

Although this painting shows Canton, China, the flags flying over the fenced-in areas near the shore are those of Spain, the United States, Great Britain, and the Netherlands. Canton was one of only two Chinese ports open to Westerners until 1842.

Comparing & Contrasting

Scientific and Technological Changes

In Unit 3, you will learn about scientific and technological changes that led to the Industrial Revolution and helped Western nations establish colonies around the world. At the end of the unit, you will have a chance to compare and contrast those changes. (See pages 396–401.)

CHAPTER 9

The Industrial Revolution, 1700–1900

Previewing Main Ideas

SCIENCE AND TECHNOLOGY From the spinning jenny to the locomotive train, there was an explosion of inventions and technological advances. These improvements paved the way for the Industrial Revolution.

Geography *What other European countries besides England had coal, iron, and textile industries in the 1800s?*

EMPIRE BUILDING The global power balance shifted after the Industrial Revolution. This shift occurred because industrialized nations dominated the rest of the world.

Geography *Study the map. Which country appears to be the most industrialized?*

ECONOMICS The Industrial Revolution transformed economic systems. In part, this was because nations dramatically changed the way they produced and distributed goods.

Geography *What geographic factors might have encouraged the development of industry in certain places?*

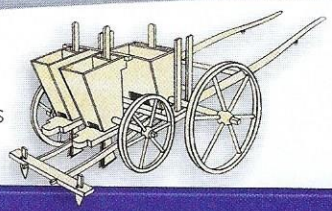
INTEGRATED TECHNOLOGY

eEdition
- Interactive Maps
- Interactive Visuals
- Interactive Primary Sources

VIDEO *Patterns of Interaction: The Industrial and Electronic Revolutions*

INTERNET RESOURCES

Go to **classzone.com** for:
- Research Links
- Internet Activities
- Primary Sources
- Chapter Quiz
- Maps
- Test Practice
- Current Events



EUROPE AND UNITED STATES

1701 Jethro Tull invents seed drill. ▶

1765 James Watt builds steam engine.

1700 — 1750

WORLD

1736 Qian-long begins his reign as emperor of China. (Imperial Palace compound at Beijing) ▶



Industry in Europe, 1870



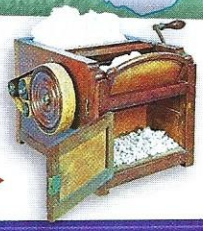
Industrialization 1870
- City population greater than 250,000
- Major railroads constructed by 1870

Industry
- Ironworking
- Textile industry
- Coal mining

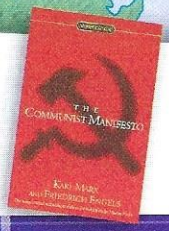
NORWAY
SWEDEN
UNITED KINGDOM
Glasgow
North Sea
DENMARK
Baltic Sea
Liverpool
Leeds
Manchester
NETHERLANDS
Birmingham
Amsterdam
BELGIUM
London
Berlin
Warsaw
Brussels
GERMANY
ATLANTIC OCEAN
LUX.
Paris
FRANCE
Vienna
SWITZERLAND
AUSTRIA-HUNGARY
Lyon
Milan
SERBIA
Marseille
ITALY
PORTUGAL
Madrid
Corsica
Adriatic Sea
SPAIN
Sardinia
Naples
Mediterranean Sea
GREECE
Sicily

60°N 15°W 0° 45°N

0 200 400 Miles
0 200 400 Kilometers
Conic Projection



1793
Eli Whitney invents cotton gin. ▶



1848
Marx and Engels publish *The Communist Manifesto.* ▶

1875
British unions win right to strike.

1800 | **1850** | **1900**

1804
Haiti wins freedom from France.

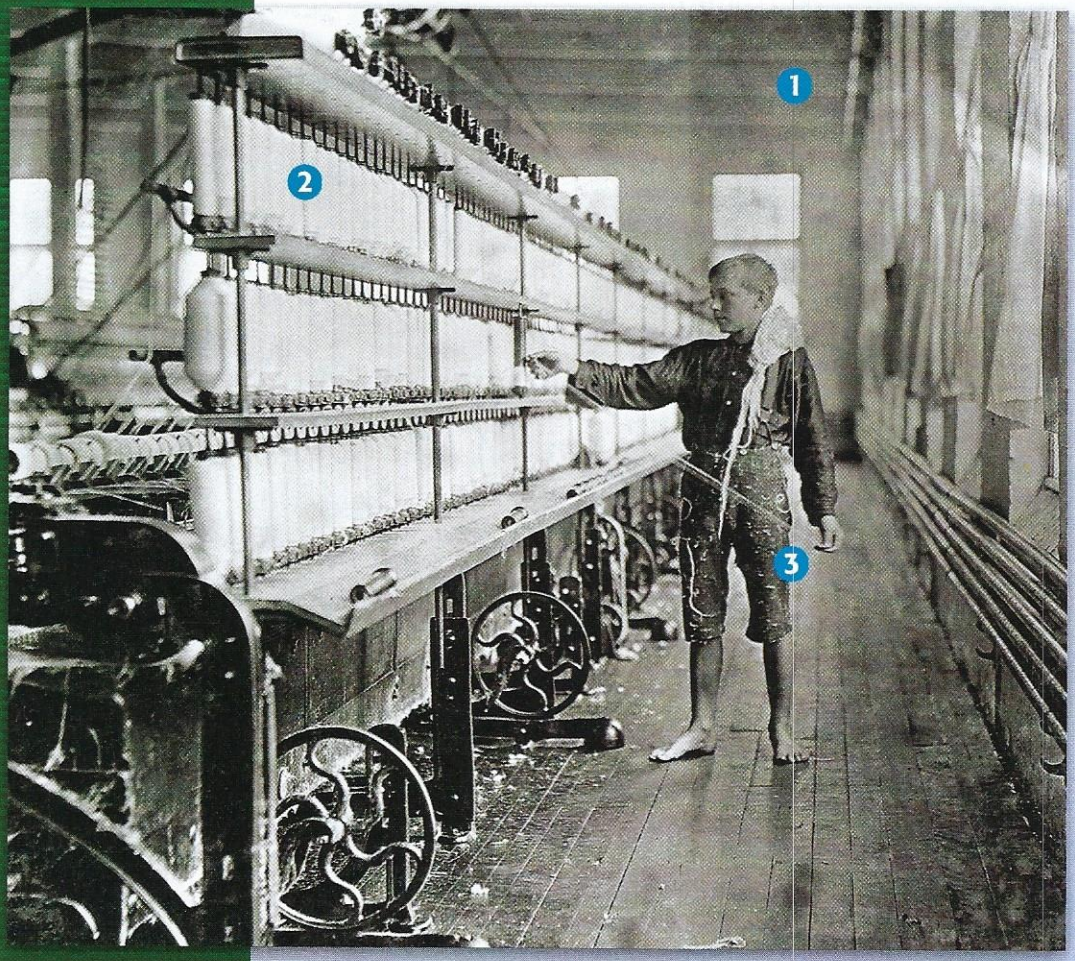
1867
Meiji era begins a period of modernization in Japan.

1869
Suez Canal opens in Africa.

Interact *with* History

What are fair working conditions?

You are a 15-year-old living in England where the Industrial Revolution has spurred the growth of thousands of factories. Cheap labor is in great demand. Like millions of other teenagers, you do not go to school. Instead, you work in a factory 6 days a week, 14 hours a day. The small pay you receive is needed to help support your family. You trudge to work before dawn every day and work until after sundown. Inside the workplace the air is hot and foul, and after sunset it is so dark it is hard to see. Minding the machines is exhausting, dirty, and dangerous.



1. **Long hours:** The sun may be shining through the windows as this child's day begins, but it will have disappeared by the time his day ends.
2. **Dangerous machines:** Children usually worked in bare feet with no safety equipment among machines with many moving parts.
3. **Hot temperatures and dust-filled air:** Dust particles from thousands of bobbins cling to the clothing and hang in air heated by the machinery.

EXAMINING *the* ISSUES

- **Would you attempt to change your working conditions in the factory?**
- **Would you join a union, go to school, or run away?**

In small groups, discuss these questions. Share your conclusions with your class. In your discussions, think about how children lived in preindustrial and industrial societies all over the world. As you read about the changes caused by industrialization, note how reform movements eventually improved conditions for most laborers.



1

The Beginnings of Industrialization

MAIN IDEA	WHY IT MATTERS NOW	TERMS & NAMES
SCIENCE AND TECHNOLOGY The Industrial Revolution started in England and soon spread to other countries.	The changes that began in Britain paved the way for modern industrial societies.	• Industrial Revolution • enclosure • crop rotation • industrialization • factors of production • factory • entrepreneur

SETTING THE STAGE In the United States, France, and Latin America, political revolutions brought in new governments. A different type of revolution now transformed the way people worked. The **Industrial Revolution** refers to the greatly increased output of machine-made goods that began in England in the middle 1700s. Before the Industrial Revolution, people wove textiles by hand. Then, machines began to do this and other jobs. Soon the Industrial Revolution spread from England to Continental Europe and North America.

Industrial Revolution Begins in Britain

In 1700, small farms covered England's landscape. Wealthy landowners, however, began buying up much of the land that village farmers had once worked. The large landowners dramatically improved farming methods. These innovations amounted to an agricultural revolution.

The Agricultural Revolution Paves the Way After buying up the land of village farmers, wealthy landowners enclosed their land with fences or hedges. The increase in their landholdings enabled them to cultivate larger fields. Within these larger fields, called **enclosures**, landowners experimented with more productive seeding and harvesting methods to boost crop yields. The enclosure movement had two important results. First, landowners tried new agricultural methods. Second, large landowners forced small farmers to become tenant farmers or to give up farming and move to the cities.

Jethro Tull was one of the first of these scientific farmers. He saw that the usual way of sowing seed by scattering it across the ground was wasteful. Many seeds failed to take root. He solved this problem with an invention called the seed drill in about 1701. It allowed farmers to sow seeds in well-spaced rows at specific depths. A larger share of the seeds took root, boosting crop yields.

Rotating Crops The process of **crop rotation** proved to be one of the best developments by the scientific farmers. The process improved upon older methods of crop rotation, such as the medieval three-field system. One year, for example, a farmer might plant a field with wheat, which exhausted soil nutrients. The next year he planted a root crop, such as turnips, to restore nutrients. This might be followed in turn by barley and then clover.

CALIFORNIA STANDARDS

10.3.1 Analyze why England was the first country to industrialize.

10.3.2 Examine how scientific and technological changes and new forms of energy brought about massive social, economic, and cultural change (e.g., the inventions and discoveries of James Watt, Eli Whitney, Henry Bessemer, Louis Pasteur, Thomas Edison).

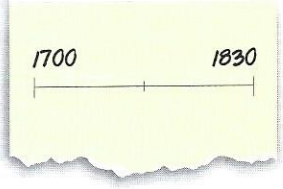
10.3.5 Understand the connections among natural resources, entrepreneurship, labor, and capital in an industrial economy.

CST 1 Students compare the present with the past, evaluating the consequences of past events and decisions and determining the lessons that were learned.

HI 1 Students show the connections, causal and otherwise, between particular historical events and larger social, economic, and political trends and developments.

TAKING NOTES

Following Chronological Order On a time line, note important events in Britain's industrialization.





▶ An English farmer plants his fields in the early 1700s using a seed drill.

Livestock breeders improved their methods too. In the 1700s, for example, Robert Bakewell increased his mutton (sheep meat) output by allowing only his best sheep to breed. Other farmers followed Bakewell's lead. Between 1700 and 1786, the average weight for lambs climbed from 18 to 50 pounds. As food supplies increased and living conditions improved, England's population mushroomed. An increasing population boosted the demand for food and goods such as cloth. As farmers lost their land to large enclosed farms, many became factory workers. (A)

MAIN IDEA

Recognizing Effects

(A) How did population growth spur the Industrial Revolution?

Why the Industrial Revolution Began in England In addition to a large population of workers, the small island country had extensive natural resources. **Industrialization**, which is the process of developing machine production of goods, required such resources. These natural resources included

- water power and coal to fuel the new machines
- iron ore to construct machines, tools, and buildings
- rivers for inland transportation
- harbors from which merchant ships set sail

In addition to its natural resources, Britain had an expanding economy to support industrialization. Businesspeople invested in the manufacture of new inventions. Britain's highly developed banking system also contributed to the country's industrialization. People were encouraged by the availability of bank loans to invest in new machinery and expand their operations. Growing overseas trade, economic prosperity, and a climate of progress led to the increased demand for goods.

Britain's political stability gave the country a tremendous advantage over its neighbors. Though Britain took part in many wars during the 1700s, none occurred on British soil. Their military successes gave the British a positive attitude. Parliament also passed laws to help encourage and protect business ventures. Other countries had some of these advantages. But Britain had all the **factors of production**, the resources needed to produce goods and services that the Industrial Revolution required. They included land, labor, and capital (or wealth).

Inventions Spur Industrialization

In an explosion of creativity, inventions now revolutionized industry. Britain's textile industry clothed the world in wool, linen, and cotton. This industry was the first to be transformed. Cloth merchants boosted their profits by speeding up the process by which spinners and weavers made cloth.

