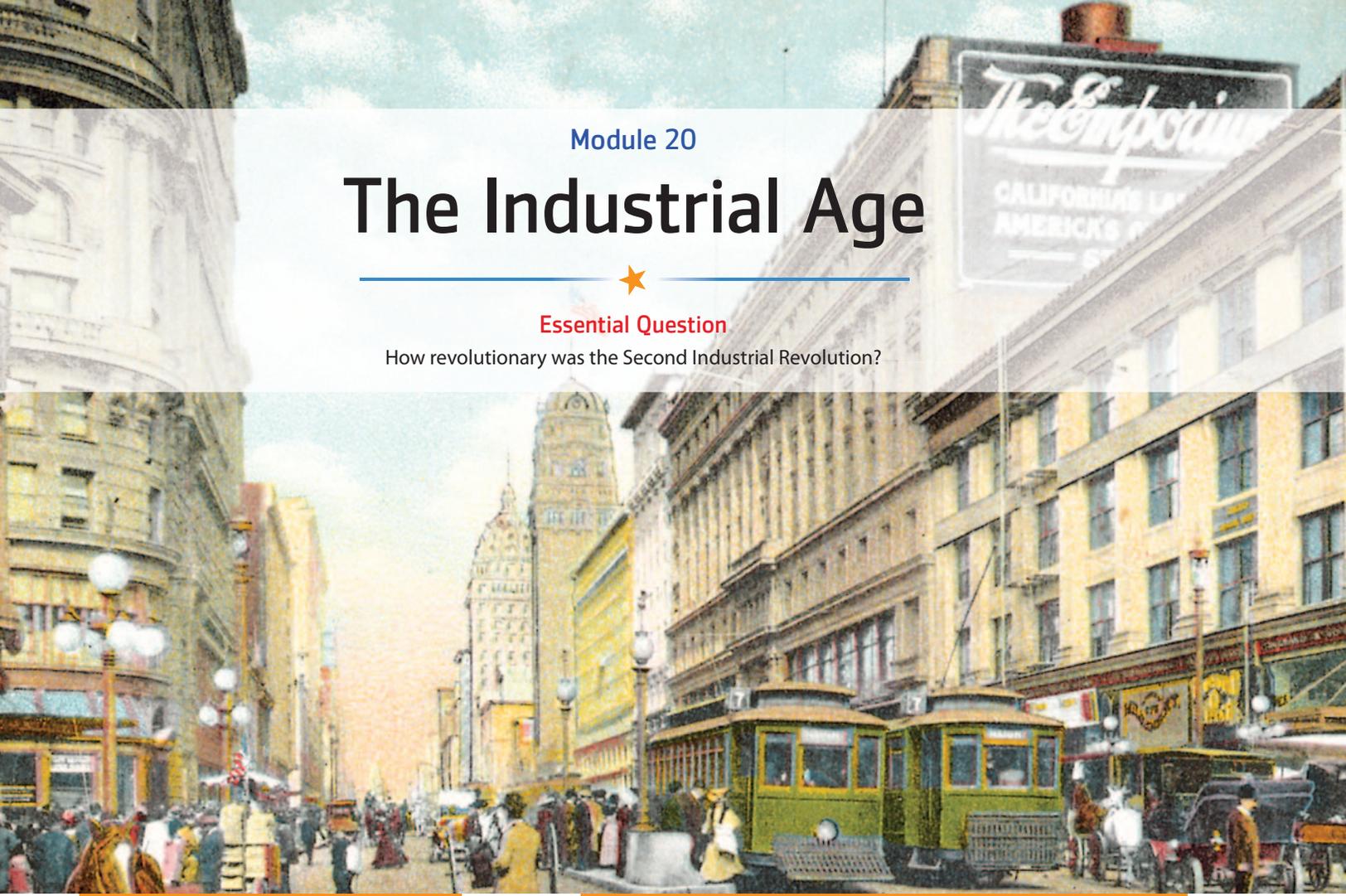


# The Industrial Age



## Essential Question

How revolutionary was the Second Industrial Revolution?



About the Photo: Technological advances changed city life in the United States.

In this module you will learn about the new inventions of the late 1800s. You will also read about how life and business changed because of these inventions.

### What You Will Learn ...

**Lesson 1: The Second Industrial Revolution . . . . . 642**  
**The Big Idea** The Second Industrial Revolution led to new sources of power and advances in transportation and communication.

**Lesson 2: Big Business. . . . . 648**  
**The Big Idea** The growth of big business in the late 1800s led to the creation of monopolies.

**Lesson 3: Industrial Workers . . . . . 652**  
**The Big Idea** Changes in the workplace led to a rise in labor unions and workers' strikes.

### Explore ONLINE!



#### VIDEOS, including...

- Skyscrapers
- The Steel Industry
- Henry Ford and the Model T
- The Wright Brothers Controversy
- John D. Rockefeller: The Standard Oil Trust
- Homestead Strike

- ✓ Document-Based Investigations
- ✓ Graphic Organizers
- ✓ Interactive Games
- ✓ Animation: Early Refrigerated Railroad Cars
- ✓ Image Carousel: The Age of Inventions
- ✓ Interactive Map: Major Labor Strikes, Late 1800s

## United States

## World

1870



< 1876 Alexander Graham Bell invents the telephone.

1876 German engineer Nikolaus A. Otto perfects a gasoline-powered engine.

1879 Thomas Edison invents the first lightbulb.

1883 The island volcano of Krakatau in the Pacific Ocean erupts in one of the world's greatest natural disasters.



^ 1886 The American Federation of Labor is formed on December 8.



^ 1889 The Eiffel Tower is built in Paris.

1890 Congress passes the Sherman Antitrust Act.

1892 On June 29 the Homestead strike begins. Carnegie Steel Company refuses to negotiate with the union.



^ 1898 French scientists Pierre and Marie Curie discover radium.

