

>> Industrial cities and towns grew up around factories like this one. Factories provided resources, goods, and jobs. **Explain** Based on this image, how do you think life changed because of industrialization?

 **Interactive Flipped Video**

TEKS
 1.E, 8.A, 15.A, 15.B, 16.A, 16.C, 28.A, 28.E

>> Objectives

Describe how changes in agriculture helped spark the Industrial Revolution.

Analyze why the Industrial Revolution began in Britain.

Explain the role of steam technology and textile manufacturing in the Industrial Revolution.

Describe how the factory system and transportation revolution advanced industry.

Trace how the Industrial Revolution spread.

>> Key Terms

- Industrial Revolution
- anesthetic
- enclosure
- James Watt
- smelt
- capital
- enterprise
- entrepreneur
- putting-out system
- Eli Whitney
- turnpike
- Liverpool
- Manchester

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For thousands of years following the rise of civilization, most people lived and worked in small farming villages. Then a chain of events set in motion in the mid-1700s changed that way of life. Today, we call this period of economic change the Industrial Revolution. Production shifted from simple hand tools to complex machines, and sources of energy shifted from human and animal power to steam and, later, electricity.

The Industrial Revolution Begins

New Ways of Working Change Life

Like the Enlightenment, which occurred around the same time, the Industrial Revolution was partly an outgrowth of the Scientific Revolution of the 1600s and 1700s. The Scientific Revolution focused attention on the physical world, and thinkers used the scientific method to conduct controlled experiments. This scientific approach helped inventors to devise new technologies to improve life. These technologies would change the way work was done.

In contrast with most political revolutions, the Industrial Revolution was neither sudden nor swift. It was a long, slow, uneven process. Yet it affected people's lives as much as previous political changes and revolutions had. From its beginnings in Britain, it spread to the rest of Europe, to North America, and around the globe.

A Rural Way of Life In 1750, most people worked the land, using handmade tools. They lived in simple cottages lit by firelight and candles. They made their own clothing and grew their own food. In nearby towns, they might exchange goods at a weekly outdoor market

Like their ancestors, these people knew little of the world that existed beyond their village. The few who left home traveled only as far as their feet or a horse-drawn cart could take them. Those bold adventurers who dared to cross the seas were at the mercy of the winds and tides.

Growing Cities With the onset of the Industrial Revolution, the rural way of life began to disappear. By the 1850s, many country villages had grown into industrial towns and cities. Those who lived there were able to buy clothing and food that someone else produced.

Industrialization Brings Great Change Unlike earlier times, industrial-age travelers were able to move rapidly between countries and continents by train or steamship. Urgent messages flew along telegraph wires. New inventions and scientific "firsts" poured forth each year.

Between 1830 and 1855, for example, an American dentist first used an **anesthetic**, or drug that prevents pain during surgery; an American inventor patented the first sewing machine; a French physicist measured the speed of light; and a Hungarian doctor introduced antiseptic methods to reduce the risk of women's dying in childbirth. By the early 1900s, our familiar world of skyscraper cities and carefully planned suburbs had begun to emerge.

How and why did these great changes occur? Historians point to a series of interrelated causes that helped trigger the industrialization of the West. The "West" referred originally to the industrialized countries of western Europe and North America, but today includes many more.

IDENTIFY MAIN IDEAS How did the Industrial Revolution lead to social and economic changes in Europe?

A New Agricultural Revolution

Oddly enough, the Industrial Revolution was made possible in part by a change in the farming fields of western Europe. The first agricultural revolution took place some 11,000 years ago, when people learned to farm and domesticate animals. Then, about 300 years ago, a second agricultural revolution took place that greatly improved the quality and quantity of farm products.

Farmers Reclaim Land and Renew Soil The Dutch led the way in this new agricultural revolution. They built earthen walls known as dikes to reclaim land from the sea. They also combined smaller fields into larger ones to make better use of the land, and they used fertilizer from livestock to renew the soil.

In the 1700s, British farmers expanded on Dutch agricultural experiments. Educated farmers exchanged news of experiments through farm journals. Some farmers mixed different kinds of soils to get higher crop yields. Others tried out new methods of crop rotation.

Lord Charles Townshend urged farmers to grow turnips, which restored exhausted soil. Jethro Tull invented a new mechanical device, the seed drill, to aid farmers. It deposited seeds in rows to maximize land use rather than scattering them over land, a practice that wasted seeds by spacing plants irregularly.

Wealthy Landowners Enclose Lands Meanwhile, wealthy landowners pushed ahead with a practice called **enclosure**. Enclosure is the process of taking over and consolidating, or combining, lands formerly shared by peasant farmers. In the 1500s, landowners had enclosed land to gain more pastures for sheep in order to increase wool output. By the 1700s, they wanted to create larger fields that could be cultivated



>> An American dentist demonstrates the use of ether as a surgical anesthetic in 1846.

more efficiently. The British Parliament passed laws that made it easier for landowners to enclose lands.

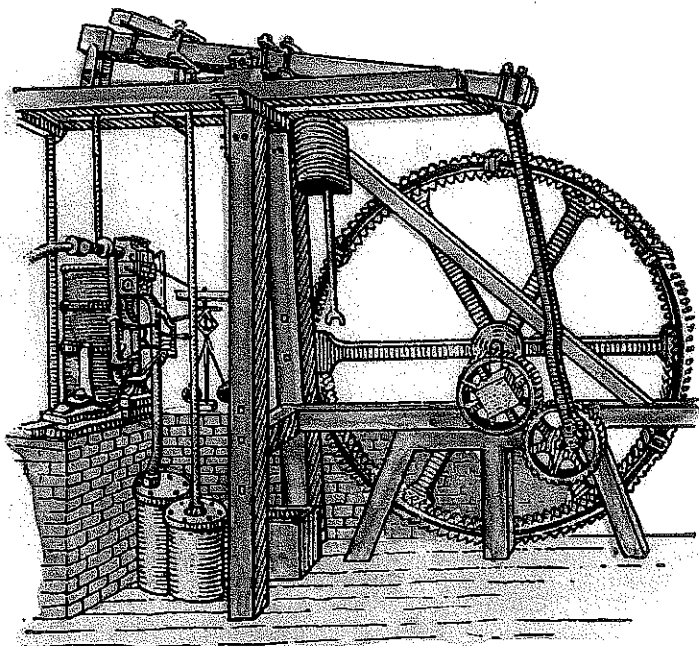
As millions of acres were enclosed, farm output rose. Profits also rose because consolidated fields needed fewer workers. However, such progress had a human cost. Many farm laborers were thrown out of work, and small farmers were forced off their land because they could not compete with large landholders. Villages shrank when people left in search of work.