Changes in the Textile Industry As you will learn in the feature on textile technology on page 285, by 1800, several major inventions had modernized the cotton industry. One invention led to another. In 1733, a machinist named John Kay made a shuttle that sped back and forth on wheels. This flying shuttle, a boat-shaped piece

Textiles Industrialize First

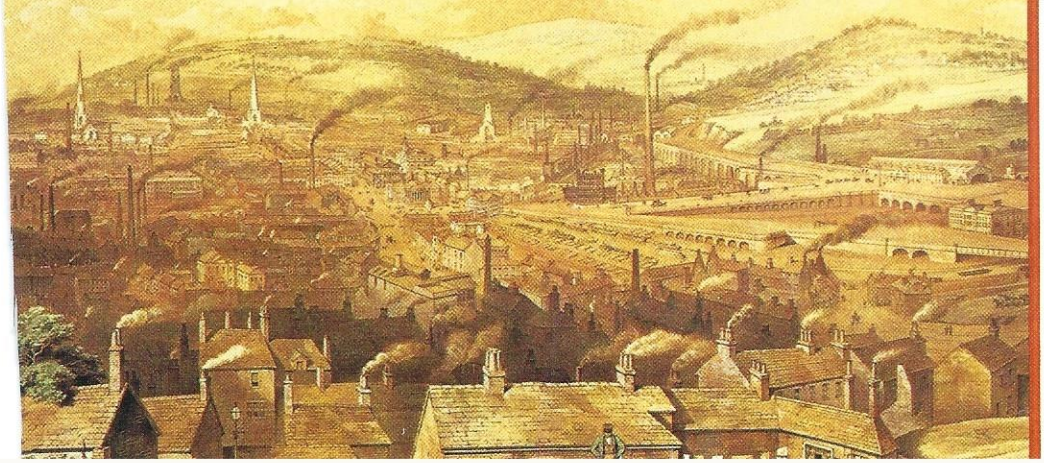
The Industrial Revolution that began in Britain was spurred by a revolution in technology. It started in the textile industry, where inventions in the late 1700s transformed the manufacture of cloth. The demand for clothing in Britain had greatly increased as a result of the population boom caused by the agricultural revolution. These developments, in turn, had an impact worldwide. For example, the consumption of cotton rose dramatically in Britain (see graph at right). This cotton came from plantations in the American South, where cotton production skyrocketed from 1820 to 1860 in response to demand from English textile mills.



▶ John Kay's flying shuttle (below) speedily carried threads of yarn back and forth when the weaver pulled a handle on the loom. The flying shuttle greatly increased the productivity of weavers.



▲ Flying shuttle

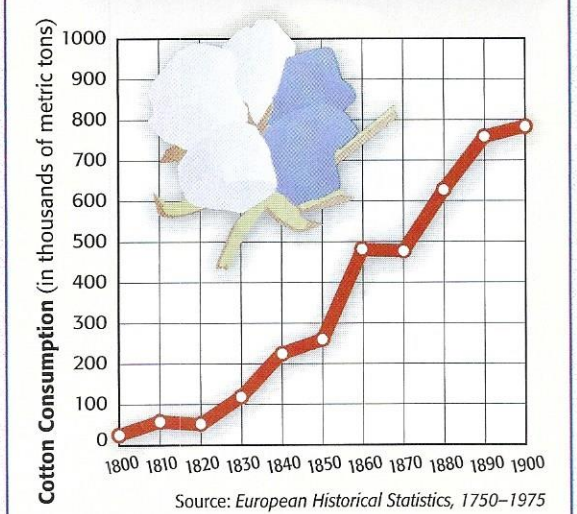


CALIFORNIA STANDARDS

10.3.1 Analyze why England was the first country to industrialize.

HI 1 Students show the connections, causal and otherwise, between particular historical events and larger social, economic, and political trends and developments.

British Cotton Consumption, 1800–1900



Source: *European Historical Statistics, 1750–1975*

Patterns of Interaction

Technology Transforms an Age: The Industrial and Electronic Revolutions

Inventions in the textile industry started in Britain and brought about the Industrial Revolution. This revolution soon spread to other countries. The process of industrialization is still spreading around the world, especially in developing countries. A similar technological revolution is occurring in electronics today, transforming the distribution of information around the world.

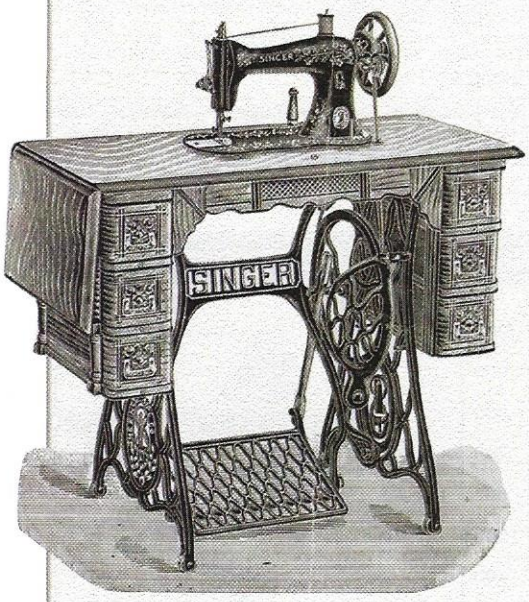
Connect *to* Today

1. **Synthesizing** How might the technological innovation and industrialization that took place in the textile industry during the Industrial Revolution have provided a model for other industries?

See Skillbuilder Handbook, Page R21.

2. **Recognizing Effects** Research the textile industry today to learn how it has been affected by new technology, including computerization. Prepare a two-paragraph summary on the effects of the new technology.

History *in* Depth



Inventions in America

In the United States, American inventors worked at making railroad travel more comfortable, inventing adjustable upholstered seats. They also revolutionized agriculture, manufacturing, and communications:

1831 Cyrus McCormick's reaper boosted American wheat production.

1837 Samuel F. B. Morse, a New England painter, first sent electrical signals over a telegraph.

1851 I. M. Singer improved the sewing machine by inventing a foot treadle (see photograph).

1876 Scottish-born inventor Alexander Graham Bell patented the telephone.

INTEGRATED TECHNOLOGY

INTERNET ACTIVITY Create a photo exhibit on American inventions of the 19th century. Include the name of the inventor and the date with each photograph. Go to **classzone.com** for your research.

of wood to which yarn was attached, doubled the work a weaver could do in a day. Because spinners could not keep up with these speedy weavers, a cash prize attracted contestants to produce a better spinning machine. Around 1764, a textile worker named James Hargreaves invented a spinning wheel he named after his daughter. His spinning jenny allowed one spinner to work eight threads at a time.

At first, textile workers operated the flying shuttle and the spinning jenny by hand. Then, Richard Arkwright invented the water frame in 1769. This machine used the waterpower from rapid streams to drive spinning wheels. In 1779, Samuel Crompton combined features of the spinning jenny and the water frame to produce the spinning mule. The spinning mule made thread that was stronger, finer, and more consistent than earlier spinning machines. Run by waterpower, Edmund Cartwright's power loom sped up weaving after its invention in 1787. B

MAIN IDEA

Summarizing

B What inventions transformed the textile industry?

The water frame, the spinning mule, and the power loom were bulky and expensive machines. They took the work of spinning and weaving out of the house. Wealthy textile merchants set up the machines in large buildings called **factories**. Factories needed waterpower, so the first ones were built near rivers and streams:

PRIMARY SOURCE

A great number of streams . . . furnish water-power adequate to turn many hundred mills: they afford the element of water, indispensable for scouring, bleaching, printing, dyeing, and other processes of manufacture: and when collected in their larger channels, or employed to feed canals, they supply a superior inland navigation, so important for the transit of raw materials and merchandise.

EDWARD BAINS, *The History of Cotton Manufacture in Great Britain* (1835)

England's cotton came from plantations in the American South in the 1790s. Removing seeds from the raw cotton by hand was hard work. In 1793, an American inventor named Eli Whitney invented a machine to speed the chore. His cotton gin multiplied the amount of cotton that could be cleaned. American cotton production skyrocketed from 1.5 million pounds in 1790 to 85 million pounds in 1810.

Improvements in Transportation

Progress in the textile industry spurred other industrial improvements. The first such development, the steam engine, stemmed from the search for a cheap, convenient source of power. As early as 1705, coal miners were using steam-powered pumps to remove water from deep mine shafts. But this early model of a steam engine gobbled great quantities of fuel, making it expensive to run.

Watt's Steam Engine James Watt, a mathematical instrument maker at the University of Glasgow in Scotland, thought about the problem for two years. In 1765, Watt figured out a way to make the steam engine work faster and more efficiently while burning less fuel. In 1774, Watt joined with a businessman named Matthew Boulton. Boulton was an **entrepreneur** (AHN•truh•pruh•NUR), a person who organizes, manages, and takes on the risks of a business. He paid Watt a salary and encouraged him to build better engines.

Water Transportation Steam could also propel boats. An American inventor named Robert Fulton ordered a steam engine from Boulton and Watt. He built a steamboat called the *Clermont*, which made its first successful trip in 1807. The *Clermont* later ferried passengers up and down New York's Hudson River.

In England, water transportation improved with the creation of a network of canals, or human-made waterways. By the mid-1800s, 4,250 miles of inland channels slashed the cost of transporting both raw materials and finished goods.

Road Transportation British roads improved, too, thanks largely to the efforts of John McAdam, a Scottish engineer. Working in the early 1800s, McAdam equipped road beds with a layer of large stones for drainage. On top, he placed a carefully smoothed layer of crushed rock. Even in rainy weather heavy wagons could travel over the new "macadam" roads without sinking in mud.

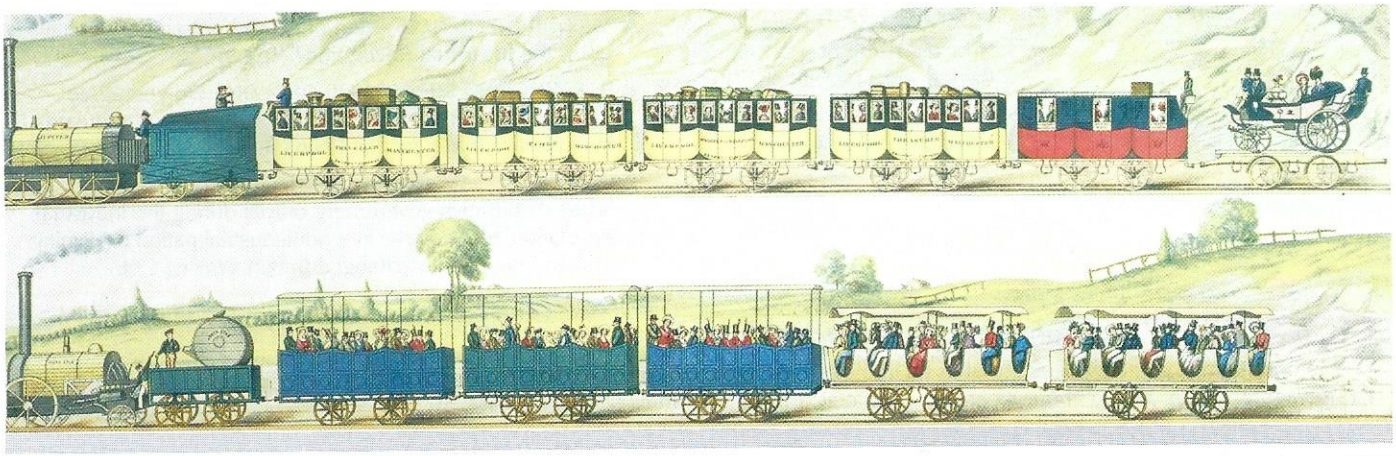
Private investors formed companies that built roads and then operated them for profit. People called the new roads turnpikes because travelers had to stop at tollgates (turnstiles or turnpikes) to pay tolls before traveling farther.

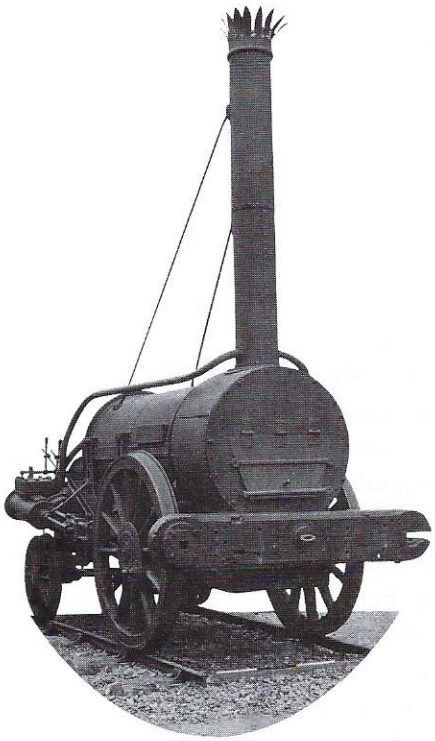
The Railway Age Begins

Steam-driven machinery powered English factories in the late 1700s. A steam engine on wheels—the railroad locomotive—drove English industry after 1820.