1900

# Reading Social Studies

## THEME FOCUS:

### Economics, Society and Culture

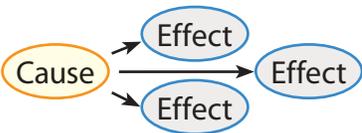
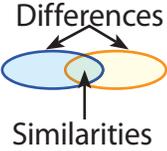
In this module you will read about the advancements in transportation and communication made during what is called the Second Industrial Revolution. You will learn about the rise of powerful corporations. You will also read about the workers who organized in the late 1800s and will see what happened as unions began demanding better treatment for workers. Throughout the module you will see how society was affected by the changing economy.

## READING FOCUS:

### Identify Patterns of Organization

How are clothes organized in a department store? How are files arranged in a file cabinet? Clear organization helps us find the product we need, and it also helps us find facts and information.

**Understand Structural Patterns** Writers use structural patterns to organize information in sentences or paragraphs. What's a structural pattern? It's simply a way of organizing information. Learning to recognize those patterns will make it easier for you to read and understand social studies texts.

Patterns of Organization		
Pattern	Clue Words	Graphic Organizer
<b>Cause-effect</b> shows how one thing leads to another.	as a result, therefore, because, this led to	
<b>Chronological order</b> shows the sequence of events or actions.	after, before, first, then, not long after, finally	
<b>Comparison-contrast</b> points out similarities and/or differences.	although, but, however, on the other hand, similarly, also	
<b>Listing</b> presents information in categories such as size, location, or importance.	also, most important, for example, in fact	Category • Fact • Fact • Fact

To use text structure to improve your understanding, follow these steps:

1. Look for the main idea of the passage you are reading.
2. Then look for clues that signal a specific pattern.
3. Look for other important ideas and think about how the ideas connect. Is there any obvious pattern?
4. Use a graphic organizer to map the relationships among the facts and details.

# You Try It!

*The following passages are from the module you are about to read. As you read each set of sentences, ask yourself what structural pattern the writer used to organize the information.*

- (A) Great advances in communication technologies took place in the late 1800s. By 1861 telegraph wires connected the East and West coasts. Five years later, a telegraph cable on the floor of the Atlantic Ocean connected the United States and Great Britain.
- (B) Many business leaders justified their business methods through their belief in social Darwinism. . . . Other business leaders, however, believed that the rich had a duty to aid the poor.
- (C) During the late 1800s, several factors led to a decline in the quality of working conditions. Machines run by unskilled workers were eliminating the jobs of many skilled craftspeople. These low-paid workers could be replaced easily.

*After you read the passages, answer the following questions:*

1. Re-read passage A. What structural pattern did the writer use to organize this information? How can you tell?
2. Re-read passage B. What structural pattern did the writer use to organize this information? How can you tell? Why do you think the writer chose this pattern?
3. Re-read passage C. What structural pattern did the writer use to organize this information? How can you tell? Why do you think the writer chose this pattern?

**As you read Module 20**, think about the organization of the ideas. Ask yourself why the writer chose to organize the information in this way.

## Key Terms and People

### Lesson 1

Second Industrial Revolution  
Bessemer process  
Thomas Edison  
patents  
Alexander Graham Bell  
Henry Ford  
moving assembly line  
Wilbur and Orville Wright

### Lesson 2

corporations  
Andrew Carnegie  
vertical integration  
John D. Rockefeller  
horizontal integration  
trust  
Leland Stanford  
social Darwinism  
monopoly  
Sherman Antitrust Act

### Lesson 3

Frederick W. Taylor  
collective bargaining  
Knights of Labor  
Terence V. Powderly  
American Federation  
of Labor (AFL)  
Samuel Gompers  
Mary Harris Jones  
Haymarket Riot  
Homestead strike  
Pullman strike

# The Second Industrial Revolution

## The Big Idea

The Second Industrial Revolution led to new sources of power and advances in transportation and communication.

## Main Ideas

- Breakthroughs in steel processing led to a boom in railroad construction.
- Advances in the use of oil and electricity improved communication and transportation.
- A rush of inventions changed Americans' lives.

## Key Terms and People

Second Industrial Revolution  
 Bessemer process  
 Thomas Edison  
 patents  
 Alexander Graham Bell  
 Henry Ford  
 moving assembly line  
 Wilbur and Orville Wright

## If YOU were there . . .

You live in a small town but are visiting an aunt in the city in the 1890s. You are amazed when your aunt pushes a button on the wall to turn on electric lights. At home you still use kerosene lamps. You hear a clatter outside and see an electric streetcar traveling down the street. You are shocked when a telephone rings and your aunt speaks to someone miles away!

**Which of these inventions would you find most amazing?**

## Breakthroughs Fuel Industrialization

In the late 1800s, new technologies helped industry grow at a staggering pace. Electrical power replaced steam and water power. Factories became larger and produced more and more goods. Faster transportation helped move people and goods more cheaply. These advances and others fueled the **Second Industrial Revolution**, a period of rapid growth in U.S. manufacturing in the late 1800s. By the mid-1890s the United States had become the world's industrial leader.

**Bessemer Steel Process** Some of the most important advances in technology happened in the steel industry. Steel is iron that has been made stronger by heat and the addition of other metals. In the mid-1850s Henry Bessemer invented the **Bessemer process**, a way to manufacture steel quickly and cheaply by blasting hot air through melted iron to quickly remove impurities. Before, turning several tons of iron ore into steel took a day or more. The Bessemer process took only 10 to 20 minutes.

**New Use for Steel** The Bessemer process cut the time and the cost required to produce steel. Factories began to make many products out of steel, including barbed wire, nails, and beams for buildings. To meet demand for these products, the nation's steel production rose dramatically, from 77,000 tons in 1870 to more than 1 million tons in 1879.

Steel made innovative construction possible. One of the most remarkable structures was the Brooklyn Bridge. Completed in 1883 it spanned 1,595 feet across the East River in New York City. Not only was it the longest suspension bridge in the world, it was the first to use steel cables.

**Riding the Rails** Steel was also used for rails to expand the railroads. As steel prices dropped, so too did the cost of railroad construction. Companies built thousands of miles of new steel track. The design of elegant passenger and sleeping cars improved passenger service. Manufacturers and farmers sent products to market faster than ever by rail in newly invented refrigerated shipping cars. Cities where major rail lines crossed, such as Chicago, grew rapidly. Railroads also increased western growth by offering free tickets to settlers. Finally, as rail travel and shipping increased, railroads and related industries began employing more people.