This shift in the labor force became a key factor in industrialization. Jobless farm workers migrated to towns and cities. Many found work in the new factories, tending to the machines of the Industrial Revolution.

Population Grows Because of Better Farming

Not only did people move to towns and cities, but an overall boom in population also occurred. The improved farming practices of the agricultural revolution contributed to this rapid population growth. Precise population statistics for the 1700s are rare, but those that do exist are striking. Britain's population, for example, soared from about 5 million in 1700 to almost 9 million in 1800.

The population of Europe as a whole shot up from roughly 120 million to about 180 million during the same period. Such growth had never before been seen.



WATT'S STEAM-ENGINE

>> Watt's engine used steam and atmospheric pressure to power pistons and rods that moved machinery. It had a separate condenser to keep the water hot, conserving energy.

Why did this population increase occur? The population boom was due more to declining death rates than to rising birth rates. The agricultural revolution reduced the risk of famine. Since people ate better, they were healthier. Also, by the late 1800s, better hygiene and sanitation, along with improved medical care, further slowed deaths from disease. During the Industrial Revolution, this growing population tended to the machines and bought the goods produced by factories.

? CHECK UNDERSTANDING How did an agricultural revolution contribute to population growth?

Coal, Steam, and the Energy Revolution

Another major factor that contributed to the Industrial Revolution was an "energy revolution." In the past, the energy for work came mostly from the muscles of humans and animals. In the 1700s, inventive minds found ways to use water power more efficiently and harnessed new sources of energy. Among the most important energy sources was coal, which was used to develop the steam engine.

James Watt and the Steam Engine In 1712, inventor Thomas Newcomen developed a steam engine powered by coal to pump water out of mines. Later, in 1764, Scottish engineer **James Watt** looked at Newcomen's invention and set out to make improvements on the engine in order to make it more efficient. Watt's engine would become a vital power source of the Industrial Revolution.

The steam engine was first used to power machines, but later was adapted to power locomotives and steamships.

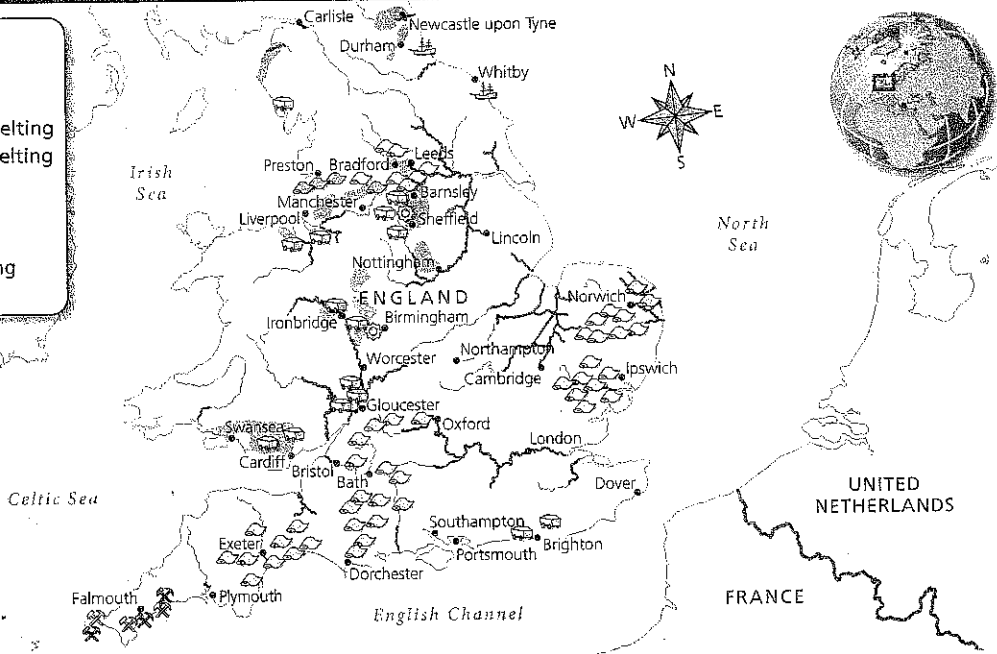
Producing Better Iron Coal was also a vital source of fuel in the production of iron, a material needed for the construction of machines and steam engines. The Darby family of Coalbrookdale, England, pioneered new methods of producing iron. In 1709, Abraham Darby used coal instead of charcoal to **smelt** iron, or separate iron from its ore.

Darby's experiments led him to produce less expensive and better-quality iron, which was used to produce parts for the steam engines. Both his son and grandson continued to improve on his methods. In fact, Abraham Darby III built the world's first iron bridge. In the decades that followed, high-quality iron was used

Resources and Industry in England, 1750

KEY

- Woolfield
- Navigable river
- Copper mining and smelting
- Iron extraction and smelting
- Woolen cloth
- Metals and cutlery
- Shipbuilding
- Iron mining and smelting
- Woolen cloth



Analyze Maps Notice where various resources and industries were located in 1750. Why is the location of navigable rivers important to resources and industry?

and more widely, especially after the world turned into a global village with the coming of steam engines and railroads.