Steam-Driven Locomotives In 1804, an English engineer named Richard Trevithick won a bet of several thousand dollars. He did this by hauling ten tons of iron over nearly ten miles of track in a steam-driven locomotive. Other British engineers soon built improved versions of Trevithick's locomotive. One of these early

▼ First-class passengers on the Liverpool-Manchester Railway in the 1830s rode in covered cars; all others, in open cars.





▲ George Stephenson's *Rocket*

railroad engineers was George Stephenson. He had gained a solid reputation by building some 20 engines for mine operators in northern England. In 1821, Stephenson began work on the world's first railroad line. It was to run 27 miles from the Yorkshire coal fields to the port of Stockton on the North Sea. In 1825, the railroad opened. It used four locomotives that Stephenson had designed and built.

The Liverpool-Manchester Railroad News of this success quickly spread throughout Britain. The entrepreneurs of northern England wanted a railroad line to connect the port of Liverpool with the inland city of Manchester. The track was laid. In 1829, trials were held to choose the best locomotive for use on the new line. Five engines entered the competition. None could compare with the *Rocket*, designed by Stephenson and his son.

Smoke poured from the *Rocket*'s tall smokestack, and its two pistons pumped to and fro as they drove the front wheels. The locomotive hauled a 13-ton load at an unheard-of speed—more than 24 miles per hour. The Liverpool-Manchester Railway opened officially in 1830. It was an immediate success.

Railroads Revolutionize Life in Britain The invention and perfection of the locomotive had at least four major effects. First, railroads spurred industrial growth by giving manufacturers a cheap way to transport materials and finished products. Second, the railroad boom created hundreds of thousands of new jobs for both railroad workers and miners. These miners provided iron for the tracks and coal for the steam engines. Third, the railroads boosted England's agricultural and fishing industries, which could transport their products to distant cities.

Finally, by making travel easier, railroads encouraged country people to take distant city jobs. Also, railroads lured city dwellers to resorts in the countryside. Like a locomotive racing across the country, the Industrial Revolution brought rapid and unsettling changes to people's lives. C

MAIN IDEA

Synthesizing

C How did improvements in transportation promote industrialization in Britain?

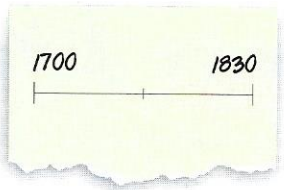
SECTION 1 ASSESSMENT

TERMS & NAMES 1. For each term or name, write a sentence explaining its significance.

• Industrial Revolution • enclosure • crop rotation • industrialization • factors of production • factory • entrepreneur

USING YOUR NOTES

2. Which of the events listed do you think was the most important? Explain. (10.3.5)



MAIN IDEAS

3. What were four factors that contributed to industrialization in Britain? (10.3.1)
4. How did rising population help the Industrial Revolution? (10.3.1)
5. What American invention aided the British textile industry? (10.3.1)

CRITICAL THINKING & WRITING

6. **EVALUATING** Was the revolution in agriculture necessary to the Industrial Revolution? Explain. (10.3.5)
7. **MAKING INFERENCES** What effect did entrepreneurs have upon the Industrial Revolution? (10.3.5)
8. **FORMING AND SUPPORTING OPINIONS** Do you agree with the statement that the steam engine was the greatest invention of the Industrial Revolution? Why? (10.3.2)
9. **WRITING ACTIVITY** SCIENCE AND TECHNOLOGY Write a **letter,** as a British government official during the Industrial Revolution, to an official in a nonindustrial nation explaining how the railroad has changed Britain. (Writing 2.5.b)

CONNECT TO TODAY **CREATING AN ILLUSTRATED NEWS ARTICLE**

Find information on a recent agricultural or technological invention or improvement. Write a two-paragraph **news article** about its economic effects and include an illustration, if possible. (10.3.5)

2

Industrialization

CASE STUDY: Manchester

MAIN IDEA	WHY IT MATTERS NOW	TERMS & NAMES
ECONOMICS The factory system changed the way people lived and worked, introducing a variety of problems.	Many less-developed countries are undergoing the difficult process of industrialization today.	• urbanization • middle class

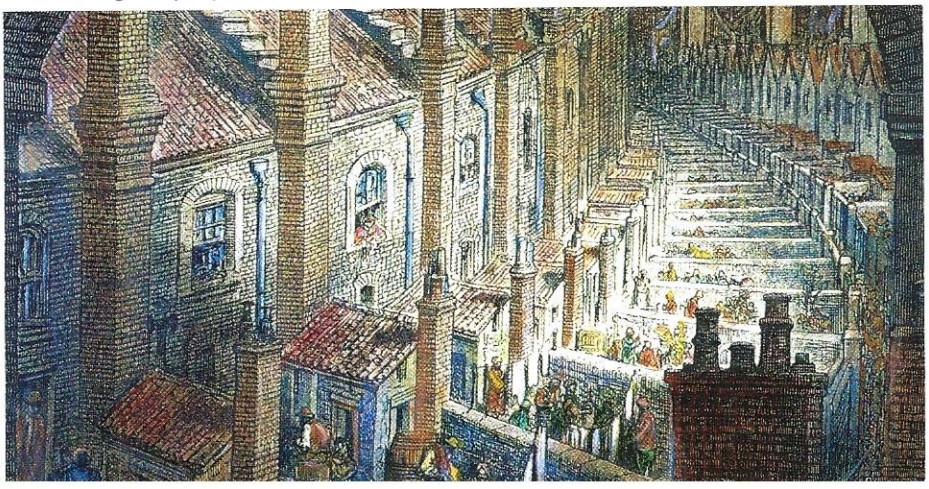
SETTING THE STAGE The Industrial Revolution affected every part of life in Great Britain, but proved to be a mixed blessing. Eventually, industrialization led to a better quality of life for most people. But the change to machine production initially caused human suffering. Rapid industrialization brought plentiful jobs, but it also caused unhealthy working conditions, air and water pollution, and the ills of child labor. It also led to rising class tensions, especially between the working class and the middle class.

Industrialization Changes Life

The pace of industrialization accelerated rapidly in Britain. By the 1800s, people could earn higher wages in factories than on farms. With this money, more people could afford to heat their homes with coal from Wales and dine on Scottish beef. They wore better clothing, too, woven on power looms in England's industrial cities. Cities swelled with waves of job seekers.

Industrial Cities Rise For centuries, most Europeans had lived in rural areas. After 1800, the balance shifted toward cities. This shift was caused by the growth of the factory system, where the manufacturing of goods was concentrated in a central location. Between 1800 and 1850, the number of European cities boasting more than 100,000 inhabitants rose from 22 to 47. Most of Europe's urban areas at least doubled in population; some even quadrupled. This period was one of **urbanization**—city building and the movement of people to cities.

▼ As cities grew, people crowded into tenements and row houses such as these in London.



CALIFORNIA STANDARDS

10.3.2 Examine how scientific and technological changes and new forms of energy brought about massive social, economic, and cultural change (e.g., the inventions and discoveries of James Watt, Eli Whitney, Henry Bessemer, Louis Pasteur, Thomas Edison).

10.3.3 Describe the growth of population, rural to urban migration, and growth of cities associated with the Industrial Revolution.

10.3.4 Trace the evolution of work and labor, including the demise of the slave trade and the effects of immigration, mining and manufacturing, division of labor, and the union movement.

CST 1 Students compare the present with the past, evaluating the consequences of past events and decisions and determining the lessons that were learned.

CST 3 Students use a variety of maps and documents to interpret human movement, including major patterns of domestic and international migration, changing environmental preferences and settlement patterns, the frictions that develop between population groups, and the diffusion of ideas, technological innovations, and goods.

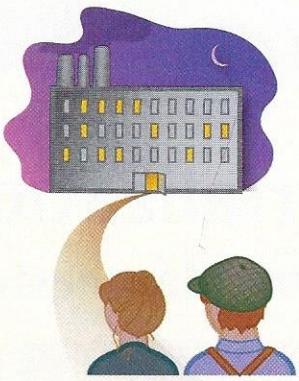
TAKING NOTES

Outlining Organize main ideas and details.

I. Industrialization Changes Life
   A.
   B.
II. Class Tensions Grow

The Day of a Child Laborer, William Cooper

William Cooper began working in a textile factory at the age of ten. He had a sister who worked upstairs in the same factory. In 1832, Cooper was called to testify before a parliamentary committee about the conditions among child laborers in the textile industry. The following sketch of his day is based upon his testimony.





5 A.M. The workday began. Cooper and his sister rose as early as 4:00 or 4:30 in order to get to the factory by 5:00. Children usually ate their breakfast on the run.



12 NOON The children were given a 40-minute break for lunch. This was the only break they received all day.



Factories developed in clusters because entrepreneurs built them near sources of energy, such as water and coal. Major new industrial centers sprang up between the coal-rich area of southern Wales and the Clyde River valley in Scotland. But the biggest of these centers developed in England. (See map on page 281.)

Britain's capital, London, was the country's most important city. It had a population of about one million people by 1800. During the 1800s, its population exploded, providing a vast labor pool and market for new industry. London became Europe's largest city, with twice as many people as its closest rival (Paris). Newer cities challenged London's industrial leadership. Birmingham and Sheffield became iron-smelting centers. Leeds and Manchester dominated textile manufacturing. Along with the port of Liverpool, Manchester formed the center of Britain's bustling cotton industry. During the 1800s, Manchester experienced rapid growth from around 45,000 in 1760 to 300,000 by 1850.

Living Conditions Because England's cities grew rapidly, they had no development plans, sanitary codes, or building codes. Moreover, they lacked adequate housing, education, and police protection for the people who poured in from the countryside to seek jobs. Most of the unpaved streets had no drains, and garbage collected in heaps on them. Workers lived in dark, dirty shelters, with whole families crowding into one bedroom. Sickness was widespread. Epidemics of the deadly disease cholera regularly swept through the slums of Great Britain's industrial cities. In 1842, a British government study showed an average life span to be 17 years for working-class people in one large city, compared with 38 years in a nearby rural area.

Elizabeth Gaskell's *Mary Barton* (1848) is a work of fiction. But it presents a startlingly accurate portrayal of urban life experienced by many at the time. Gaskell provides a realistic description of the dank cellar dwelling of one family in a Manchester slum:

▼ Elizabeth Gaskell (1810–1865) was a British writer whose novels show a sympathy for the working class.



PRIMARY SOURCE A

You went down one step even from the foul area into the cellar in which a family of human beings lived. It was very dark inside. The window-panes many of them were broken and stuffed with rags . . . . the smell was so fetid [foul] as almost to knock the two men down. . . . they began to penetrate the thick darkness of the place, and to see three or four little children rolling on the damp, nay wet brick floor, through which the stagnant, filthy moisture of the street oozed up.

ELIZABETH GASKELL, *Mary Barton*

MAIN IDEA

Analyzing Primary Sources

A How does Gaskell indicate her sympathy for the working class in this passage?

But not everyone in urban areas lived miserably. Well-to-do merchants and factory owners often built luxurious homes in the suburbs.

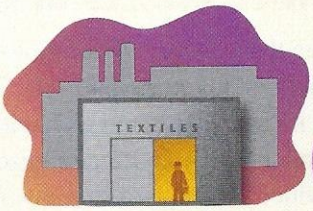


3 P.M. The children often became drowsy during the afternoon or evening hours. In order to keep them awake, adult overseers sometimes whipped the children.

6 P.M. There was no break allowed for an evening meal. Children again ate on the run.



9 P.M. William Cooper's day ended after an exhausting 16-hour shift at work.



11 P.M. Cooper's sister worked another two hours even though she had to be back at work at 5:00 the next morning.



Working Conditions To increase production, factory owners wanted to keep their machines running as many hours as possible. As a result, the average worker spent 14 hours a day at the job, 6 days a week. Work did not change with the seasons, as it did on the farm. Instead, work remained the same week after week, year after year.

Industry also posed new dangers for workers. Factories were seldom well lit or clean. Machines injured workers. A boiler might explode or a drive belt might catch an arm. And there was no government program to provide aid in case of injury. The most dangerous conditions of all were found in coal mines. Frequent accidents, damp conditions, and the constant breathing of coal dust made the average miner's life span ten years shorter than that of other workers. Many women and children were employed in the mining industry because they were the cheapest source of labor.

Class Tensions Grow

Though poverty gripped Britain's working classes, the Industrial Revolution created enormous amounts of wealth in the nation. Most of this new money belonged to factory owners, shippers, and merchants. These people were part of a growing **middle class**, a social class made up of skilled workers, professionals, businesspeople, and wealthy farmers.

The Middle Class The new middle class transformed the social structure of Great Britain. In the past, landowners and aristocrats had occupied the top position in British society. With most of the wealth, they wielded the social and political power. Now some factory owners, merchants, and bankers grew wealthier than the landowners and aristocrats. Yet important social distinctions divided the two wealthy classes. Landowners looked down on those who had made their fortunes in the "vulgar" business world. Not until late in the 1800s were rich entrepreneurs considered the social equals of the lords of the countryside.