## Use of Oil and Electricity

The Second Industrial Revolution was characterized by dramatic developments in the use and distribution of oil and electricity. These power sources fueled other changes.

**Oil as a Power Source** Other important technological breakthroughs in the late 1800s led to the widespread use of petroleum, or oil, as a power

### Reading Check Identify Cause and Effect

How did steel processing change in the 1850s, and how did this affect the United States?

#### Homestead Steel Mill

Steel mills like this one in Homestead, Pennsylvania, were the center of the new steel industry that led to advancements in rail travel. Workers used the Bessemer process to make steel more quickly.

*How do you think mills like this one affected the surrounding area?*

### Quick Facts

#### Factors Affecting Industrial Growth

- Greater ability to use natural resources
- A growing population
- Transportation advances
- Rising immigration
- Inventions and innovations
- Increasing business investment
- Government policies assisting business, such as protective tariffs



source. In the 1850s scientists discovered an inexpensive way to convert crude, or unprocessed, oil into a fuel called kerosene that could be used to light lamps. Because kerosene was so affordable, people quickly put it to good use lighting their homes and businesses.

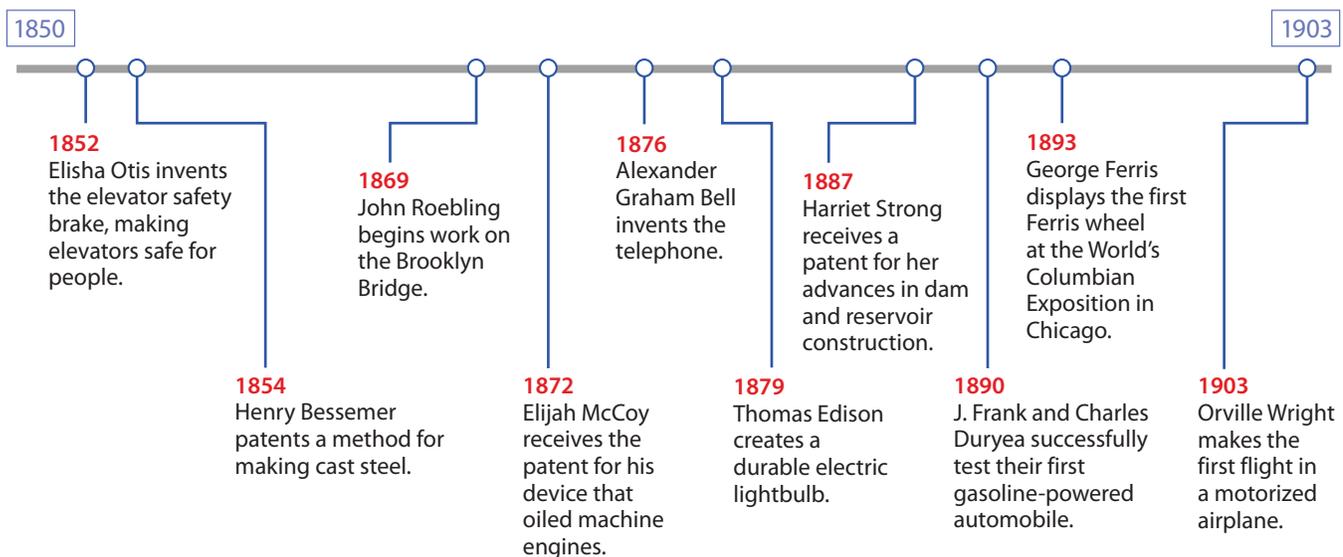
Not surprisingly, demand for oil skyrocketed and companies set out to discover new oil sources. Until this time, people had collected oil from seeps, places where oil naturally oozes from the ground. However, oil from seeps couldn't keep up with demand. One company hired Edwin L. Drake, who believed he could access oil by drilling into the ground in Pennsylvania. At first people mocked Drake's drilling efforts as "Drake's Folly." Then, in 1859 his crew hit an underground spring deep in the rock. The next day, oil seeped up and the crew scrambled to collect it in buckets, tubs, and barrels. Edwin Drake had drilled the first commercial oil well. He was soon steadily pumping "black gold" to the surface.

The output from Drake's well was modest, but it drew plenty of wild-catters, or oil prospectors, to Ohio, Pennsylvania, and West Virginia. Oil became a big business as these states began producing millions of barrels per year. Oil companies built refineries to turn the crude oil into finished products like kerosene. One oil company supervisor referred to oil workers as "men who are supplying light for the world."

**Electricity Spreads** In addition to kerosene, electricity became a critical source of light and power during the Second Industrial Revolution. The possible uses of electricity interested inventors like **Thomas Edison**. His

## Timeline: The Spirit of Innovation

Improvements in steel production and the use of oil and electricity as power sources led to inventions that changed the ways Americans communicated, traveled, worked, and lived.



### Analyze Timelines

Which inventions improved transportation and communication?

research center in Menlo Park, New Jersey, was called an invention factory. Edison explained his practical approach to science.

“I do not regard myself as a pure scientist, as so many persons have insisted that I am. I do not search for the laws of nature . . . for the purpose of learning truth. I am only a professional inventor . . . with the object [goal] of inventing that which will have commercial utility [use].”

—Thomas Edison, quoted in *Scientific American*, July 8, 1893

Edison eventually held more than 1,000 **patents**, exclusive rights to make or sell inventions. Patents allowed inventors to protect their inventions from being manufactured by others.

In 1878 Edison announced that he would soon invent a practical electric light. By the end of 1879 Edison and his team of inventors had created the electric lightbulb. The public was excited. However, Edison had a problem. At the time, few homes or businesses could get electricity. Edison therefore built a power plant that began supplying electricity to dozens of New York City buildings in September 1882. The *New York Times* reported that with electric lighting in the newspaper offices, “it seemed almost like writing by daylight.” However, Edison’s equipment could not send electricity over long distances. As a result, his power company, Edison Electric, provided electricity mainly to central cities.