Identify Supporting Details What did the family contribute to the Industrial Revolution?

Why Did the Industrial Revolution Start in Britain?

Historians have fiercely debated why the Industrial Revolution began in Britain in the 1700s. They have listed a number of advantages Britain had. No one was unique to Britain, but taken together they helped Britain take an early lead. This complex nation included natural resources, labor, capital, and entrepreneurship. Economists call these the four elements of production; that is, the elements necessary to produce goods. In addition to these factors, growing demand for goods and new technology provided the essential building blocks for Britain's leap forward.

Natural Resources and Geography During the 1700s, Britain began to take greater advantage of its abundant natural resources. Although Britain was a relatively small nation, it had large supplies of coal to

power steam engines. Britain also had plentiful iron, which was used to build machines.

Britain's geography also provided an advantage. As an island nation with many ports, Britain had long benefited from trade. Its ships brought raw materials from its overseas empire and exported finished goods. Britain also had streams and rivers that could be harnessed to provide water power. Many rivers were later developed with canals and then used to transport goods to internal markets.

Labor and Capital A large number of workers were needed to mine the coal and iron, build the factories, and run the machines. The agricultural revolution of the 1600s and 1700s freed many men and women from farm labor. The population boom that resulted from changes in agriculture further swelled the available work force. The growing population also increased the demand for goods, which industry supplied.

To develop mining and other industries, capital was needed. **Capital** is money used to invest in enterprises. An **enterprise** is a business organization in an area such as shipping, mining, railroads, or factories. Many businesspeople were ready to risk their profits in new ventures. The capital that helped Britain industrialize came from landowners, banks, and merchants who profited from overseas trade, including the slave trade.

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Entrepreneurs and Inventors Britain also had plenty of skilled mechanics. They developed practical new inventions and partnered with entrepreneurs to profit from them. An **entrepreneur** is someone who manages and assumes the financial risks of starting new businesses.

Technology was important to the Industrial Revolution, but did not cause it. Only when other necessary conditions existed, including demand and capital, did technology pave the way for industrialization.

A Favorable Climate for Business In addition to the advantages already cited, Britain had a stable government that supported economic growth. Other countries in Europe imposed heavy river tolls and other barriers to growth. Britain had far fewer blocks to the movement of goods. The government built a strong navy that protected its empire, including shipping and overseas trade.

Social attitudes adjusted to changing economic conditions. Although members of the upper class looked down on business and business people, they did not reject the great wealth produced by the new entrepreneurs. Religious groups encouraged thrift

and hard work. These goals led inventors, bankers, and other risk-takers to devote their energies to new enterprises.

2 CHECK UNDERSTANDING What conditions in Britain paved the way for the Industrial Revolution?

Textile Industry Initiates Industrialization

The Industrial Revolution first took hold in Britain's largest industry—textiles. In the 1600s, cotton cloth imported from India had become popular. British merchants tried to organize a cotton cloth industry at home. They developed the **putting-out system**, also known as the cottage industry, in which raw cotton was distributed to peasant families who spun it into thread and then wove the thread into cloth in their own homes. Skilled artisans in the towns then finished and dyed the cloth.

Technology Speeds Production Under the putting-out system, production was slow. The process of using manually operated machines for spinning and weaving took time. As the demand for cloth grew, inventors came up with a series of remarkable devices that revolutionized the British textile industry. For example, John Kay's flying shuttle enabled weavers to work so fast that they soon outpaced spinners. James Hargreaves solved that problem by producing the spinning jenny in 1764, which spun many threads at the same time. Five years later, Richard Arkwright patented the water frame, a spinning machine that could be powered by water.

Meanwhile, in America, these faster spinning and weaving machines presented a challenge—how to produce enough cotton to keep up with England. Raw cotton grown in the South had to be cleaned of dirt and seeds by hand, which is a time-consuming task. To solve this, **Eli Whitney** invented a machine called the cotton gin that separated the seeds from the raw cotton at a fast rate. He finished the cotton gin in 1793, and cotton production increased at a rapid rate.

The First Factories The new machines doomed the putting-out system. They were too large and expensive to be operated at home. Instead, manufacturers built long sheds to house the machines. At first, they located the sheds near rapidly moving streams, harnessing the water power to run the machines. Later, machines were powered by steam engines.

Spinners and weavers now came each day to work in these first factories, which brought together workers



>> Generations of women made textiles at home as part of the putting-out system. These women are making lace. **Make Predictions** What impact do you think machines and industrialization will have on the putting-out system?

machines to produce large quantities of goods. By observers were awed at the size and output of these establishments. One onlooker noted: "The same amount of labor is now performed in one of these factories which formerly occupied the industry of an entire district."

IDENTIFY CAUSE AND EFFECT What technology brought about advances in the British textile industry?

ELPS 4.F.2 Use the images in *Textile Industry* to enhance your understanding of how the textile industry grew and changed over time.