Gradually, a larger middle class—neither rich nor poor—emerged. The upper middle class consisted of government employees, doctors, lawyers, and managers of factories, mines, and shops. The lower middle class included factory overseers and such skilled workers as toolmakers, mechanical drafters, and printers. These people enjoyed a comfortable standard of living. B

MAIN IDEA

Summarizing

B Describe the social classes in Britain.

The Working Class During the years 1800 to 1850, however, laborers, or the working class, saw little improvement in their living and working conditions. They watched their livelihoods disappear as machines replaced them. In frustration, some smashed the machines they thought were putting them out of work.

One group of such workers was called the Luddites. They were named after Ned Ludd. Ludd, probably a mythical English laborer, was said to have destroyed weaving machinery around 1779. The Luddites attacked whole factories in northern England beginning in 1811, destroying laborsaving machinery. Outside the factories, mobs of workers rioted, mainly because of poor living and working conditions.

Positive Effects of the Industrial Revolution

Despite the problems that followed industrialization, the Industrial Revolution had a number of positive effects. It created jobs for workers. It contributed to the wealth of the nation. It fostered technological progress and invention. It greatly increased the production of goods and raised the standard of living. Perhaps most important, it provided the hope of improvement in people's lives.

The Industrial Revolution produced a number of other benefits as well. These included healthier diets, better housing, and cheaper, mass-produced clothing. Because the Industrial Revolution created a demand for engineers as well as clerical and professional workers, it expanded educational opportunities.

The middle and upper classes prospered immediately from the Industrial Revolution. For the workers it took longer, but their lives gradually improved during the 1800s. Laborers eventually won higher wages, shorter hours, and better working conditions after they joined together to form labor unions.

Long-Term Effects The long-term effects of the Industrial Revolution are still evident. Most people today in industrialized countries can afford consumer goods that would have been considered luxuries 50 or 60 years ago. In addition, their living and working conditions are much improved over those of workers in the 19th century. Also, profits derived from industrialization produced tax revenues. These funds have allowed local, state, and federal governments to invest in urban improvements and raise the standard of living of most city dwellers.

The economic successes of the Industrial Revolution, and also the problems created by it, were clearly evident in one of Britain's new industrial cities in the 1800s—Manchester.

CASE STUDY: Manchester

The Mills of Manchester

Manchester's unique advantages made it a leading example of the new industrial city. This northern English town had ready access to waterpower. It also had available labor from the nearby countryside and an outlet to the sea at Liverpool.

"From this filthy sewer pure gold flows," wrote Alexis de Tocqueville (ah•lehk•SEE duh TOHK•vihl), the French writer, after he visited Manchester in 1835. Indeed, the industrial giant showed the best and worst of the Industrial Revolution. Manchester's rapid, unplanned growth made it an unhealthy place for the poor people who lived and worked there. But wealth flowed from its factories. It went first to the mill owners and the new middle class. Eventually, although not immediately, the working class saw their standard of living rise as well.

Manchester's business owners took pride in mastering each detail of the manufacturing process. They worked many hours and risked their own money. For their efforts, they were rewarded with high profits. Many erected gracious homes on the outskirts of town.

To provide the mill owners with high profits, workers labored under terrible conditions. Children as young as six joined their parents in the factories. There, for six days a week, they toiled from 6 A.M. to 7 or 8 P.M., with only half an hour for

Industrialization

Industrialization is the process of developing industries that use machines to produce goods. This process not only revolutionizes a country's economy, it also transforms social conditions and class structures.

Effects of Industrialization

Industrialization

Working Conditions
- Industry created many new jobs.
- Factories were dirty, unsafe, and dangerous.
- Factory bosses exercised harsh discipline.
- ▶ **Long-Term Effect** Workers won higher wages, shorter hours, better conditions.

Social Classes
- Factory workers were overworked and underpaid.
- Overseers and skilled workers rose to lower middle class. Factory owners and merchants formed upper middle class.
- Upper class resented those in middle class who became wealthier than they were.
- ▶ **Long-Term Effect** Standard of living generally rose.

Size of Cities
- Factories brought job seekers to cities.
- Urban areas doubled, tripled, or quadrupled in size.
- Many cities specialized in certain industries.
- ▶ **Long-Term Effect** Suburbs grew as people fled crowded cities.

Living Conditions
- Cities lacked sanitary codes or building controls.
- Housing, water, and social services were scarce.
- Epidemics swept through the city.
- ▶ **Long-Term Effect** Housing, diet, and clothing improved.

CALIFORNIA STANDARDS

10.3.3 Describe the growth of population, rural to urban migration, and growth of cities associated with the Industrial Revolution.



▼ This engraving shows urban growth and industrial pollution in Manchester.

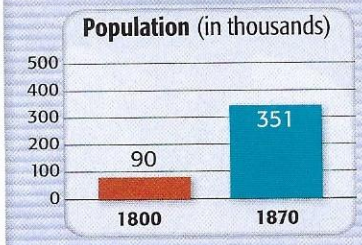
INTEGRATED TECHNOLOGY

RESEARCH LINKS For more on industrialization, go to **classzone.com**

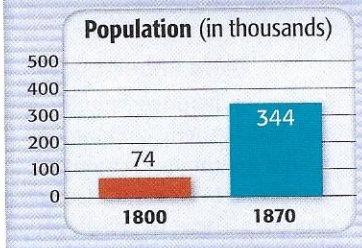
> DATA FILE

GROWTH OF CITIES

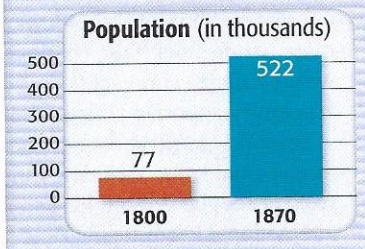
MANCHESTER



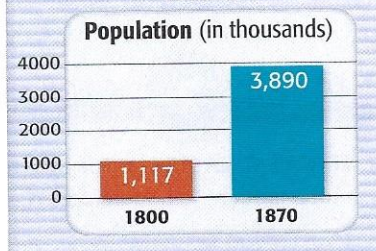
BIRMINGHAM



GLASGOW



LONDON



Source: European Historical Statistics, 1750–1975

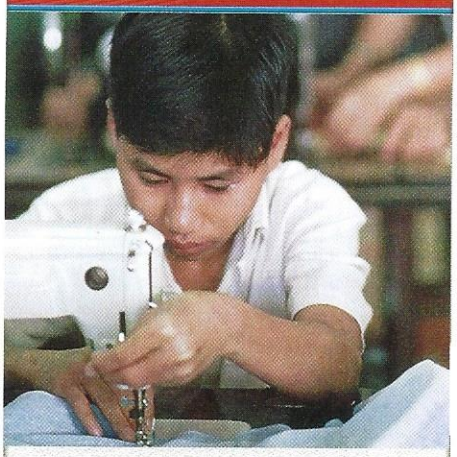
Connect *to* Today

1. **Recognizing Effects** What were some advantages and disadvantages of industrialization?

See Skillbuilder Handbook, page R6.

2. **Making Inferences** Many nations around the world today are trying to industrialize. What do you think they hope to gain from that process?

Connect to Today



Child Labor Today

To save on labor costs in the 1990s and 2000s, many corporations moved their manufacturing operations overseas to developing countries. There, in sweatshops, young children work long hours under wretched conditions. They are unprotected by child labor laws. For mere pennies per hour, children weave carpets, sort vegetables, or assemble expensive athletic shoes.

Several organizations are working to end child labor, including the Child Welfare League of America and the International Labor Rights Fund.

lunch and an hour for dinner. To keep the children awake, mill supervisors beat them. Tiny hands repaired broken threads in Manchester's spinning machines, replaced thread in the bobbins, or swept up cotton fluff. The dangerous machinery injured many children. The fluff filled their lungs and made them cough.

Until the first Factory Act passed in 1819, the British government exerted little control over child labor in Manchester and other factory cities. The act restricted working age and hours. For years after the act passed, young children still did heavy, dangerous work in Manchester's factories. C

MAIN IDEA

Drawing Conclusions

C Whose interests did child labor serve?

Putting so much industry into one place polluted the natural environment. The coal that powered factories and warmed houses blackened the air. Textile dyes and other wastes poisoned Manchester's Irwell River. An eyewitness observer wrote the following description of the river in 1862:

PRIMARY SOURCE

Steam boilers discharge into it their seething contents, and drains and sewers their fetid impurities; till at length it rolls on—here between tall dingy walls, there under precipices of red sandstone—considerably less a river than a flood of liquid manure.

HUGH MILLER, *"Old Red Sandstone"*

Like other new industrial cities of the 19th century, Manchester produced consumer goods and created wealth on a grand scale. Yet, it also stood as a reminder of the ills of rapid and unplanned industrialization.

As you will learn in Section 3, the industrialization that began in Great Britain spread to the United States and to continental Europe in the 1800s.

SECTION 2 ASSESSMENT

TERMS & NAMES **1.** For each term or name, write a sentence explaining its significance.

- urbanization
- middle class

USING YOUR NOTES

2. Which change brought about by industrialization had the greatest impact? (10.3.4)

I. Industrialization Changes Life
A.
B.
II. Class Tensions Grow

MAIN IDEAS

3. Why did people flock to British cities and towns during the Industrial Revolution? (10.3.3)

4. What social class expanded as a result of industrialization? (10.3.3)

5. What were some of the negative effects of the rapid growth of Manchester? (10.3.2)

CRITICAL THINKING & WRITING

6. SUMMARIZING How did industrialization contribute to city growth? (10.3.3)

7. EVALUATING How were class tensions affected by the Industrial Revolution? (10.3.4)

8. FORMING AND SUPPORTING OPINIONS The Industrial Revolution has been described as a mixed blessing. Do you agree or disagree? Support your answer with text references. (10.3.4)

9. WRITING ACTIVITY ECONOMICS As a factory owner during the Industrial Revolution, write a **letter** to a newspaper justifying working conditions in your factory. (Writing 2.5.d)

CONNECT TO TODAY **CREATING A COMPARISON CHART**

Make a **comparison chart** listing information on child labor in three developing nations—one each from Asia, Africa, and Latin America—and compare with data from the United States. (10.3.4)



3

Industrialization Spreads

MAIN IDEA	WHY IT MATTERS NOW	TERMS & NAMES
EMPIRE BUILDING The industrialization that began in Great Britain spread to other parts of the world.	The Industrial Revolution set the stage for the growth of modern cities and a global economy.	• stock • corporation

SETTING THE STAGE Great Britain's favorable geography and its financial systems, political stability, and natural resources sparked industrialization. British merchants built the world's first factories. When these factories prospered, more laborsaving machines and factories were built. Eventually, the Industrial Revolution that had begun in Britain spread both to the United States and to continental Europe. Countries that had conditions similar to those in Britain were ripe for industrialization.

CALIFORNIA STANDARDS

10.3.2 Examine how scientific and technological changes and new forms of energy brought about massive social, economic, and cultural change (e.g., the inventions and discoveries of James Watt, Eli Whitney, Henry Bessemer, Louis Pasteur, Thomas Edison).

10.3.3 Describe the growth of population, rural to urban migration, and growth of cities associated with the Industrial Revolution.

10.3.5 Understand the connections among natural resources, entrepreneurship, labor, and capital in an industrial economy.

10.4.1 Describe the rise of industrial economies and their link to imperialism and colonialism (e.g., the role played by national security and strategic advantage; moral issues raised by the search for national hegemony, Social Darwinism, and the missionary impulse; material issues such as land, resources, and technology).

Industrial Development in the United States

The United States possessed the same resources that allowed Britain to mechanize its industries. America had fast-flowing rivers, rich deposits of coal and iron ore, and a supply of laborers made up of farm workers and immigrants. During the War of 1812, Britain blockaded the United States, trying to keep it from engaging in international trade. This blockade forced the young country to use its own resources to develop independent industries. Those industries would manufacture the goods the United States could no longer import.

Industrialization in the United States As in Britain, industrialization in the United States began in the textile industry. Eager to keep the secrets of industrialization to itself, Britain had forbidden engineers, mechanics, and toolmakers to leave the country. In 1789, however, a young British mill worker named Samuel Slater emigrated to the United States. There, Slater built a spinning machine from memory and a partial design. The following year, Moses Brown opened the first factory in the United States to house Slater's machines in Pawtucket, Rhode Island. But the Pawtucket factory mass-produced only one part of finished cloth, the thread.