In the late 1880s George Westinghouse built a power system that could send electricity across many miles. As Edison and Westinghouse competed, the use of electricity spread rapidly in the nation’s cities. After a while, electricity soon lit homes and businesses and powered city factories. Electricity also was used to power streetcars in cities across the nation.

### Reading Check

#### Draw Conclusions

Why did people begin to pump oil from the ground?



Alexander Graham Bell opened the telephone line that connected New York and Chicago in 1892.

## Rush of Inventions

In the late 1800s inventors focused on finding solutions to practical problems. Communication and transportation took the lead.

**Advances in Communication** Great advances in communication technologies took place in the late 1800s. By 1861 telegraph wires connected the East and West coasts. Five years later, a telegraph cable on the floor of the Atlantic Ocean connected the United States and Great Britain.

However, the telegraph carried only written messages and was difficult for untrained people to use. These problems were solved in March 1876, when inventor **Alexander Graham Bell** patented the telephone. Bell was a Scottish-born speech teacher who studied the science of sound. He called the telephone a “talking telegraph.”

Companies quickly found telephones to be an essential business tool. People wanted them in their homes, too. Telephone companies raced to lay thousands of miles of phone lines. By 1880 there were about 55,000 telephones



J. Frank and Charles Duryea designed and invented the first gasoline-powered automobile in America.

in the United States. By 1900 about 1.5 million telephones had been installed in homes and offices across the nation.

**Automobiles and Planes** In 1876 a German engineer invented an engine powered by gasoline, another fuel made from oil. In 1893 two brothers, Charles and J. Frank Duryea, used a gasoline engine to build the first practical motorcar in the United States. By the early 1900s, thousands of cars were being built in the United States.

At first, cars were luxury items that only the wealthy could buy. That changed when a young entrepreneur, **Henry Ford**, introduced the Model T in 1908. Ford aimed to make “a motor car for the great multitude.” At first, Ford’s mechanics built Model Ts one car at a time, but this soon changed.

Ford started by simplifying his design and making all of his cars identical. This brought the cost down, but not enough to make cars affordable to ordinary people. So Ford studied manufacturing processes that would reduce costs by increasing productivity and efficiency, such as using interchangeable parts and the assembly line.

Ford became the first to **implement** a large-scale **moving assembly line** to make cars. On Ford’s assembly line, each car that was being built moved along a conveyor belt to workers at various workstations. The work of building the car was broken down into 84 steps. Each worker was trained to do just one job, requiring simple skills and interchangeable parts. This process allowed Ford to produce more cars at a lower cost. In its first year, the Ford assembly line produced a car every hour and a half. The cars sold for under \$500, about half the cost of the first Model Ts and a price that many people could afford.

New engine technology helped make another breakthrough in transportation possible—air flight. Brothers **Wilbur and Orville Wright** built a lightweight airplane that used a small, gas-powered engine. On December 17, 1903, the Wright brothers tried out their airplane at Kitty Hawk, North Carolina. In freezing temperatures and a strong wind, Orville climbed into the pilot’s seat and the plane took off across the beach. It flew just inches above the ground and landed 120 feet from where it had started. This short trip—12 seconds in all—was the first true flight in an airplane. The Wright brothers quickly followed this success with even longer flights.

Airplanes would soon give Americans another transportation option. Passenger airlines first flew through American skies in the 1920s. Early flights offered little comfort—some passengers wore goggles and helmets for protection. Moreover, planes couldn’t fly over mountains or at night. In

**Academic Vocabulary**  
**implement** to put in place

Wilbur and Orville Wright  
invented the first power-  
driven airplane in 1903.



### Reading Check

**Compare** What new inventions excited the public in the 1800s, and how were they used?

fact, for cross-country travel, trains were more comfortable, faster, and less expensive option. Still, for a handful of Americans, the thrill of air travel outweighed the early discomfort.

**Summary and Preview** The Second Industrial Revolution led to advances in energy sources, communication, and transportation. In the next lesson you will learn about the growth of big business.

## Lesson 1 Assessment

### Review Ideas, Terms, and People

- a. Describe** What was the Bessemer process?

**b. Summarize** How did improvements to railroads affect the economy and transportation in the United States?

**c. Elaborate** What was the most important effect of the Bessemer process? Why?
- a. Describe** How does the paragraph about Edwin L. Drake and oil drilling show the cause and effect structure?

**b. Describe** Using technology related to oil production, explain how technological innovations impact how people modify the physical environment.

**c. Explain** What problem did Thomas Edison face regarding the use of electricity, and how did he solve it?

- a. Recall** What contribution did Wilbur and Orville Wright make to transportation?

**b. Draw Conclusions** How did Alexander Graham Bell's invention improve life in the United States?

**c. Elaborate** Why do you think there was a rush of inventions in the late 1800s?

### Critical Thinking

- Analyze** In this lesson you learned about inventors. Complete a table like the one below about inventors, their inventions, and their impact on Americans.

Inventor	Invention	Impact

# Big Business

## The Big Idea

The growth of big business in the late 1800s led to the creation of monopolies.

## Main Ideas

- The rise of corporations and powerful business leaders led to the dominance of big business in the United States.
- People and the government began to question the methods of big business.

## Key Terms and People

corporations  
 Andrew Carnegie  
 vertical integration  
 John D. Rockefeller  
 horizontal integration  
 trust  
 Leland Stanford  
 social Darwinism  
 monopoly  
 Sherman Antitrust Act

## If YOU were there . . .

It is 1895, and your town is home to a large corporation. The company's founder and owner, a wealthy man, lives in a mansion on a hill. He is a fair employer but not especially generous. Many townspeople work in his factory. You and other town leaders feel that he should contribute more to local charities and community organizations.

**How could this business leader help the town more?**

## Dominance of Big Business

In the late 1800s many entrepreneurs formed their businesses as **corporations**, or businesses that sell portions of ownership called stock shares. The leaders of these corporations were some of the richest and most influential members of American society in the late 1800s. Political leaders praised prosperous businesspeople as examples of American hard work, talent, and success.