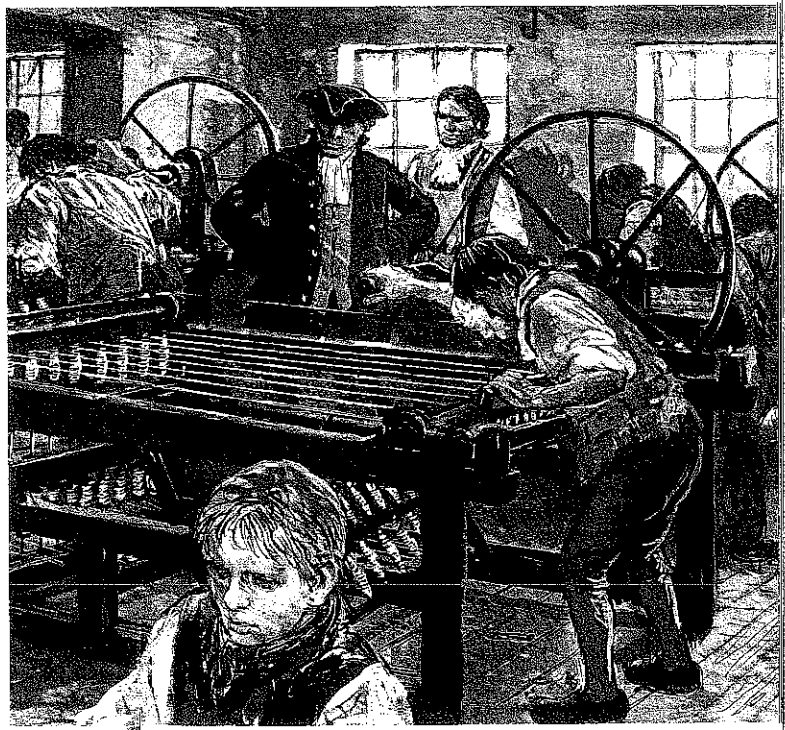
Revolution in Transportation

As production increased, entrepreneurs needed faster and cheaper methods of moving goods from place to place. Some capitalists invested in **turnpikes**, private roads built by entrepreneurs who charged travelers toll, or fee, to use them. Goods traveled faster as a result, and turnpikes soon linked every part of Britain. Other entrepreneurs had canals dug to connect rivers together or to connect inland towns with coastal ports. Engineers also built stronger bridges and upgraded harbors to help the expanding overseas trade.

Canals Improve Transportation During the late 1700s and early 1800s, British factories needed an efficient, inexpensive way to receive coal and raw materials and then to ship finished goods to market. In 1793, when the Bridgewater Canal opened, it not only made a profit from tolls, but it shortened the trip enough to cut in half the price of coal in Manchester.

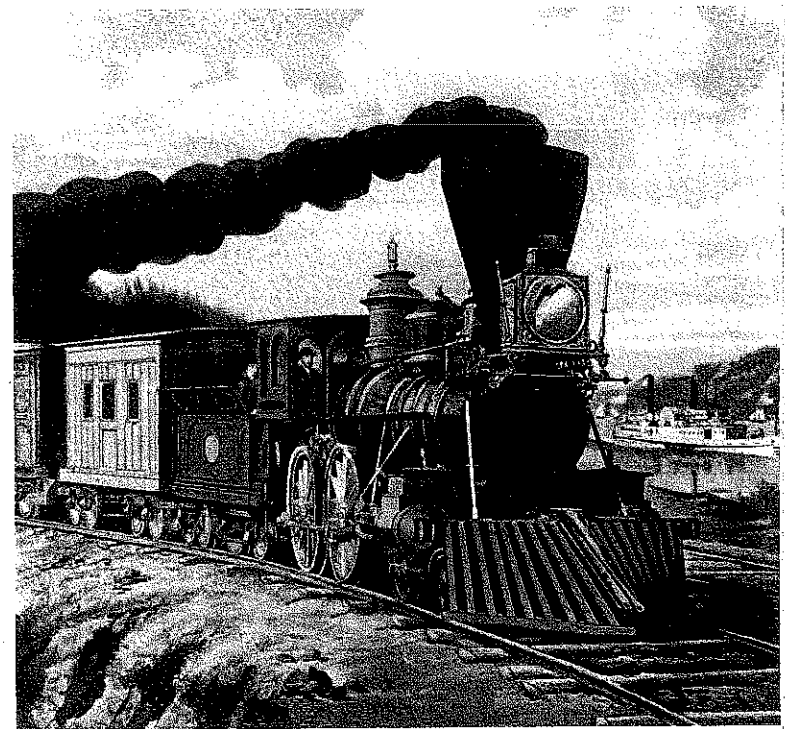
The success of this canal set off a canal-building frenzy. Entrepreneurs formed companies to construct canals for profit. Not all the canals that were built had enough traffic to support them, however, and bankruptcy often resulted. Then, beginning in the 1830s, canals lost their importance as steam locomotives made railroads the new preferred form of transportation.

The Steam Locomotive Drives Railroads It was the invention of the steam locomotive that made the growth of railroads possible. In the early 1800s, engineers like George Stephenson developed steam-powered locomotives to pull carriages along iron rails. The railroad did not have to follow the course of a river. This meant that tracks could go places where rivers did not, allowing factory owners and merchants to ship goods swiftly and cheaply over land. The world's



>> Workers and machines filled the early factories of the Industrial Revolution. Machines dramatically increased the quantity of goods that could be produced.

 [Interactive Gallery](#)



>> Steam locomotives made travel faster than ever before. The locomotives burned coal to produce steam and traveled overland routes on iron rails.

 [Interactive Map](#)

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first major rail line, from **Liverpool** to **Manchester**, opened in England in 1830.

In the following decades, railroad travel became faster and railroad building boomed. By 1870, rail lines crisscrossed Britain, Europe, and North America.

Cheaper Goods Lead to More Demand As the Industrial Revolution got under way, it triggered a chain reaction. Once inventors developed machines that could produce large quantities of goods more efficiently, prices fell. Lower prices made goods more affordable and thus attracted more consumers. Additional consumers then further fed the demand for goods. This new cycle caused a wave of economic and social changes that dramatically affected the way people lived.

DRAW CONCLUSIONS How did the development of railroads advance the Industrial Revolution?