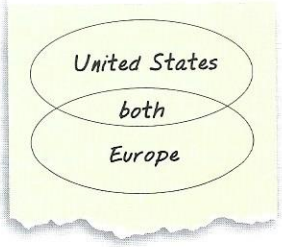
In 1813, Francis Cabot Lowell of Boston and four other investors revolutionized the American textile industry. They mechanized every stage in the manufacture of cloth. Their weaving factory in Waltham, Massachusetts, earned them enough money to fund a larger



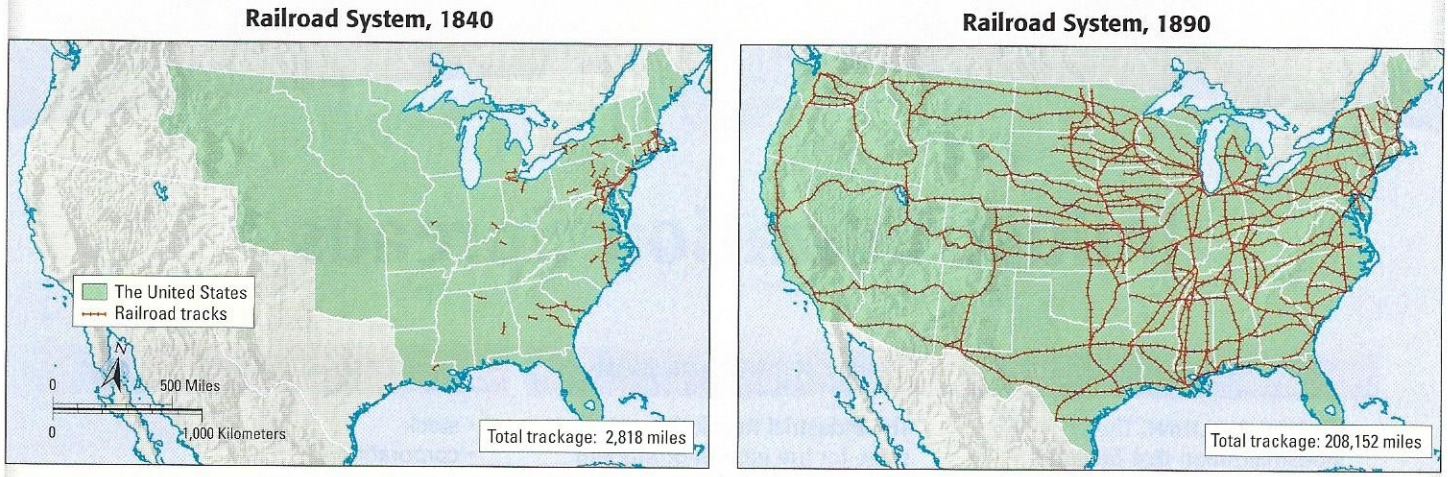
◀ Teenage mill girls at a Georgia cotton mill

TAKING NOTES

Comparing Use a Venn diagram to compare industrialization in the United States and in Europe.



The Growth of Railroads in the United States



GEOGRAPHY SKILLBUILDER: Interpreting Maps

1. **Region** *In what part of the country were the first railroads built? By 1890, what other part of the country was densely covered by railroad tracks?*
2. **Movement** *In what direction did the railroads help people move across the country?*

operation in another Massachusetts town. When Lowell died, the remaining partners named the town after him. By the late 1820s, Lowell, Massachusetts, had become a booming manufacturing center and a model for other such towns.

Thousands of young single women flocked from their rural homes to work as mill girls in factory towns. There, they could make higher wages and have some independence. However, to ensure proper behavior, they were watched closely inside and outside the factory by their employers. The mill girls toiled more than 12 hours a day, 6 days a week, for decent wages. For some, the mill job was an alternative to being a servant and was often the only other job open to them:

PRIMARY SOURCE A

Country girls were naturally independent, and the feeling that at this new work the few hours they had of everyday leisure were entirely their own was a satisfaction to them. They preferred it to going out as "hired help." It was like a young man's pleasure in entering upon business for himself. Girls had never tried that experiment before, and they liked it.

LUCY LARCOM, *A New England Girlhood*

MAIN IDEA

Analyzing Primary Sources

A Why did Lucy Larcom think mill work benefited young women?

Textiles led the way, but clothing manufacture and shoemaking also underwent mechanization. Especially in the Northeast, skilled workers and farmers had formerly worked at home. Now they labored in factories in towns and cities such as Waltham, Lowell, and Lawrence, Massachusetts.

Later Expansion of U.S. Industry The Northeast experienced much industrial growth in the early 1800s. Nonetheless, the United States remained primarily agricultural until the Civil War ended in 1865. During the last third of the 1800s, the country experienced a technological boom. As in Britain, a number of causes contributed to this boom. These included a wealth of natural resources, among them oil, coal, and iron; a burst of inventions, such as the electric light bulb and the telephone; and a swelling urban population that consumed the new manufactured goods.

Also, as in Britain, railroads played a major role in America's industrialization. Cities like Chicago and Minneapolis expanded rapidly during the late 1800s. This

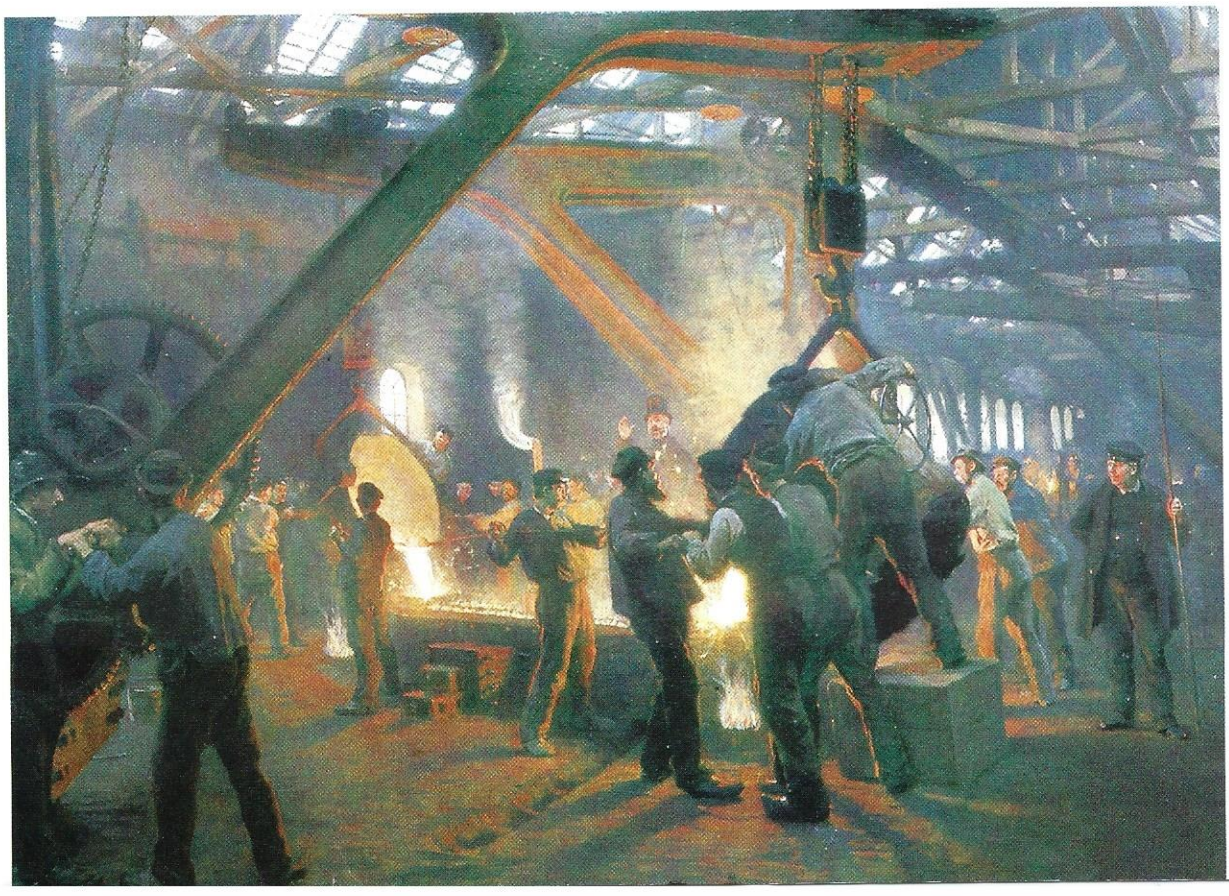
was due to their location along the nation's expanding railroad lines. Chicago's stockyards and Minneapolis's grain industries prospered by selling products to the rest of the country. Indeed, the railroads themselves proved to be a profitable business. By the end of the 1800s, a limited number of large, powerful companies controlled more than two-thirds of the nation's railroad tracks. Businesses of all kinds began to merge as the railroads had. Smaller companies joined together to form a larger one.

The Rise of Corporations Building large businesses like railroads required a great deal of money. To raise the money, entrepreneurs sold shares of **stock**, or certain rights of ownership. Thus people who bought stock became part owners of these businesses, which were called corporations. A **corporation** is a business owned by stockholders who share in its profits but are not personally responsible for its debts. Corporations were able to raise the large amounts of capital needed to invest in industrial equipment.

In the late 1800s, large corporations such as Standard Oil (founded by John D. Rockefeller) and the Carnegie Steel Company (founded by Andrew Carnegie) sprang up. They sought to control every aspect of their own industries in order to make big profits. Big business—the giant corporations that controlled entire industries—also made big profits by reducing the cost of producing goods. In the United States as elsewhere, workers earned low wages for laboring long hours, while stockholders earned high profits and corporate leaders made fortunes.

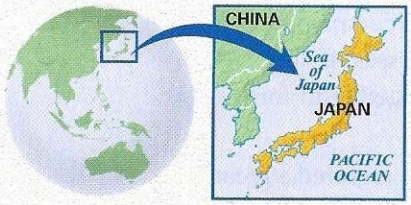
Continental Europe Industrializes

European businesses yearned to adopt the "British miracle," the result of Britain's profitable new methods of manufacturing goods. But the troubles sparked by the French Revolution and the Napoleonic wars between 1789 and 1815 had halted trade, interrupted communication, and caused inflation in some parts of the continent. European countries watched the gap widen between themselves and Britain. Even so, industrialization eventually reached continental Europe.



▼ Danish workers labor in a steel mill in this 1885 painting by Peter Severin Kroyer.

Global Impact



Industrialization in Japan

With the beginning of the Meiji era in Japan in 1868, the central government began an ambitious program to transform the country into an industrialized state. It financed textile mills, coal mines, shipyards, and cement and other factories. It also asked private companies to invest in industry.

Some companies had been in business since the 1600s. But new companies sprang up too. Among them was the Mitsubishi company, founded in 1870 and still in business.

The industrializing of Japan produced sustained economic growth for the country. But it also led to strengthening the military and to Japanese imperialism in Asia.

Beginnings in Belgium Belgium led Europe in adopting Britain's new technology. It had rich deposits of iron ore and coal as well as fine waterways for transportation. As in the United States, British skilled workers played a key role in industrializing Belgium.

Samuel Slater had smuggled the design of a spinning machine to the United States. Much like him, a Lancashire carpenter named William Cockerill illegally made his way to Belgium in 1799. He carried secret plans for building spinning machinery. His son John eventually built an enormous industrial enterprise in eastern Belgium. It produced a variety of mechanical equipment, including steam engines and railway locomotives. Carrying the latest British advances, more British workers came to work with Cockerill. Several then founded their own companies in Europe.

Germany Industrializes Germany was politically divided in the early 1800s. Economic isolation and scattered resources hampered countrywide industrialization. Instead, pockets of industrialization appeared, as in the coal-rich Ruhr Valley of west central Germany. Beginning around 1835, Germany began to copy the British model. Germany imported British equipment and engineers. German manufacturers also sent their children to England to learn industrial management. (B)

MAIN IDEA

Analyzing Causes

(B) What factors slowed industrialization in Germany?

Most important, Germany built railroads that linked its growing manufacturing cities, such as Frankfurt, with the Ruhr Valley's coal and iron ore deposits. In 1858, a German economist wrote, "Railroads and machine shops, coal mines and iron foundries, spinneries and rolling mills seem to spring up out of the ground, and smokestacks sprout from the earth like mushrooms." Germany's economic strength spurred its ability to develop as a military power. By the late 1800s, a unified, imperial Germany had become both an industrial and a military giant.

Expansion Elsewhere in Europe In the rest of Europe, as in Germany, industrialization during the early 1800s proceeded by region rather than by country. Even in countries where agriculture dominated, pockets of industrialization arose. For example, Bohemia developed a spinning industry. Spain's Catalonia processed more cotton than Belgium. Northern Italy mechanized its textile production, specializing in silk spinning. Serf labor ran factories in regions around Moscow and St. Petersburg.

In France, sustained industrial growth occurred after 1830. French industrialization was more measured and controlled than in other countries because the agricultural economy remained strong. As a result, France avoided the great social and economic problems caused by industrialization. A thriving national market for new French products was created after 1850, when the government began railroad construction.

For a variety of reasons, many European countries did not industrialize. In some nations, the social structure delayed the adoption of new methods of production. The accidents of geography held back others. In Austria-Hungary and Spain, transportation posed great obstacles. Austria-Hungary's mountains defeated railroad builders. Spain lacked both good roads and waterways for canals.

The Impact of Industrialization

The Industrial Revolution shifted the world balance of power. It increased competition between industrialized nations and poverty in less-developed nations.