**Corporations Generate Wealth** Successful corporations reward not only the people who found them but also investors who hold stock. Stockholders in a corporation typically get a percentage of profits based on the amount of stock they own. Although stockholders actually own the corporation, they do not run its day-to-day business. Instead, they elect a board of directors that chooses the corporation's main leaders, such as the president.

New sales techniques like those taught by John H. Patterson helped change business practices.





## The Rise of Investing

Investors purchased stock in corporations in record numbers in the late 1800s. They received stock certificates, like the one shown here, to document their part ownership in corporations. Corporations used the money raised by selling stocks to expand. Standard Oil Company financed the building of this refinery in Richmond, California, by selling stock.

*Why did investors buy stock?*

Corporations provided several important advantages over earlier business forms. Stockholders in a corporation are not responsible for business debts. If a corporation fails financially, the stockholders lose only the money that they invested. Stockholders are also usually free to sell their stock to whomever they want, whenever they want. As a result, corporations encouraged more investment in businesses. By 1900 more than 100 million shares per year were being traded on the New York Stock Exchange.

**Business Leaders** Some business leaders became wealthy, powerful, and famous because of the business boom. **Andrew Carnegie** was one of the most admired businesspeople of the time. Born in Scotland, Carnegie came to the United States as a poor immigrant. As a teenager he took a job with a railroad company and quickly worked his way up to the position of railroad superintendent.

In 1873 he focused his efforts on steelmaking. Carnegie expanded his business by buying out competitors when steel prices were low. By 1901 Carnegie's mills were producing more steel than all of Great Britain's mills combined. Carnegie's businesses succeeded largely through **vertical integration**, or ownership of businesses involved in each step of a manufacturing process. For example, to lower production costs, Carnegie **acquired** the iron ore mines, coalfields, and railroads needed to supply and support his steel mills.

**John D. Rockefeller** was also successful in consolidating, or combining, businesses. By age 21, while a partner in a wholesale business, he decided to start an oil-refining company. In only ten years Rockefeller's Standard Oil Company was the country's largest oil refiner. Like Carnegie, Rockefeller used vertical integration. For example, the company controlled most of the pipelines it used.

**Academic Vocabulary**  
acquire to get

Rockefeller's company also developed **horizontal integration**, or owning all businesses in a certain field. By 1880 Rockefeller's companies controlled about 90 percent of the oil refining business in the United States. Rockefeller also formed a **trust**, a legal arrangement grouping together a number of companies under a single board of directors. To earn more money, trusts often tried to get rid of competition and to control production.

**Leland Stanford** was another important business leader of the late 1800s. He made a fortune selling equipment to miners. While governor of California, he became one of the founders of the state's Central Pacific Railroad. He also founded Stanford University. Late in life, Stanford argued that industries should be owned and managed cooperatively by workers. He believed this would be the fulfillment of democracy.



Leland Stanford moved to California during the Gold Rush and made his fortune in the railroad industry.

**Reading Check**  
Compare and Contrast Why did Andrew Carnegie use vertical integration?

## Questioning the Methods of Big Business

In the late 1800s many Americans admired business tycoons as natural leaders and “captains of industry.” However, other people and the government began to see the tough tactics of big business as a problem.

**Social Darwinism** Many business leaders justified their business methods through their belief in **social Darwinism**, a view of society based on scientist Charles Darwin's theory of natural selection. Social Darwinists thought that Darwin's “survival of the fittest” theory decided which human beings would succeed in business and in life in general.

Other business leaders, however, believed that the rich had a duty to aid the poor. These leaders tried to help the less fortunate through philanthropy, or giving money to charities. Carnegie, Rockefeller, Stanford, and other business leaders gave away large sums. Carnegie gave away more than \$350 million to charities, about \$60 million of which went to fund public libraries to expand access to books. By the late 1800s various charities had received millions of dollars from philanthropists.

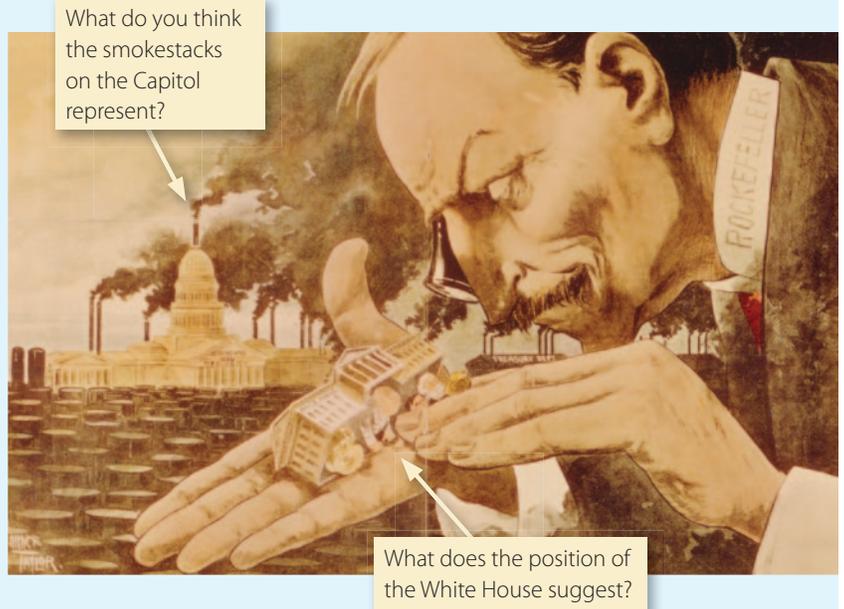
**The Antitrust Movement** Critics of big business said that many business leaders earned their fortunes through unfair business practices. These criticisms grew stronger in the 1880s as corporations became more powerful. Large corporations often used their size and strength to drive smaller competitors out of business. Carnegie and Rockefeller, for example, pressured railroads to charge their companies lower shipping rates. Powerful trusts also arranged to sell goods and services below market value. Smaller competitors went out of business trying to match those prices. Then the trusts raised prices again.

Some people became concerned when a trust gained a **monopoly**, or total ownership of a product or service. Critics argued that monopolies reduced necessary competition. They believed competition in a free market economy kept prices low and the quality of goods and services high.