Industrialization Spreads

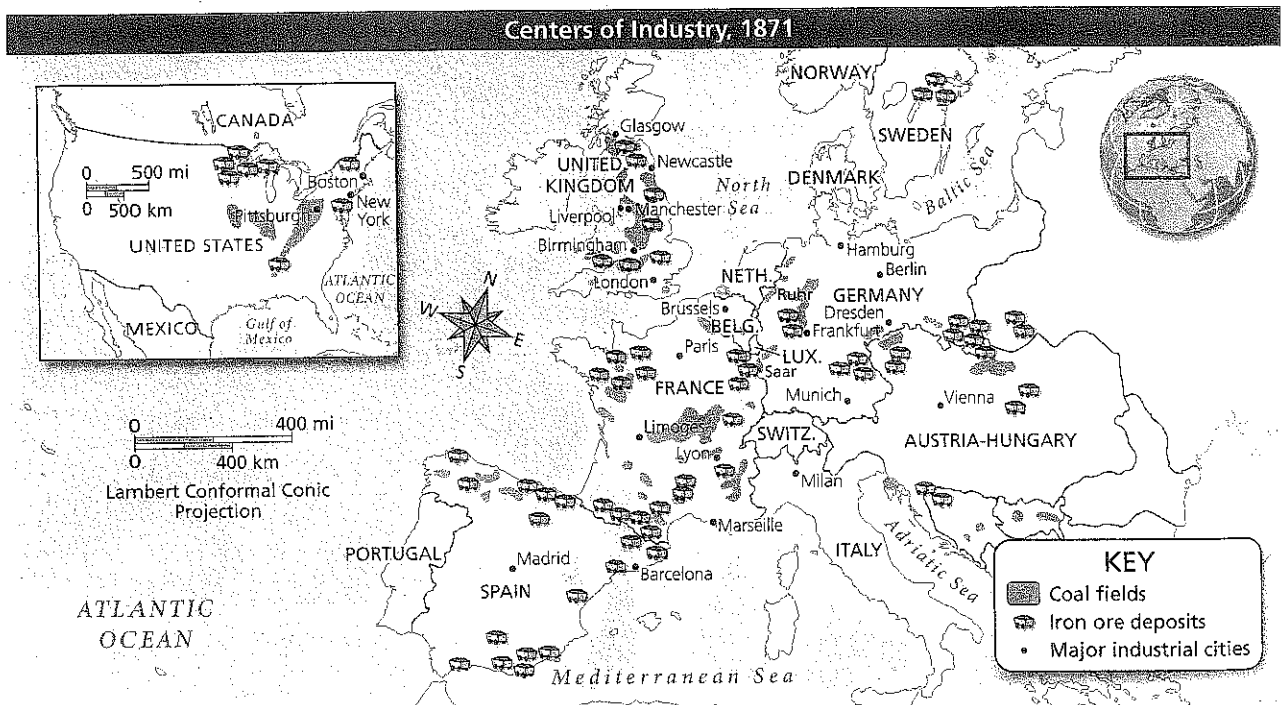
The start of industrialization had largely been forged from iron, powered by steam engines, and driven by the British textile industry. By the mid-1800s, the Industrial Revolution entered a second phase. By

then, it had spread outside Britain. New industrial powers emerged. Factories powered by electricity used innovative processes to turn out new products. Changes in business organization contributed to the rise of giant companies. As the twentieth century dawned, this second Industrial Revolution transformed the economies of the Western world.

Other Nations Industrialize During the early Industrial Revolution, Britain stood alone as the world's industrial giant. To protect its head start, Britain tried to enforce strict rules against exporting inventions.

For a while, the rules worked. Then, in 1807, British mechanic William Cockerill opened factories in Belgium to manufacture spinning and weaving machines. Belgium became the first European nation after Britain to industrialize. By the mid-1800s, other nations had joined the race, and several newcomers were challenging Britain's industrial supremacy.

How were other nations able to catch up with Britain so quickly? First, nations such as Germany, France, and the United States had more abundant supplies of coal, iron, and other resources than Britain did. Also, they had the advantage of being able to follow Britain's lead. Like Belgium, latecomers often borrowed British experts or technology. The first American textile factory was built in Pawtucket, Rhode Island, with plans smuggled out of



>> Analyze Maps By 1871, industrialization had spread through Europe and across the Atlantic to America. Which major industrial cities were probably shipping centers as well? Identify two nations that were at a disadvantage for industrialization.

tain. American inventor Robert Fulton powered his steamboat with one of James Watt's steam engines.

Two countries in particular—Germany and the United States—thrust their way to industrial leadership. Germany united into a powerful nation in 1871. Within a few decades, it became Europe's leading industrial power. Across the Atlantic, the United States advanced even more rapidly, especially after the Civil War.

With a large labor force, plenty of resources, and entrepreneurs who had capital, by 1900 the United States was manufacturing about 30 percent of the world's industrial goods. It had surpassed Britain as the leading industrial nation.

Industry Spreads Unevenly Other nations industrialized more slowly, particularly those in eastern and southern Europe. These nations often lacked natural resources or the capital to invest in industry. Although Russia did have resources, social and political conditions slowed its economic development. Only in the late 1800s, more than 100 years after Britain, did Russia move toward industrialization.