Rise of Global Inequality Industrialization widened the wealth gap between industrialized and nonindustrialized countries, even while it strengthened their economic ties. To keep factories running and workers fed, industrialized countries required a steady supply of raw materials from less-developed lands. In turn, industrialized countries viewed poor countries as markets for their manufactured products.

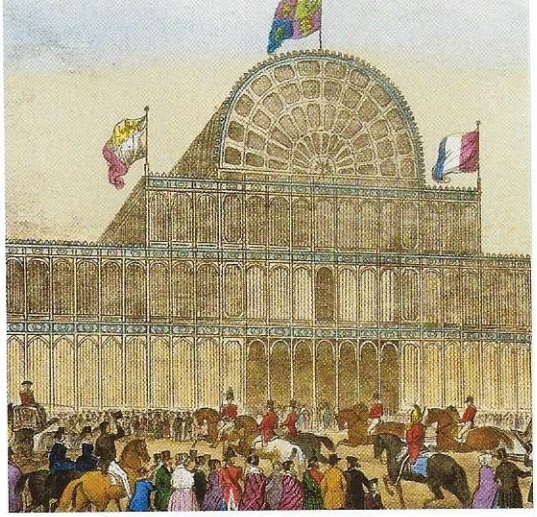
Britain led in exploiting its overseas colonies for resources and markets. Soon other European countries, the United States, Russia, and Japan followed Britain's lead, seizing colonies for their economic resources. Imperialism, the policy of extending one country's rule over many other lands, gave even more power and wealth to these already wealthy nations. Imperialism was born out of the cycle of industrialization, the need for resources to supply the factories of Europe, and the development of new markets around the world. (See Chapter 11.) C

MAIN IDEA

Clarifying

C Why did imperialism grow out of industrialization?

Transformation of Society Between 1700 and 1900, revolutions in agriculture, production, transportation, and communication changed the lives of people in Western Europe and the United States. Industrialization gave Europe tremendous economic power. In contrast, the economies of Asia and Africa were still based on agriculture and small workshops. Industrialization revolutionized every aspect of society, from daily life to life expectancy. Despite the hardships early urban workers suffered, population, health, and wealth eventually rose dramatically in all industrialized countries. The development of a middle class created great opportunities for education and democratic participation. Greater democratic participation, in turn, fueled a powerful movement for social reform.



▲ The Crystal Palace Exposition in London in 1851 (shown above) celebrated the "works of industry of all nations."

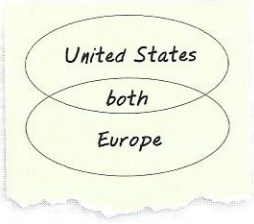
SECTION 3 ASSESSMENT

TERMS & NAMES 1. For each term or name, write a sentence explaining its significance.

- stock
- corporation

USING YOUR NOTES

2. Which development had the most impact in the United States? in continental Europe? (10.3.2)



MAIN IDEAS

3. What early industries mechanized in the United States? (10.3.2)
4. Why did Belgium lead Europe in adopting industrialization? (10.3.5)
5. How did the Industrial Revolution shift the world balance of power? (10.3.2)

CRITICAL THINKING & WRITING

6. **RECOGNIZING BIAS** Go back to the quote from Lucy Larcom on page 296. Do you think her feelings about working in the mill are typical? Why or why not? (10.3.2)
7. **MAKING INFERENCES** Why was Britain unable to keep industrial secrets away from other nations? (10.3.5)
8. **FORMING AND SUPPORTING OPINIONS** What was the most significant effect of the Industrial Revolution? (10.3.3)
9. **WRITING ACTIVITY** EMPIRE BUILDING Draw a **political cartoon** that could have been used by the British government to show their sense of superiority over nonindustrialized nations they planned to colonize. (Writing 2.2.a)

INTEGRATED TECHNOLOGY **INTERNET ACTIVITY**

Use the Internet to research the economy of a less-developed nation in either Asia, Africa, or South America. Create a **database** of economic statistics for that country. (10.3.5)

INTERNET KEYWORD
country profiles



4

Reforming the Industrial World

MAIN IDEA	WHY IT MATTERS NOW	TERMS & NAMES
ECONOMICS The Industrial Revolution led to economic, social, and political reforms.	Many modern social welfare programs developed during this period of reform.	• laissez faire • Adam Smith • capitalism • utilitarianism • socialism • Karl Marx • communism • union • strike

CALIFORNIA STANDARDS

10.3.2 Examine how scientific and technological changes and new forms of energy brought about massive social, economic, and cultural change (e.g., the inventions and discoveries of James Watt, Eli Whitney, Henry Bessemer, Louis Pasteur, Thomas Edison).

10.3.4 Trace the evolution of work and labor, including the demise of the slave trade and the effects of immigration, mining and manufacturing, division of labor, and the union movement.

10.3.5 Understand the connections among natural resources, entrepreneurship, labor, and capital in an industrial economy.

10.3.6 Analyze the emergence of capitalism as a dominant economic pattern and the responses to it, including Utopianism, Social Democracy, Socialism, and Communism.

CST 4 Students relate current events to the physical and human characteristics of places and regions.

HI 6 Students conduct cost-benefit analyses and apply basic economic indicators to analyze the aggregate economic behavior of the U.S. economy.

TAKING NOTES

Summarizing Use a chart to summarize the characteristics of capitalism and socialism.

Capitalism	Socialism
1.	1.
2.	2.
3.	3.

SETTING THE STAGE In industrialized countries in the 19th century, the Industrial Revolution opened a wide gap between the rich and the poor. Business leaders believed that governments should stay out of business and economic affairs. Reformers, however, felt that governments needed to play an active role to improve conditions for the poor. Workers also demanded more rights and protection. They formed labor unions to increase their influence.

The Philosophers of Industrialization

The term **laissez faire** (LEHS•ay•FAIR) refers to the economic policy of letting owners of industry and business set working conditions without interference. This policy favors a free market unregulated by the government. The term is French for "let do," and by extension, "let people do as they please."

Laissez-faire Economics Laissez-faire economics stemmed from French economic philosophers of the Enlightenment. They criticized the idea that nations grow wealthy by placing heavy tariffs on foreign goods. In fact, they argued, government regulations only interfered with the production of wealth. These philosophers believed that if government allowed free trade—the flow of commerce in the world market without government regulation—the economy would prosper.

Adam Smith, a professor at the University of Glasgow, Scotland, defended the idea of a free economy, or free markets, in his 1776 book *The Wealth of Nations*. According to Smith, economic liberty guaranteed economic progress. As a result, government should not interfere. Smith's arguments rested on what he called the three natural laws of economics:

- the law of self-interest—People work for their own good.
- the law of competition—Competition forces people to make a better product.
- the law of supply and demand—Enough goods would be produced at the lowest possible price to meet demand in a market economy.

The Economists of Capitalism Smith's basic ideas were supported by British economists Thomas Malthus and David Ricardo. Like Smith, they believed that natural laws governed economic life. Their important ideas were the foundation of laissez-faire capitalism. **Capitalism** is an economic system in which the factors of production are privately owned and money is invested in business ventures to make a profit. These ideas also helped bring about the Industrial Revolution.

In *An Essay on the Principle of Population*, written in 1798, Thomas Malthus argued that population tended to increase more rapidly than the food supply. Without wars and epidemics to kill off the extra people, most were destined to be poor and miserable. The predictions of Malthus seemed to be coming true in the 1840s.

David Ricardo, a wealthy stockbroker, took Malthus's theory one step further in his book, *Principles of Political Economy and Taxation* (1817). Like Malthus, Ricardo believed that a permanent underclass would always be poor. In a market system, if there are many workers and abundant resources, then labor and resources are cheap. If there are few workers and scarce resources, then they are expensive. Ricardo believed that wages would be forced down as population increased.

MAIN IDEA

Summarizing

A What did Malthus and Ricardo say about the effects of population growth?

Laissez-faire thinkers such as Smith, Malthus, and Ricardo opposed government efforts to help poor workers. They thought that creating minimum wage laws and better working conditions would upset the free market system, lower profits, and undermine the production of wealth in society. A

The Rise of Socialism

In contrast to laissez-faire philosophy, which advised governments to leave business alone, other theorists believed that governments should intervene. These thinkers believed that wealthy people or the government must take action to improve people's lives. The French writer Alexis de Tocqueville gave a warning:

PRIMARY SOURCE

Consider what is happening among the working classes. . . . Do you not see spreading among them, little by little, opinions and ideas that aim not to overturn such and such a ministry, or such laws, or such a government, but society itself, to shake it to the foundations upon which it now rests?

ALEXIS DE TOCQUEVILLE, 1848 speech

Utilitarianism English philosopher Jeremy Bentham modified the ideas of Adam Smith. In the late 1700s, Bentham introduced the philosoophy of **utilitarianism**. Bentham wrote his most influential works in the late 1700s. According to Bentham's theory, people should judge ideas, institutions, and actions on the basis of their utility, or usefulness. He argued that the government should try to promote the greatest good for the greatest number of people. A government policy was only useful if it promoted this goal. Bentham believed that in general the individual should be free to pursue his or her own advantage without interference from the state.

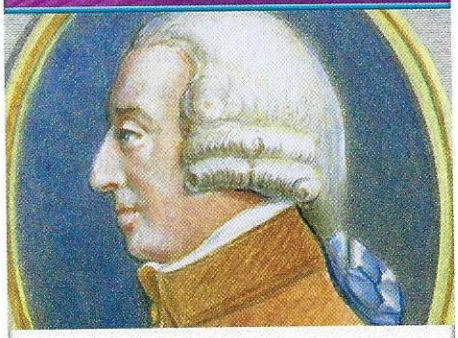
John Stuart Mill, a philosopher and economist, led the utilitarian movement in the 1800s. Mill came to question unregulated capitalism. He believed it was wrong that workers should lead deprived lives that sometimes bordered on starvation. Mill wished to help ordinary working people with policies that would lead to a more equal division of profits. He also favored a cooperative system of agriculture and women's rights, including the right to vote. Mill called for the government to do away with great differences in wealth. Utilitarians also pushed for reforms in the legal and prison systems and in education. B

MAIN IDEA

Clarifying

B How did Mill want to change the economic system?

History Makers



Adam Smith
1723–1790

In his book *The Wealth of Nations*, Smith argued that if individuals freely followed their own self-interest, the world would be an orderly and progressive place. Social harmony would result without any government direction, "as if by an invisible hand."

Smith applied an invisible hand of his own. After his death, people discovered that he had secretly donated large sums of his income to charities.

INTEGRATED TECHNOLOGY

RESEARCH LINKS For more on Adam Smith, go to **classzone.com**

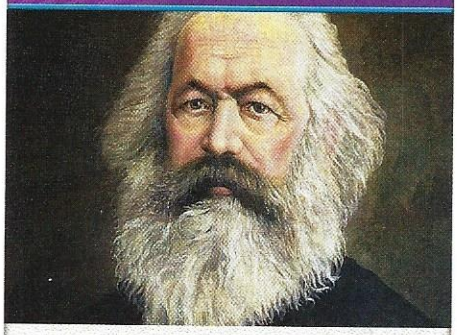
Utopian Ideas Other reformers took an even more active approach. Shocked by the misery and poverty of the working class, a British factory owner named Robert Owen improved working conditions for his employees. Near his cotton mill in New Lanark, Scotland, Owen built houses, which he rented at low rates. He prohibited children under ten from working in the mills and provided free schooling.

Then, in 1824, he traveled to the United States. He founded a cooperative community called New Harmony in Indiana, in 1825. He intended this community to be a utopia, or perfect living place. New Harmony lasted only three years but inspired the founding of other communities.

Socialism French reformers such as Charles Fourier (FUR•ee•AY), Saint-Simon (san see•MOHN), and others sought to offset the ill effects of industrialization with a new economic system called socialism. In **socialism**, the factors of production are owned by the public and operate for the welfare of all.

Socialism grew out of an optimistic view of human nature, a belief in progress, and a concern for social justice. Socialists argued that the government should plan the economy rather than depend on free-market capitalism to do the job. They argued that government control of factories, mines, railroads, and other key industries would end poverty and promote equality. Public ownership, they believed, would help workers, who were at the mercy of their employers. Some socialists—such as Louis Blanc—advocated change through extension of the right to vote.

History Makers



Karl Marx
1818–1883

Karl Marx studied philosophy at the University of Berlin before he turned to journalism and economics. In 1849, Marx joined the flood of radicals who fled continental Europe for England. He had declared in *The Communist Manifesto* that "the working men have no country."

Marx's theories of socialism and the inevitable revolt of the working class made him little money. He earned a meager living as a journalist. His wealthy coauthor and fellow German, Friedrich Engels, gave Marx financial aid.

INTEGRATED TECHNOLOGY

RESEARCH LINKS For more on Karl Marx, go to **classzone.com**

Marxism: Radical Socialism

The writings of a German journalist named **Karl Marx** introduced the world to a radical type of socialism called Marxism. Marx and Friedrich Engels, a German whose father owned a textile mill in Manchester, outlined their ideas in a 23-page pamphlet called *The Communist Manifesto*.