Some Americans also worried about the political power of wealthy trusts. Many citizens and small businesses wanted the government to help control monopolies and trusts. People who favored trusts responded that trusts were more efficient and gave the consumer dependable products or services.

**“What a Funny Little Government”**

This 1899 cartoon of John D. Rockefeller expressed a fear shared by many Americans—trusts, such as Standard Oil, had grown too powerful.



**Analyze Historical Sources**  
How does the cartoonist show Rockefeller’s power?

**Reading Check**  
Analyze How did concerns about trusts lead to the Sherman Antitrust Act?

Many members of Congress favored big business. However, elected officials could not ignore the concerns of voters. In July 1890 Congress passed the **Sherman Antitrust Act**, a law that made it illegal to create monopolies or trusts that restrained trade. It stated that any “attempt to monopolize . . . any part of the trade or commerce among the several States” was a crime. However, the act did not clearly define a trust in legal terms. The antitrust laws were therefore difficult to enforce. Corporations and trusts kept growing in size and power.

**Summary and Preview** In this lesson you learned how, in the late 1800s, some corporations became monopolies that dominated entire industries, such as oil. In the next lesson you will learn about how industrial workers organized to improve working conditions.

**Lesson 2 Assessment**

**Review Ideas, Terms, and People**

1. **a. Identify** What are horizontal and vertical integration?
  - b. Explain** What are the benefits of investing in corporations?
  - c. Evaluate** What do you think about the business methods of Carnegie, Rockefeller, and Stanford?
2. **a. Describe** What is social Darwinism?
  - b. Summarize** What concerns did critics of big business have regarding trusts?
  - c. Evaluate** Was the Sherman Antitrust Act successful? Why or why not?

**Critical Thinking**

3. **Contrast** In this lesson you learned about new business practices. Create a graphic organizer like the one below and identify examples of these new business practices.

New Practices	Example

# Industrial Workers

## The Big Idea

Changes in the workplace led to a rise in labor unions and workers' strikes.

## Main Ideas

- The desire to maximize profits and become more efficient led to poor working conditions.
- Workers began to organize and demand improvements in working conditions and pay.
- Labor strikes often turned violent and failed to accomplish their goals.

## Key Terms and People

Frederick W. Taylor  
 collective bargaining  
 Knights of Labor  
 Terence V. Powderly  
 American Federation  
 of Labor (AFL)  
 Samuel Gompers  
 Mary Harris Jones  
 Haymarket Riot  
 Homestead strike  
 Pullman strike

**Reading Check**  
**Identify Cause and Effect** Why did companies begin to use scientific management, and how did it affect workers?

## If YOU were there . . .

You run a button machine in a clothing factory in the 1890s. You work from 7:00 in the morning until 6:00 at night, every day except Sunday. Your only break is 15 minutes for lunch. Now you hear about a movement to start a workers' union to bargain with your employer. Union members will ask for an eight-hour workday. But you think your employer might fire you if you join.

**Would you join the union?**

## Maximizing Profits and Efficiency

During the late 1800s several factors led to a decline in the quality of working conditions. Skilled craftspeople found themselves replaced by machines operated by unskilled workers, who were low-paid and easily replaced. This was an unfortunate side effect of new technologies and increasing labor specialization, or the splitting of work into smaller and more specific tasks.

For workers, specialization often meant having to perform the same small task over and over again. This made workers tired, bored, and more likely to be injured. But, for factories, specialization reduced costs and greatly increased production. For example, specialization along Ford's moving assembly line sped the production and lowered the cost of making automobiles. As a result, automobiles became affordable to a wider segment of the population than ever before.

In 1909 **Frederick W. Taylor**, an efficiency engineer, published a popular book called *The Principles of Scientific Management*. He encouraged managers to view workers as interchangeable parts of the production process. In factories, managers influenced by Taylor paid less attention to working conditions. Injuries increased, and as conditions grew worse, workers looked for ways to bring about change.



### Poor Working Conditions

Small, crowded rooms. Stuffy air. Unsafe workplaces. Long hours. Low pay. No job security. These were the facts of working life for millions of Americans during the Second Industrial Revolution.

*What does this photograph suggest about working conditions?*

## Workers Organize

By the late 1800s working conditions and pay were so poor that workers began to join labor unions to improve their lot. By joining forces with others, they hoped to pressure employers into paying better wages and improving working conditions. With **collective bargaining**—all workers acting collectively, or together—workers had a much greater chance of success in negotiating with management. Most employers opposed collective bargaining. One company president said, “I shall never give in. I would rather go out of business.”

Tailors who wanted to protect their interests founded the first national labor union, the **Knights of Labor**, in Philadelphia in 1869 as a secret society. In the 1880s, under the leadership of **Terence V. Powderly**, the Knights ended its policy of secrecy. It also began to accept unskilled workers, women, and African Americans as members. By 1886 the group had more than 700,000 members.

With the motto “An injury to one is a concern of all,” the Knights of Labor campaigned for many reforms. It pushed for an eight-hour workday, equal pay for equal work, and an end to child labor. Union members also wanted the government to regulate trusts. In its early years, the Knights

## Samuel Gompers 1850–1924

Samuel Gompers was born to Jewish parents in London. He immigrated to the United States with his parents in 1863 at age 13. He worked as a cigar maker and joined a local union, eventually becoming its president. In time, the cigar-makers' union was reorganized and later joined the American Federation of Labor. Gompers became the AFL's first president and remained so, except for the year 1895, until his death. He campaigned for basic trade-union rights, such as the right to picket and to organize boycotts and strikes. His efforts on behalf of workers helped organized labor to gain respect.

### Summarize

How did Samuel Gompers help the labor movement?



discouraged strikes, preferring tactics such as boycotts and negotiations. Yet soon enough, strikes would become commonplace.

Another early labor union was the **American Federation of Labor (AFL)**, led by **Samuel Gompers**. The AFL was founded by members of craft unions who were unhappy with how the Knights of Labor represented their interests. While the Knights organized individual workers, the AFL organized unions, such as the mineworkers' and steelworkers' unions. The AFL also limited its membership to skilled workers. This gave the union great bargaining power but left out most workers. The AFL tried to get better wages, hours, and working conditions for laborers. By 1890 the AFL's membership was larger than that of the Knights. Using strikes and other tactics, the AFL won wage increases and shorter workweeks.