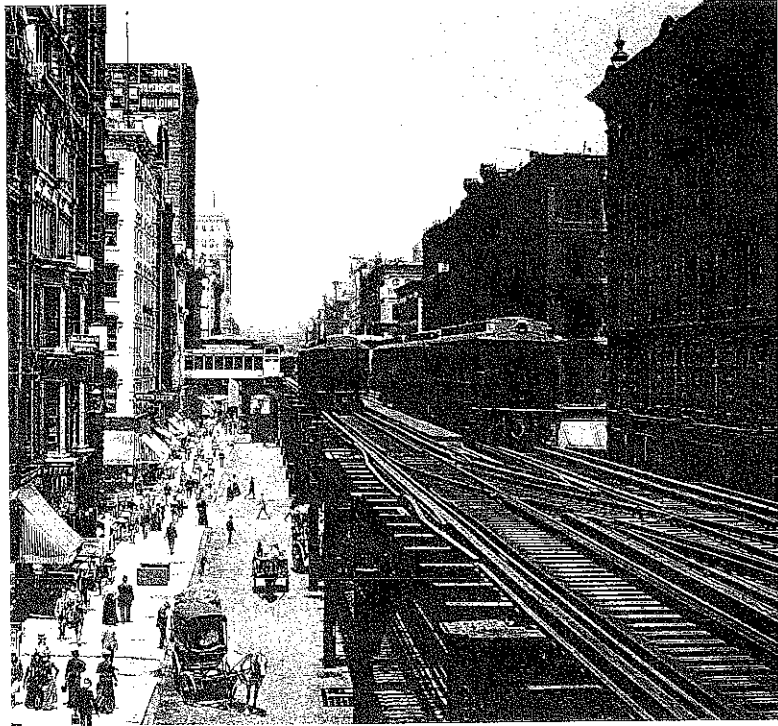
In East Asia, however, Japan offered a remarkable success story. Although Japan lacked many basic resources, it industrialized rapidly after 1868 because of a political revolution that made modernization a priority. Canada, Australia, and New Zealand also built thriving industries during this time.

Social, Economic, and Political Changes Like Britain, the new industrial nations underwent social changes, such as rapid urbanization. Early in the history of industrialization, men, women, and children worked long hours in difficult and dangerous conditions. By 1900, however, these conditions had begun to improve in many industrialized nations.

The factory system produced huge quantities of new goods at lower prices than ever before. In time, ordinary workers were buying goods that in earlier days only the wealthy could afford. The demand for goods created jobs, as did the building of cities, railroads, and factories. Politics changed, too, as leaders had to meet the demands of an industrial society.

Globally, industrial nations competed fiercely, altering patterns of world trade. Because of their technological and economic advantage, the Western powers came to dominate the world more than ever before.

ANALYZE INFORMATION What factors allowed other nations to industrialize after Britain?



>> A street scene in Chicago, Illinois, from the early 1900s shows how the urban landscape was altered by industrialization. **Compare and Contrast** How is the scene similar to and different from a typical city street today?

ASSESSMENT

1. **Identify Patterns** What would you identify as the important changes in human life caused by the Industrial Revolution?
2. **Identify Cause and Effect** How did technological advances in agriculture affect the Industrial Revolution?
3. **Generate Explanations** Why was a supply of coal crucial to the Industrial Revolution?
4. **Synthesize** How did the four factors of production determine which nations were able to industrialize after Britain? Cite specific examples from the text.
5. **Cite Evidence** How did industrialization enable Western powers to dominate world affairs?



>> Men, women, and children worked side by side in many factories. Conditions in cotton mills could be cramped, as this photograph inside a mill in Lancashire shows.

 Interactive Flipped Video

TEKS
 1.E, 8.B, 8.E, 17.A, 17.B, 18.A, 18.B, 18.C, 18.F, 24.A

>> Objectives

Outline the growth of industrial cities and the emergence of new social classes.

Describe the working conditions in factories and mines.

Analyze the benefits and challenges of industrialism.

Describe the ideas of Adam Smith and other thinkers regarding free enterprise.

Identify the origins and characteristics of socialism and communism.

>> Key Terms

- | | |
|---------------------|------------------|
| urbanization | communism |
| tenement | proletariat |
| labor union | social democracy |
| standard of living | |
| social mobility | |
| free market | |
| Thomas Malthus | |
| Jeremy Bentham | |
| utilitarianism | |
| socialism | |
| means of production | |
| Robert Owen | |
| Karl Marx | |

13.2

The Industrial Revolution

brought great riches to most of the entrepreneurs who helped set it in motion. It also provided employment for farmers and farmhands displaced by the changes in agriculture. But these jobs came with a heavy price. Millions of workers who crowded into the new factory towns endured dangerous working conditions, unsanitary and overcrowded housing, and unrelenting poverty.

Social Impact of Industrialism

Industry Causes Urban Growth

In time, reforms would curb many of the worst abuses of the early Industrial Age in Europe and the Americas. As standards of living increased, people at all levels of society would benefit from industrialization.

The Industrial Revolution brought rapid **urbanization**, or the movement of people to cities. Changes in farming, soaring population growth, and an ever-increasing demand for workers led masses of people to migrate from farms to cities. Almost overnight, small towns around coal or iron mines mushroomed into cities. Other cities grew up around the factories that entrepreneurs built in once-quiet market towns.

The British market town of Manchester numbered 17,000 people in the 1750s. Within a few years, it exploded into a center of the textile industry. Its population soared to 40,000 by 1780 and 70,000 by 1801. Visitors described the "cloud of coal vapor" that polluted the air, the pounding noise of steam engines, and the filthy stench of its river.

This growth of industry and rapid population growth dramatically changed the location and distribution of two resources—labor and people.

IDENTIFY SUPPORTING DETAILS What led to the massive migration of people from farms to cities?

ELPS 4.F.3 Demonstrate your understanding of vocabulary words from this section by defining them with both pictures and words.

The Rise of New Social Classes

The Industrial Revolution helped create both a new middle class and a new urban working class. The middle class included entrepreneurs and others who profited from the growth of industry and the rise of cities. The middle class enjoyed a comfortable lifestyle.