The Communist Manifesto In their manifesto, Marx and Engels argued that human societies have always been divided into warring classes. In their own time, these were the middle class "haves" or employers, called the bourgeoisie (BUR•zhwah•ZEE), and the "have-nots" or workers, called the proletariat (PROH•lih•TAIR•ee•iht). While the wealthy controlled the means of producing goods, the poor performed backbreaking labor under terrible conditions. This situation resulted in conflict:

PRIMARY SOURCE

Freeman and slave, patrician and plebeian, lord and serf, guild-master and journeyman, in a word, oppressor and oppressed, stood in constant opposition to one another, carried on an uninterrupted, now hidden, now open fight, a fight that each time ended, either in a revolutionary reconstitution of society at large, or in the common ruin of the contending classes.

KARL MARX and **FRIEDRICH ENGELS**, *The Communist Manifesto* (1848)

According to Marx and Engels, the Industrial Revolution had enriched the wealthy and impoverished the poor. The two writers predicted that the workers would overthrow the owners: "The proletarians have nothing to lose but their chains. They have a world to win. Workingmen of all countries, unite." C

MAIN IDEA

Summarizing

C What were the ideas of Marx and Engels concerning relations between the owners and the working class?

Capitalism vs. Socialism

The economic system called capitalism developed gradually over centuries, beginning in the late Middle Ages. Because of the ways industrialization changed society, some people began to think that capitalism led to certain problems, such as the abuse of workers. They responded by developing a new system of economic ideas called socialism.

Capitalism	Socialism
• Individuals and businesses own property and the means of production.	• The community or the state should own property and the means of production.
• Progress results when individuals follow their own self-interest.	• Progress results when a community of producers cooperate for the good of all.
• Businesses follow their own self-interest by competing for the consumer's money. Each business tries to produce goods or services that are better and less expensive than those of competitors.	• Socialists believe that capitalist employers take advantage of workers. The community or state must act to protect workers.
• Consumers compete to buy the best goods at the lowest prices. This competition shapes the market by affecting what businesses are able to sell.	• Capitalism creates unequal distribution of wealth and material goods. A better system is to distribute goods according to each person's need.
• Government should not interfere in the economy because competition creates efficiency in business.	• An unequal distribution of wealth and material goods is unfair. A better system is to distribute goods according to each person's need.

SKILLBUILDER: Interpreting Charts

1. **Developing Historical Perspective** *Consider the following people from 19th-century Britain: factory worker, shop owner, factory owner, unemployed artisan. Which of them would be most likely to prefer capitalism and which would prefer socialism? Why?*
2. **Forming and Supporting Opinions** *Which system of economic ideas seems most widespread today? Support your opinion.*

The Future According to Marx Marx believed that the capitalist system, which produced the Industrial Revolution, would eventually destroy itself in the following way. Factories would drive small artisans out of business, leaving a small number of manufacturers to control all the wealth. The large proletariat would revolt, seize the factories and mills from the capitalists, and produce what society needed. Workers, sharing in the profits, would bring about economic equality for all people. The workers would control the government in a "dictatorship of the proletariat." After a period of cooperative living and education, the state or government would wither away as a classless society developed.

Marx called this final phase pure communism. Marx described **communism** as a form of complete socialism in which the means of production—all land, mines, factories, railroads, and businesses—would be owned by the people. Private property would in effect cease to exist. All goods and services would be shared equally.

Published in 1848, *The Communist Manifesto* produced few short-term results. Though widespread revolts shook Europe during 1848 and 1849, Europe's leaders eventually put down the uprisings. Only after the turn of the century did the fiery Marxist pamphlet produce explosive results. In the 1900s, Marxism inspired revolutionaries such as Russia's Lenin, China's Mao Zedong, and Cuba's Fidel Castro. These leaders adapted Marx's beliefs to their own specific situations and needs.

Connect to Today



Communism Today

Communism expanded to all parts of the world during the Cold War that followed the end of World War II. (See map on page 529.) At the peak of Communist expansion in the 1980s, about 20 nations were Communist-controlled, including two of the world's largest—China and the Soviet Union. However, dissatisfaction with the theories of Karl Marx had been developing.

Eventually, most Communist governments were replaced. Today, there are only five Communist countries—China, North Korea, Vietnam, and Laos in Asia and Cuba in the Caribbean. (See map above.)

In *The Communist Manifesto*, Marx and Engels stated their belief that economic forces alone dominated society. Time has shown, however, that religion, nationalism, ethnic loyalties, and a desire for democratic reforms may be as strong influences on history as economic forces. In addition, the gap between the rich and the poor within the industrialized countries failed to widen in the way that Marx and Engels predicted, mostly because of the various reforms enacted by governments.

Labor Unions and Reform Laws

Factory workers faced long hours, dirty and dangerous working conditions, and the threat of being laid off. By the 1800s, working people became more active in politics. To press for reforms, workers joined together in voluntary labor associations called **unions**.

Unionization A union spoke for all the workers in a particular trade. Unions engaged in collective bargaining, negotiations between workers and their employers. They bargained for better working conditions and higher pay. If factory owners refused these demands, union members could **strike**, or refuse to work.

Skilled workers led the way in forming unions because their special skills gave them extra bargaining power. Management would have trouble replacing such skilled workers as carpenters, printers, and spinners. Thus, the earliest unions helped the lower middle class more than they helped the poorest workers.

The union movement underwent slow, painful growth in both Great Britain and the United States. For years, the British government denied workers the right to form unions. The government saw unions as a threat to social order and stability. Indeed, the Combination Acts of 1799 and 1800 outlawed unions and strikes. Ignoring the threat of jail or job loss, factory workers joined unions anyway. Parliament finally repealed the Combination Acts in 1824. After 1825, the British government unhappily tolerated unions.

British unions had shared goals of raising wages for their members and improving working conditions. By 1875, British trade unions had won the right to strike and picket peacefully. They had also built up a membership of about 1 million people.

In the United States, skilled workers had belonged to unions since the early 1800s. In 1886, several unions joined together to form the organization that would become the American Federation of Labor (AFL). A series of successful strikes won AFL members higher wages and shorter hours.

Reform Laws Eventually, reformers and unions forced political leaders to look into the abuses caused by industrialization. In both Great Britain and the United States, new laws reformed some of the worst abuses of industrialization. In the 1820s and 1830s, for example, Parliament began investigating child labor and working conditions in factories and mines. As a result of its findings, Parliament passed the Factory Act of 1833. The new law made it illegal to hire children under 9 years old. Children from the ages of 9 to 12 could not work more than 8 hours a day. Young people from 13 to 17 could not work more than 12 hours. In 1842, the Mines Act prevented women and children from working underground.

MAIN IDEA

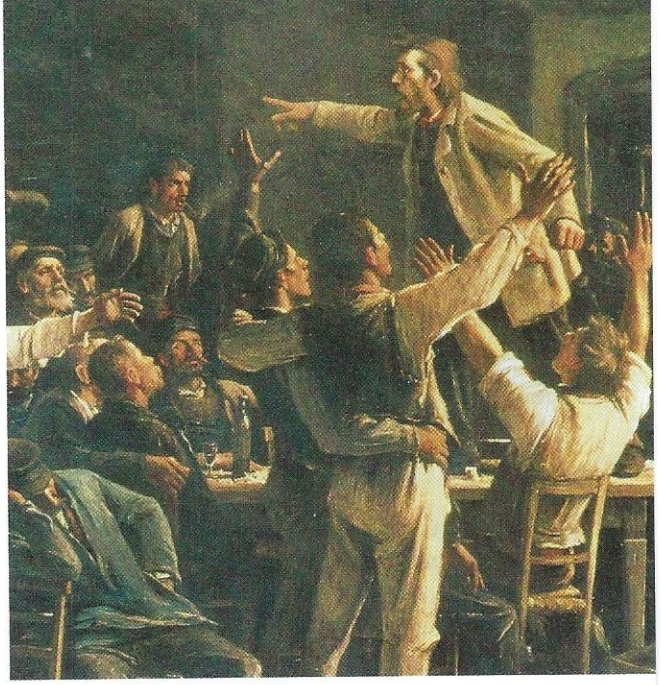
D Summarizing

What were some of the important reform bills passed in Britain during this period?

In 1847, the Parliament passed a bill that helped working women as well as their children. The Ten Hours Act of 1847 limited the workday to ten hours for women and children who worked in factories. D

Reformers in the United States also passed laws to protect child workers. In 1904, a group of progressive reformers organized the National Child Labor Committee to end child labor. Arguing that child labor lowered wages for all workers, union members joined the reformers. Together they pressured national and state politicians to ban child labor and set maximum working hours.

In 1919, the U.S. Supreme Court objected to a federal child labor law, ruling that it interfered with states' rights to regulate labor. However, individual states were allowed to limit the working hours of women and, later, of men.



▲ Hungarian workers meet to plan their strategy before a strike.

The Reform Movement Spreads

Almost from the beginning, reform movements rose in response to the negative impact of industrialization. These reforms included improving the workplace and extending the right to vote to working-class men. The same impulse toward reform, along with the ideals of the French Revolution, also helped to end slavery and promote new rights for women and children.

The Abolition of Slavery William Wilberforce, a highly religious man, was a member of Parliament who led the fight for abolition—the end of the slave trade and slavery in the British Empire. Parliament passed a bill to end the slave trade in the British West Indies in 1807. After he retired from Parliament in 1825, Wilberforce continued his fight to free the slaves. Britain finally abolished slavery in its empire in 1833.

British antislavery activists had mixed motives. Some, such as the abolitionist Wilberforce, were morally against slavery. Others viewed slave labor as an economic threat. Furthermore, a new class of industrialists developed who supported cheap labor rather than slave labor. They soon gained power in Parliament.

In the United States the movement to fulfill the promise of the Declaration of Independence by ending slavery grew in the early 1800s. The enslavement of African people finally ended in the United States when the Union won the Civil War in 1865. Then, enslavement persisted in the Americas only in Puerto Rico, Cuba, and Brazil. In Puerto Rico, slavery was ended in 1873. Spain finally abolished slavery in its Cuban colony in 1886. Not until 1888 did Brazil's huge enslaved population win freedom.

The Fight for Women's Rights The Industrial Revolution proved a mixed blessing for women. On the one hand, factory work offered higher wages than work done at home. Women spinners in Manchester, for example, earned much more money than women who stayed home to spin cotton thread. On the other hand, women factory workers usually made only one-third as much money as men did.

Women led reform movements to address this and other pressing social issues. During the mid-1800s, for example, women formed unions in the trades where they dominated. In Britain, some women served as safety inspectors in factories where other women worked. In the United States, college-educated women like Jane Addams ran settlement houses. These community centers served the poor residents of slum neighborhoods.

History Makers



Jane Addams
1860–1935

After graduating from college, Jane Addams wondered what to do with her life.

> *I gradually became convinced that it would be a good thing to rent a house in a part of the city where many primitive and actual needs are found, in which young women who had been given over too exclusively to study, might . . . learn of life from life itself.*

Addams and her friend Ellen Starr set up Hull House in a working-class district in Chicago. Eventually the facilities included a nursery, a gym, a kitchen, and a boarding house for working women. Hull House not only served the immigrant population of the neighborhood, it also trained social workers.

In both the United States and Britain, women who had rallied for the abolition of slavery began to wonder why their own rights should be denied on the basis of gender. The movement for women's rights began in the United States as early as 1848. Women activists around the world joined to found the International Council for Women in 1888. Delegates and observers from 27 countries attended the council's 1899 meeting. (E)

MAIN IDEA

(E) Making Inferences
Why might women abolitionists have headed the movement for women's rights?

Reforms Spread to Many Areas of Life In the United States and Western Europe, reformers tried to correct the problems troubling the newly industrialized nations. Public education and prison reform ranked high on the reformers' lists.

One of the most prominent U.S. reformers, Horace Mann of Massachusetts, favored free public education for all children. Mann, who spent his own childhood working at hard labor, warned, "If we do not prepare children to become good citizens . . . if we do not enrich their minds with knowledge, then our republic must go down to destruction." By the 1850s, many states were starting public school systems. In Western Europe, free public schooling became available in the late 1800s.

In 1831, French writer Alexis de Tocqueville had contrasted the brutal conditions in American prisons to the "extended liberty" of American society. Those who sought to reform prisons emphasized the goal of providing prisoners with the means to lead to useful lives upon release.

During the 1800s, democracy grew in industrialized countries even as foreign expansion increased. The industrialized democracies faced new challenges both at home and abroad. You will learn about these challenges in Chapter 10.

SECTION 4 ASSESSMENT

TERMS & NAMES 1. For each term or name, write a sentence explaining its significance.

• laissez faire • Adam Smith • capitalism • utilitarianism • socialism • Karl Marx • communism • union • strike

USING YOUR NOTES

2. What characteristics do capitalism and socialism share? (10.3.6)

Capitalism	Socialism
1.	1.
2.	2.
3.	3.