Many women took active roles in unions. For example, **Mary Harris Jones**, an Irish immigrant, dedicated herself to improving the lives of workers. "Mother Jones," as she was affectionately called, was a fiery speaker, who used her abilities to organize strikes and educate workers.

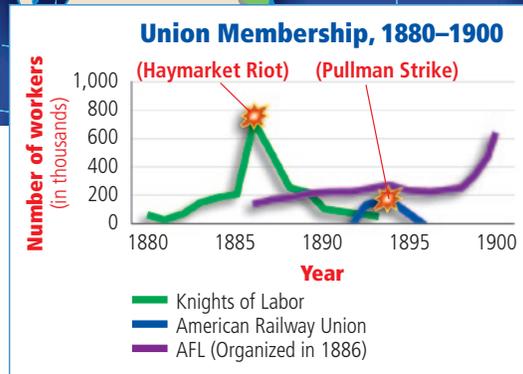
## Labor Strikes

By the late 1800s other unions were gaining strength. Major workers' strikes swept the country and included miners in Colorado, steelworkers in Pennsylvania, and railroad workers in Illinois and California. Some strikes involved violent clashes with police. One of the worst confrontations occurred in Chicago in 1886.

In May 1886 thousands of union members in Chicago went on strike because they wanted an eight-hour workday. Two strikers were killed in a fight with police. The next night, workers met at Haymarket Square to protest the killings. In what became known as the **Haymarket Riot**, an unidentified person threw a dynamite bomb at police, who were trying to

**Reading Check**  
**Contrast** How did the Knights of Labor and the AFL differ?

## Major Labor Strikes, Late 1800s



- 1 Haymarket Riot** In May 1886 the Haymarket Riot erupted between protesters and police in Chicago. It resulted in the decline of the Knights of Labor.
- 2 Homestead Strike** In 1892 a strike occurred in the Carnegie Steel Company in Homestead, Pennsylvania. The resulting fight left several workers and Pinkerton guards dead.
- 3 Colorado Miners' Strike** In the summer of 1893, gold miners at Cripple Creek, Colorado, went on strike for higher wages and a shorter workday.
- 4 Pullman Strike** The Pullman strike of 1894 began with workers who made Pullman train cars. It soon spread to workers who worked on trains pulling the sleeper cars.
- 5 California Railroad Strike** In 1894 railroad workers in Oakland went on strike in the Bay Area's first major strike. Supporting Chicago Pullman workers, they halted passenger, freight, and mail trains for months.

### Analyze Information

How did conflicts between striking workers and authorities affect union membership?

break up the crowd. The police panicked and fired into the crowd. Before the situation calmed down, seven police officers and four workers were killed. More than 100 others suffered injuries.

Police arrested numerous suspects and eventually charged eight people with conspiracy and murder. No evidence existed to connect these men to the crime. In fact, five of them were not even in Haymarket Square when the bomb went off. Still, all eight were convicted and sentenced to death. Four were hanged and one killed himself in prison. In 1893 the new governor of Illinois pardoned the last three. He believed that their guilt had not been proven.

Sometimes, business owners succeeded in breaking up unions. In 1892 a violent strike called the **Homestead strike** took place at Andrew Carnegie's Homestead steel factory in Pennsylvania. Union members there protested a plan to buy new machinery and cut jobs. The company refused to negotiate with the union and locked workers out of the plant, hiring

### The Pullman Strike

On July 6, 1894, during the Pullman Strike, a mob of frustrated strikers toppled and set fire to hundreds of railcars in South Chicago.



strikebreakers to perform their jobs. The workers responded by seizing control of the plant. Gunfire erupted on July 6, when Pinkerton detectives hired by the company tried to enter the plant. A fierce battle raged for 14 hours, leaving 16 people dead. The governor called out the state militia to restore order. Continuing for four more months, the union was eventually defeated.

Another major strike happened at George Pullman's Pullman Palace Car Company in the company town of Pullman, Illinois. Most of the company workers lived there, paying high rents. During a financial depression that began in 1893, Pullman laid off about half of the workers and cut pay for those who were left, without lowering their rents. On May 11, 1894, workers began the **Pullman strike**, which stopped traffic on many railroad lines until federal courts ordered the workers to return to their jobs. President Grover Cleveland sent federal troops to Chicago to stop the strike. Such defeats seriously damaged the labor movement for years.

**Summary and Preview** Workers formed unions to fight for better conditions and to keep their jobs. In the next module you will learn about a new wave of immigrants in the late 1800s.

#### Reading Check

**Analyze** What were the effects of early major strikes on workers?

### Lesson 3 Assessment

#### Review Ideas, Terms, and People

- a. Recall** Why did conditions in factories begin to decline?

**b. Draw Conclusions** How were workers affected by specialization and scientific management?

**c. Evaluate** Do you think scientific management made businesses more successful? Explain.
- a. Identify** What role did Mary Harris Jones play in the labor movement?

**b. Analyze** Why did workers use collective bargaining, and why did business owners oppose it?

**c. Explain** What were the origins and accomplishments of the Knights of Labor and the American Federation of Labor?

**d. Elaborate** Do you think the demands made by labor unions were reasonable?

- a. Describe** What major labor strikes took place in the late 1800s?

**b. Evaluate** Do you think President Cleveland was right to use federal troops to end the Pullman strike? Explain.

#### Critical Thinking

- Analyze** In this lesson you learned about the problems workers faced. Create a table like the one below and show how workers tried to solve the problems they faced.

Problem	Solution

# Social Studies Skills

## Analyze Costs and Benefits

### Define the Skill

Everything you do has both costs and benefits connected to it. *Benefits* are things that you gain from something. *Costs* are what you give up to obtain benefits. For example, if you buy a video game, the benefits of your action include the game itself and the enjoyment of playing it. The most clear cost is what you pay for the game. However, there are other costs that do not involve money. One is the time you spend playing the game. This is a cost because you give up something else, such as doing your homework or watching a TV show, when you choose to play the game.