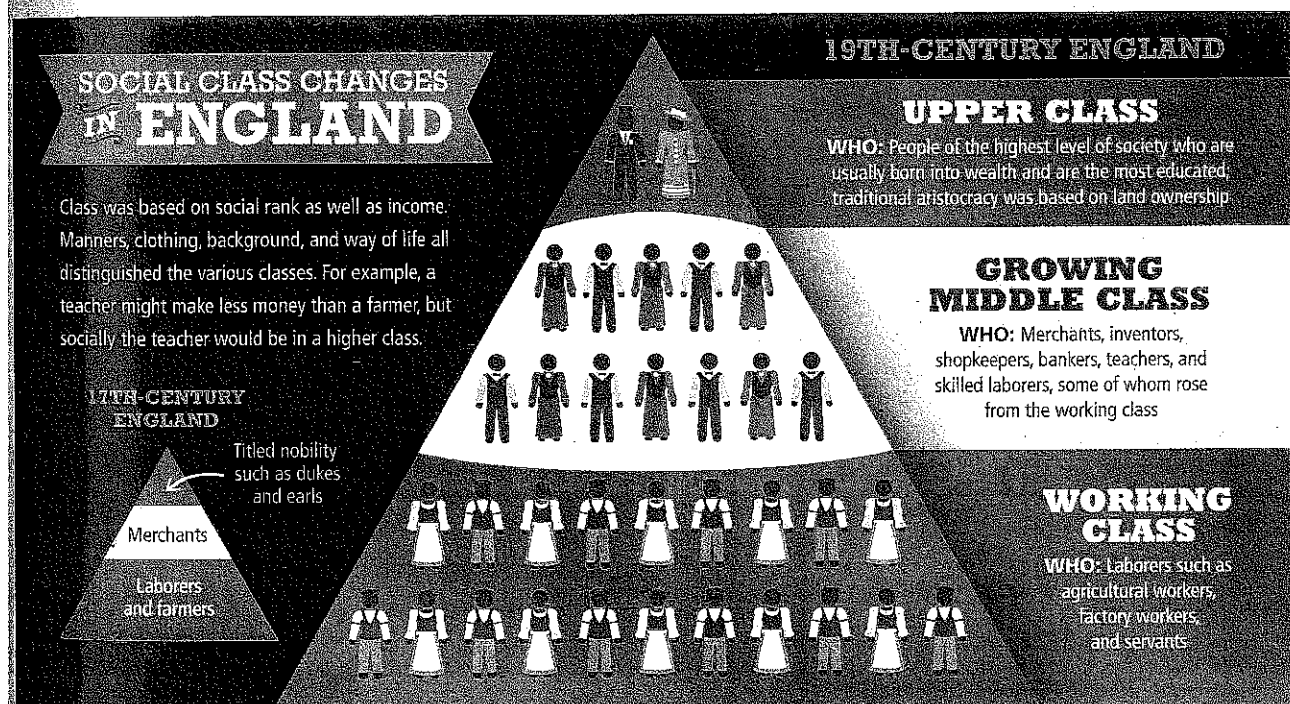
When farm laborers and others moved to the new industrial cities, they took jobs in factories or mines. In rural villages, they had strong ties to a community, where their families had lived for generations. In the cities, they felt lost and bewildered. In time, though, factory and mine workers developed their own sense of community.

The Lives of the New Middle Class Those who benefited most from the Industrial Revolution were the entrepreneurs who set it in motion. The Industrial Revolution created this new middle class, or bourgeoisie (boor zhwah ZEE), whose members came from a variety of backgrounds. Some were merchants who invested their profits in factories. Others were inventors or skilled artisans who developed

new technologies. Some rose from “rags to riches,” a pattern that the age greatly admired. Middle-class families lived in well-built, well-furnished homes. In time, middle-class neighborhoods had paved streets and a steady water supply. These families dressed and ate well. The new middle class took pride in their hard work and their determination to “get ahead.” Only a few had sympathy for the poor.

As a sign of their new and improved status, middle-class women sought to imitate the wealthy women of the upper classes. They did not do physical labor or work outside the home. They hired maidservants to care for their homes and look after their children.

The Lives of the Working Class While the wealthy and the middle class lived in pleasant neighborhoods, vast numbers of poor struggled to survive in foul-smelling slums. They packed into tiny rooms in **tenements**, or multistory buildings divided into



>> The expanding middle class included working-class people who found new opportunities because of industrialization. **Analyze Charts** Which class changed the least due to industrialization?

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apartments. These tenements had no running water, only community pumps. Early industrial cities had no sewage or sanitation systems, so waste and garbage rotted in the streets.

Sewage was also dumped into rivers, which created an overwhelming stench and contaminated drinking water. This led to the spread of diseases such as cholera.

Workers' Protests During the early Industrial Revolution, there were no **labor unions**, organizations of workers who bargained for better pay and working conditions. As the Industrial Revolution began, weavers and other skilled artisans resisted the new "labor-saving" machines that were replacing their jobs.

From 1811 to 1813, protesting workers, called Luddites (LUD yts), smashed machines and burned factories. The Luddites were harshly crushed. Although frustrated workers continued to protest, they were forbidden to form worker associations and strikes were outlawed.

Methodists Help the Poor Many working-class people found comfort in a religious movement called Methodism. John Wesley had founded the Methodist movement in the mid-1700s. Wesley stressed the need

for a personal sense of faith. He encouraged his followers to improve themselves by adopting sober, moral ways.

Methodist meetings featured hymns and sermons promising forgiveness of sin and a better life to come. Methodist preachers took this message of salvation into the slums. There, they tried to rekindle hope among the working poor. They set up Sunday schools where followers not only studied the Bible but also learned to read and write. Methodists helped channel workers' anger away from revolution and toward reform.

2 MAKE GENERALIZATIONS How did members of the working class react to their new experiences in industrial cities?

Harsh Conditions in Factories and Mines

The heart of the new industrial city was the factory. There, the technology of the machine age imposed a harsh and dangerous way of life on workers. The miners who supplied the coal and iron for the Industrial Age faced equally unsafe working conditions.

Hazards of the Factory System Working in a factory system differed greatly from working on a farm. In rural villages, people worked long hours for low wages, but their work varied according to the season. Life was also hard for poor rural workers who were part of the putting-out system. If they worked too slowly, they did not earn enough, but at least they worked at their own pace. In the factories of industrial towns, workers faced a rigid schedule set by the factory whistle.