MAIN IDEAS

3. What were Adam Smith's three natural laws of economics? (10.3.6)
4. What kind of society did early socialists want? (10.3.6)
5. Why did workers join together in unions? (10.3.4)

CRITICAL THINKING & WRITING

6. **IDENTIFYING PROBLEMS** What were the main problems faced by the unions during the 1800s and how did they overcome them? (10.3.4)
7. **DRAWING CONCLUSIONS** Why do you think that Marx's "dictatorship of the proletariat" did not happen? (10.3.6)
8. **MAKING INFERENCES** Why did the labor reform movement spread to other areas of life? (10.3.4)
9. **WRITING ACTIVITY** ECONOMICS Write a two-paragraph **persuasive essay** on how important economic forces are in society. Support your opinion using evidence from this and previous chapters. (Writing 2.4.c)

CONNECT TO TODAY **PREPARING AN ECONOMIC REPORT**

Research a present-day corporation. Prepare an **economic report** that includes the corporation's structure, products or services, number of employees, and any other relevant economic information you are able to find. (10.3.5)

INTERACTIVE

Industrialization

Industrialization eventually raised the standard of living for many people in Europe and North America in the 1800s. Yet the process also brought suffering to countless workers who crowded into filthy cities to toil for starvation wages. The following excerpts reveal a variety of perspectives on this major historical event.

CALIFORNIA STANDARDS

10.3.2 Examine how scientific and technological changes and new forms of energy brought about massive social, economic, and cultural change (e.g., the inventions and discoveries of James Watt, Eli Whitney, Henry Bessemer, Louis Pasteur, Thomas Edison).

HI 3 Students interpret past events and issues within the context in which an event unfolded rather than solely in terms of present-day norms and values.

A PRIMARY SOURCE

Mary Paul

Mary Paul worked in a textile factory in Lowell, Massachusetts. In an 1846 letter to her father in New Hampshire, the 16-year-old expressed her satisfaction with her situation at Lowell.

I am at work in a spinning room tending four sides of warp which is one girl's work. The overseer tells me that he never had a girl get along better than I do. . . . I have a very good boarding place, have enough to eat. . . . The girls are all kind and obliging. . . . I think that the factory is the best place for me and if any girl wants employment, I advise them to come to Lowell.

B PRIMARY SOURCE

Andrew Carnegie

In his autobiography, published in 1920, the multimillionaire industrialist views with optimism the growth of American industry.

One great advantage which America will have in competing in the markets of the world is that her manufacturers will have the best home market. Upon this they can depend for a return upon capital, and the surplus product can be exported with advantage, even when the prices received for it do no more than cover actual cost, provided the exports be charged with their proportion of all expenses. The nation that has the best home market, especially if products are standardized, as ours are, can soon outsell the foreign producer.

C PRIMARY SOURCE

Friedrich Engels

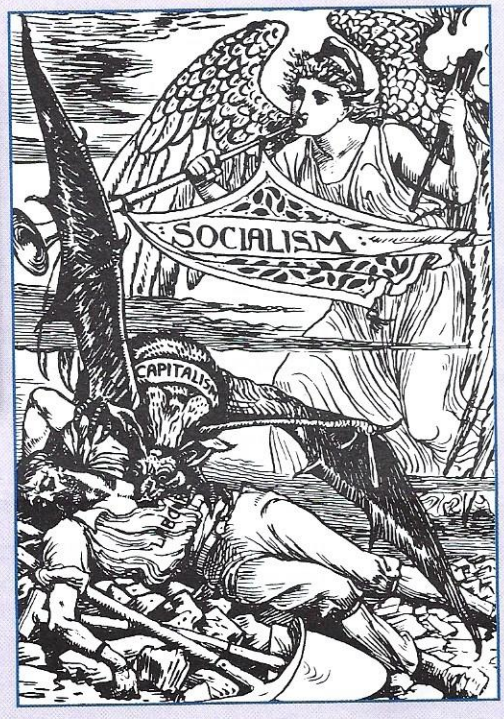
Friedrich Engels, who coauthored *The Communist Manifesto* and also managed a textile factory in Manchester, England, spent his nights wandering the city's slums.

Nobody troubles about the poor as they struggle helplessly in the whirlpool of modern industrial life. The working man may be lucky enough to find employment, if by his labor he can enrich some member of the middle classes. But his wages are so low that they hardly keep body and soul together. If he cannot find work, he can steal, unless he is afraid of the police; or he can go hungry and then the police will see to it that he will die of hunger in such a way as not to disturb the equanimity of the middle classes.

D PRIMARY SOURCE

Walter Crane

This political cartoon was published in *Cartoons for the Cause* in Britain in 1886. It shows the vampire bat of Capitalism attacking a laborer. Socialism is pictured as an angel who is coming to the rescue.



Document-Based QUESTIONS

1. Why would Andrew Carnegie (Source B) and Friedrich Engels (Source C) disagree about the effects of industrialization?
2. What might be reasons for 16-year-old Mary Paul's (Source A) satisfaction with her job and life in Lowell?
3. Why might the political cartoon by Walter Crane (Source D) be useful in getting workers to rally to the cause of socialism?

Chapter 9 Assessment

VISUAL SUMMARY

The Industrial Revolution



Economic Effects

- New inventions and development of factories
- Rapidly growing industry in the 1800s
- Increased production and higher demand for raw materials
- Growth of worldwide trade
- Population explosion and expanding labor force
- Exploitation of mineral resources
- Highly developed banking and investment system
- Advances in transportation, agriculture, and communication



Social Effects

- Increase in population of cities
- Lack of city planning
- Loss of family stability
- Expansion of middle class
- Harsh conditions for laborers, including children
- Workers' progress versus laissez-faire economic attitudes
- Improved standard of living
- Creation of new jobs
- Encouragement of technological progress



Political Effects

- Child labor laws to end abuses
- Reformers urging equal distribution of wealth
- Trade unions formed
- Social reform movements, such as utilitarianism, utopianism, socialism, and Marxism
- Reform bills in Parliament and Congress

TERMS & NAMES

For each term or name below, briefly explain its connection to the Industrial Revolution.

1. Industrial Revolution
2. enclosure
3. factory
4. urbanization
5. middle class
6. corporation
7. laissez faire
8. socialism
9. Karl Marx
10. union

MAIN IDEAS

The Beginnings of Industrialization Section 1 (pages 283–288)

11. What were the four natural resources needed for British industrialization? (10.3.1)
12. How did the enclosure movement change agriculture in England? (10.3.2)
13. What were two important inventions created during the Industrial Revolution? Describe their impact. (10.3.5)

Case Study: Industrialization Section 2 (pages 289–294)

14. Describe living conditions in Britain during industrialization. (10.3.2)
15. How did the new middle class transform the social structure of Great Britain during industrialization? (10.3.4)
16. How did industrialization affect Manchester's natural environment? (10.3.3)

Industrialization Spreads Section 3 (pages 295–299)

17. Why were other European countries slower to industrialize than Britain? (10.3.5)
18. What might explain the rise of global inequality during the Industrial Revolution? (10.3.5)

Reforming the Industrial World Section 4 (pages 300–307)

19. What were the two warring classes that Marx and Engels outlined in *The Communist Manifesto*? (10.3.6)
20. How did women fight for change during the Industrial Revolution? (10.3.2)

CRITICAL THINKING

1. USING YOUR NOTES

In a chart, list some of the major technological advances and their effects on society. (10.3.2)

Technological Advance	Effect(s)

2. EVALUATING

SCIENCE AND TECHNOLOGY How significant were the changes that the Industrial Revolution brought to the world? Explain your conclusion. (10.3.2)

3. ANALYZING CAUSES AND RECOGNIZING EFFECTS

ECONOMICS How important were labor unions in increasing the power of workers? Give reasons for your opinion. (10.3.4)

4. DRAWING CONCLUSIONS

How did the Industrial Revolution help to increase Germany's military power? Support your answer with information from the chapter. (10.3.6)

5. DEVELOPING HISTORICAL PERSPECTIVE

EMPIRE BUILDING Would a nonindustrialized or an industrialized nation more likely be an empire builder? Why? (10.3.1)

STANDARDS-BASED ASSESSMENT

Use the quotation about industrialization and your knowledge of world history to answer questions 1 and 2.
Additional Test Practice, pp. S1–S33

PRIMARY SOURCE

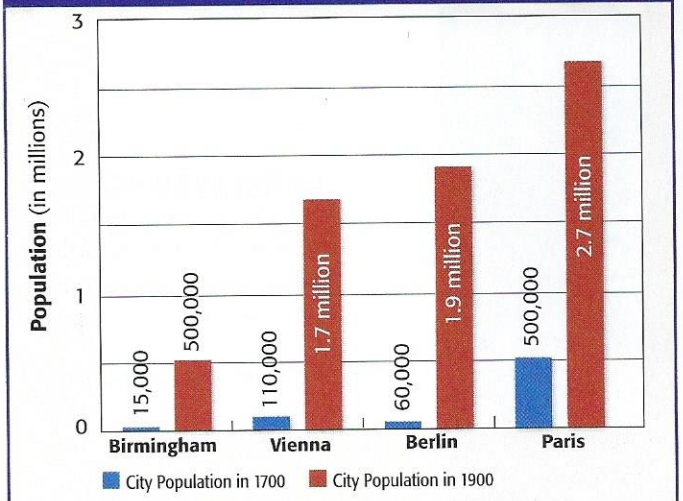
It was a town of red brick, or of brick that would have been red if the smoke and ashes had allowed it. . . . It was a town of machinery and tall chimneys, out of which interminable [endless] serpents of smoke trailed themselves for ever and ever. . . . It contained several large streets all very like one another, and many small streets still more like one another, inhabited by people equally like one another, who all went in and out at the same hours, with the same sound upon the same pavements, to do the same work, and to whom every day was the same as yesterday and tomorrow, and every year the counterpart of the last and the next.

CHARLES DICKENS, *Hard Times*

1. In this passage, the writer is trying to describe how (10.3.3)
   - **A.** people came from the countryside to the city to work in industry.
   - **B.** entrepreneurs built factories.
   - **C.** capitalism works.
   - **D.** difficult life is for workers in industrial cities.
2. What is Dickens's view of industrialization? (10.3.4)
   - **A.** that it is good for factory owners
   - **B.** that it brings progress to a nation
   - **C.** that it pollutes the air and exploits the workers
   - **D.** that it causes population growth

Use the graph below and your knowledge of world history to answer question 3.

The Growth of Cities, 1700–1900



Sources: *European Historical Statistics*, 1750–1975; Eric Hopkins, *The Rise of the Manufacturing Town*

3. The graph above shows population growth in four European cities from 1700 to 1900, that is, before and after the Industrial Revolution. Which statement best describes the information in the chart? (CST 3)
   - **A.** All of the cities grew at the same rate.
   - **B.** The increase in population for each city was less than 2 million people.
   - **C.** Paris was the most populous city both before and after the Industrial Revolution.
   - **D.** Berlin's population in 1900 was four times its size in 1700.

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ALTERNATIVE ASSESSMENT

1. Interact *with* History (10.3.4)

On page 282, you looked at working conditions in an English factory in the 19th century. Now that you have read the chapter about the Industrial Revolution, rethink your decision about what you would do to change your situation. What working conditions would you like to see change? What benefits might a union bring? What disadvantages might result if workers organize? Discuss your opinions with a small group.

2. WRITING ABOUT HISTORY (10.3.5, Writing 2.3.a)

The Industrial Revolution's impact varied according to social class. Write a three-paragraph **expository essay** indicating how these people would view the changes in industry: an inventor, an entrepreneur, a skilled worker, and a hand weaver.

INTEGRATED TECHNOLOGY

Using Graphics Software (10.3.2, Writing 2.3.d)

Make a list of five major inventions or innovations of the Industrial Revolution. Research each to learn about the scientific, economic, and social changes that contributed to its development and the effects that it caused. Use the Internet, books, and other resources to conduct your research. Then use graphics software to create a chart, graph, or diagram depicting the relationship between the inventions and innovations, the changes, and the effects.

You may include some of the following:

- the plow
- the cotton gin
- the power loom
- the telegraph
- the sewing machine

CHAPTER 10

An Age of Democracy and Progress, 1815–1914

Previewing Main Ideas

EMPIRE BUILDING During the 1800s, Great Britain gradually allowed three of its colonies—Canada, Australia, and New Zealand—greater self-rule. However, Britain maintained tight control over Ireland.

Geography *According to the map, what Western democracies existed in North America and Western Europe in 1900?*

POWER AND AUTHORITY The United States expanded across the continent during the 1800s and added new states to its territory to become a great power.

Geography *What geographical factors might have helped to make the United States a great power?*

SCIENCE AND TECHNOLOGY The transcontinental railroad helped to link the United States from the Atlantic Ocean to the Pacific Ocean. It was a triumph of 19th-century technology.

Geography *How might a technological achievement such as the transcontinental railroad have contributed to American prosperity?*

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EUROPE

1837 ◀ Queen Victoria comes to power in Great Britain.

1845 Ireland is struck by famine.

1859 Darwin publishes theory of evolution.

1815 — **1850**

WORLD

1821 Mexico wins independence from Spain.



1857 ◀ Sepoy Mutiny challenges British rule in India. (native troops in Britain's East India Company)