The ability to analyze costs and benefits is a valuable life skill as well as a useful tool in the study of history. Weighing an action's benefits against its costs can help you decide whether or not to take it.

### Learn the Skill

Analyzing the costs and benefits of historical events will help you to better understand and evaluate them. Follow these guidelines to do a cost-benefit analysis of an action or decision in history.

1. First determine what the action or decision was trying to accomplish. This step is needed in order to determine which of its effects were benefits and which were costs.
2. Then look for the positive or successful results of the action or decision. These are its benefits.
3. Consider the negative or unsuccessful effects of the action or decision. Also think about what positive things would have happened if it had *not* occurred. All these things are its costs.

4. Making a chart of the costs and benefits can be useful. By comparing the list of benefits to the list of costs, you can better understand the action or decision and evaluate it.

For example, you learned in Module 20 about the Second Industrial Revolution and its effects on the American economy. A cost-benefit analysis of the changes in American businesses might produce a chart like this one:

Benefits	Costs
New inventions made life easier.	New business methods ran smaller companies out of business.
Communication became easier with new technologies.	Workers received lower wages.
Efficient management reduced costs of products.	Strikes resulted in violence and deaths.
Workers began to organize for better conditions.	

Based on this chart, one might conclude that the Second Industrial Revolution was beneficial to the nation's economy.

### Practice the Skill

Among the changes that occurred in the early 1900s was an increase in specialization and efficiency in the workplace. Use information from the module and the guidelines above to do a cost-benefit analysis of this development. Then write a paragraph explaining whether or not it was a wise one.

# Module 20 Assessment

## Review Vocabulary, Terms, and People

Identify the descriptions below with the correct term or person from the module.

1. Labor organization that represented both skilled and unskilled laborers and was the first national labor union in the United States
2. Inventor who patented the telephone in 1876
3. A way of making steel quickly and cheaply by blasting hot air through melted iron to quickly remove waste
4. A system of business in which one company owns businesses in each step of the manufacturing process
5. Powerful business leader who helped to found the Central Pacific Railroad
6. Union speaker who worked to better the lives of mine workers
7. A method of negotiating for better wages or working conditions in which all workers act together to ensure a better chance for success

## Comprehension and Critical Thinking

### Lesson 1

8.
  - a. **Identify** What was the Second Industrial Revolution?
  - b. **Draw Conclusions** Why were advances in transportation and communication important to the Second Industrial Revolution?
  - c. **Elaborate** Which invention do you think had the greatest effect on people's lives in the late 1800s? Explain your answer.

### Lesson 2

9.
  - a. **Recall** What criticisms were made of business leaders and trusts?
  - b. **Analyze** How did the rise of corporations and powerful business leaders lead to the growth of big business?
  - c. **Evaluate** Do you think the growth of big business helped or hurt ordinary Americans? Explain your answer.

### Lesson 3

10.
  - a. **Recall** What led to poor working conditions in factories during the Second Industrial Revolution?
  - b. **Make Inferences** Why did labor unions have a better chance of improving working conditions than laborers did on their own?
  - c. **Evaluate** Did the strikes of the 1880s and 1890s hurt or help the labor movement in the long run? Explain your answer.

# Module 20 Assessment, continued

## Review Themes

11. **Economics** How did the rise of big business affect consumers in the United States?
12. **Society and Culture** What changes in society were brought about by the organization of labor?

## Reading Skills

**Identify Patterns of Organization** Use the Reading Skills taught in this module to answer the question about the reading selection below.

Corporations provided several important advantages over earlier business forms. Stockholders in a corporation are not responsible for business debts. If a corporation fails financially, the stockholders lose only the money that they invested. Stockholders are also usually free to sell their stock to whomever they want, whenever they want.

13. By which structural pattern is the above passage organized?
  - a. Listing
  - b. Cause-effect
  - c. Chronological order
  - d. Comparison-contrast

## Social Studies Skills

**Analyze Costs and Benefits** Use the Social Studies Skills taught in this module to answer the question below.

14. Write two costs and two benefits of the Pullman strike from the point of view of the workers who participated.

## Focus on Writing

15. **Write a Business Plan** Consider what you learned in this module and determine a good product to sell during the late 1800s. Decide which business practices you would use and which you would not. Consider how you would encourage investors to support your plan. Write two or three paragraphs in which you explain why your product would sell, which business practices you can use to make your product, and how to avoid conflicts with workers. Remember to explain to the investors why your plan will work.

# Henry Ford

**Henry Ford was a brilliant inventor and industrialist and founder of the Ford Motor Company.** He helped bring about a time of rapid growth and progress that forever changed how people worked and lived. Henry Ford grew up on his family's farm near Dearborn, Michigan. As a child, he disliked life on the farm. He found the clicks and whirs of machinery much more exciting. When Ford was 16, he went to nearby Detroit to work in a

machine shop. From there, he turned his ideas for how to make affordable and well-built cars into one of the world's largest automobile companies.

Explore the amazing life and career of Henry Ford online. You can find a wealth of information, video clips, primary sources, activities, and more through your online textbook.

“My ‘gasoline buggy’ was the first and for a long time the only automobile in Detroit. It was considered . . . a nuisance, for it made a racket and it scared horses.”

—Henry Ford



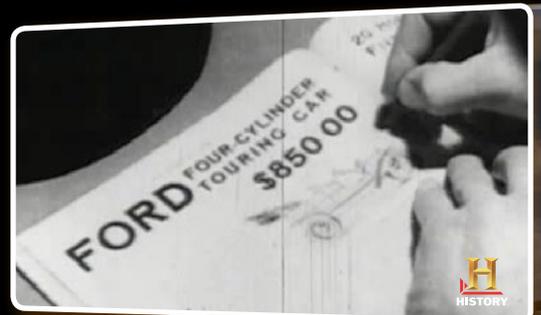
### My Life and Work

Read the document to learn more about Henry Ford's life and career in his own words.



### Big Plans

Watch the video to learn more about Henry Ford's early career.



### Taking the Low Road

Watch the video to explore Henry Ford's vision for his car company.



### The Assembly Line

Watch the video to see how Henry Ford used the assembly line to produce cars more efficiently and cheaply.

