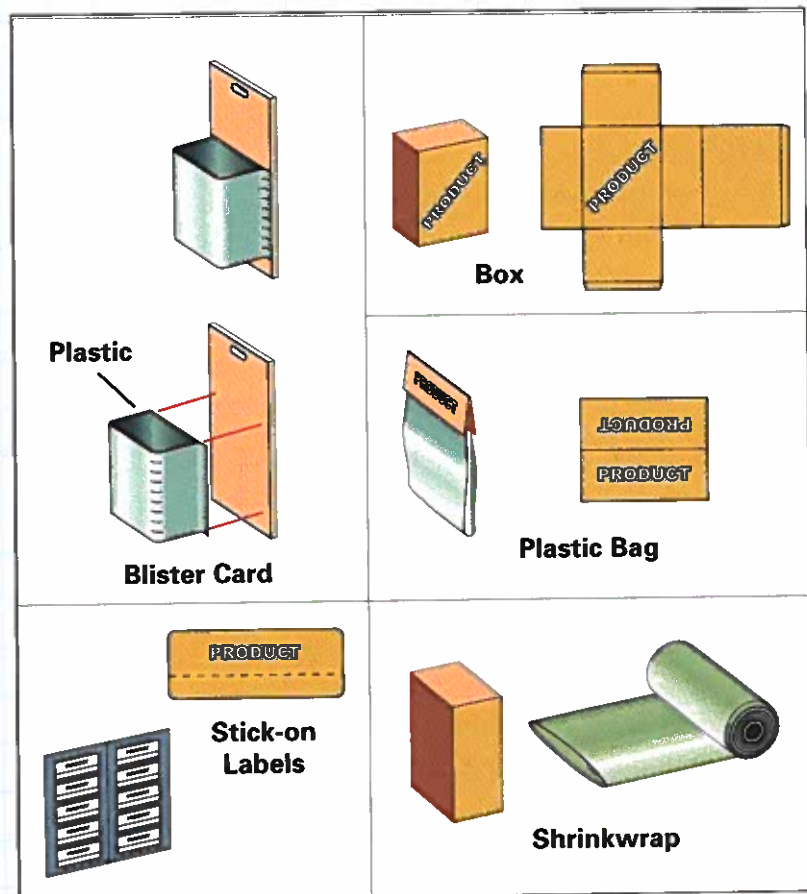


Fig. B

REVIEW &

CHAPTER SUMMARY**SECTION 1**

- A company is an organized group of people doing business.
- A company can be organized as a proprietorship, partnership, or corporation.

SECTION 2

- Stockholders, a board of directors, management, and administration are part of the structure of a corporation.
- Important company departments are human resources, research and development, production, and marketing.

SECTION 3

- Mass production enables companies to produce large quantities of products within a short time.
- Just-in-time manufacturing (JIT) eliminates the need for storage space and people to manage inventory.

SECTION 4

- Quality control makes sure products are made according to specific plans.
- Quality control inspections are made during the delivery of material, while work is in process, and when the product is finished.

SECTION 5

- Packaging keeps products from being damaged, protects products while on the shelf at a store, keeps small parts from being lost, and interests people in the product.
- Distribution departments get products to customers.

REVIEW QUESTIONS

1. Look at the ads for products in a magazine. What ads attract your attention? Why?
2. What quality control methods are you used to dealing with in school?
3. Why do you think products are always being tested and retested?
4. Was your product package design environmentally safe?
5. How have products such as milk and soda containers changed since your grandparents were your age?

CRITICAL THINKING

1. Design a consumer survey that people could fill out easily.
2. Why do people sometimes offer food samples in grocery stores?
3. What other techniques can you think of to get people to try a new product?
4. How would you feel if you were fired and your job on an assembly line was taken over by a robot? Explain.
5. Visit a local factory that makes products using the assembly-line process. Ask some of the workers what they like or dislike about their jobs.
6. Use computer graphics software to draw a floor plan (view from above) of an assembly line. How could you rearrange the equipment or conveyors to make the flow of materials more efficient?