Working hours in early factories were long, with shifts lasting from 12 to 16 hours, six or seven days a week. A factory whistle announced time to eat a hasty meal, then quickly sent them back to the machines. Exhausted workers suffered accidents from machines that had no safety devices. They might lose a finger, a limb, or even their lives.

In textile mills, workers constantly breathed air filled with lint, which damaged their lungs. Those workers who became sick or injured lost their jobs.

At first, women made up much of the new industrial work force. Employers often preferred to hire women workers. They thought women could adapt more easily to machines and were easier to manage than men. More important, they were able to pay women less than men, even for the same work.

Factory work created a double burden for women. Their new jobs took them out of their homes for 12 hours or more a day. They then returned to their tenements, which might consist of one damp room with a single



>> John Wesley, founder of Methodism, is shown preaching at his father's grave in a churchyard in Epworth, Lincolnshire, where he was born and raised.

bed. They had to feed and clothe their families, clean, and cope with such problems as sickness and injury.

Dangers in the Mines As the demand for coal and iron grew, more mines were opened. Although miners were paid more than factory workers, conditions in the mines were even harsher than in the factories. Miners worked in darkness, and the coal dust destroyed their lungs. There were always the dangers of explosions, flooding, and collapsing tunnels.

Women and children worked in mines, carting heavy loads of coal. Children were frequently hired to work in mines because they could climb through narrow shafts. Many spent their days on all fours or carried heavy baskets of coal up flimsy ladders.

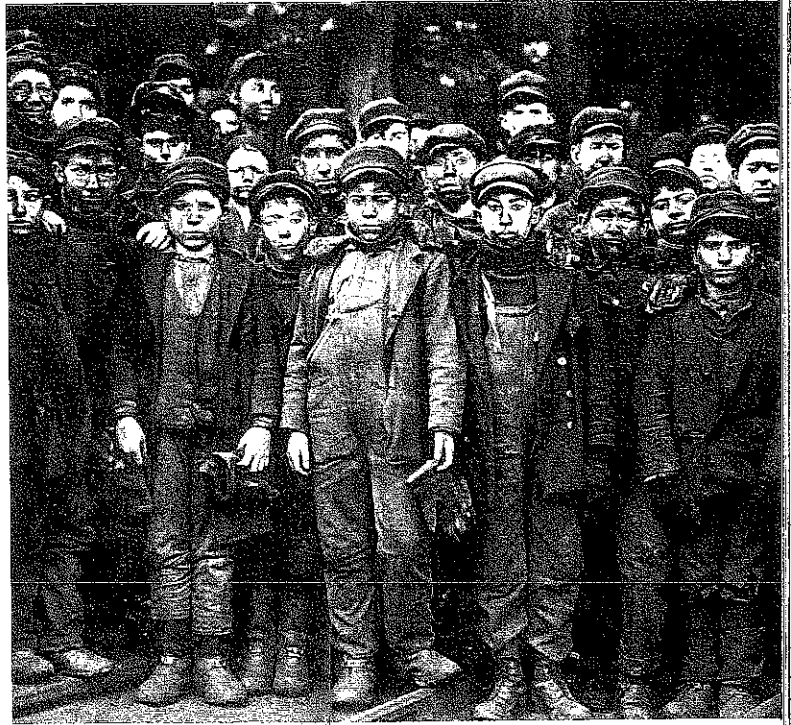
Children Perform Risky Work Children had always worked on rural farms or as servants and apprentices. However, child labor took on new dimensions during the Industrial Revolution. Since children had helped with farm work, parents accepted the idea of child labor. The wages children earned were needed to keep their families from starving.

Factories and mines hired many boys and girls. These children often started working at age seven or eight, a few as young as five. Nimble-fingered and quick-moving, they changed spools in the hot and humid textile mills where sometimes they could not see because of all the dust. They also crawled under machinery to repair broken threads in the mills.

Conditions were even worse for children who worked in the mines. Some sat all day in the dark, opening and closing air vents. Others hauled coal carts in the extreme heat.

In the early 1800s, Parliament passed a series of laws, called "factory acts," to reform child labor practices. These early efforts were largely ignored. Then, in 1833, Michael Sadler headed up a committee to look into the conditions of child workers in the textile industry. The Sadler Report contained firsthand accounts of child labor practices and helped bring the harsh labor conditions to light. As a result, Parliament passed new regulations to ease working conditions for children.

An 1833 law forbade the hiring of children under the age of nine and limited the working hours of older children in the textile industry. Over time, Parliament passed other laws to improve working conditions in both factories and mines and to limit the work day of both adults and children to 10 hours. It also enacted



>> Before child labor laws, working-class children like these boys in Pennsylvania worked long hours on hazardous jobs. Many of these mineworkers were aged 10 or even younger. **Hypothesize** Why did mine owners hire children for certain jobs?

 **Interactive Gallery**

laws to require the education of children and to stop the hiring of children and women in mines.

2 DRAW CONCLUSIONS How did the Industrial Revolution change the lives of men, women, and children?

Benefits of the Industrial Revolution

Since the 1800s, people have debated whether the Industrial Revolution was a blessing or a curse. The early Industrial Age brought great hardships and much misery. Although the first factories did provide jobs and wages to displaced farm workers, the conditions under which they labored were generally terrible. In time, however, reformers, along with labor unions, pushed for laws to improve working conditions in factories, mines, and other industries. Despite the negative aspects of industrialization, the new industrial world eventually brought many advantages.

Better Standards of Living The factory system produced huge quantities of new goods at lower prices

than ever before. In time, as wages and working conditions improved, ordinary workers were able to buy goods that in earlier days only the wealthy had been able to afford. Slowly, too, the **standard of living** rose for workers. The standard of living refers to the level of material goods and services available to people in a society. Families ate more varied diets, lived in better homes, and dressed in inexpensive, mass-produced clothing. Advances in medicine ensured healthier lives.

New job opportunities opened up for skilled and unskilled workers. The building of cities, railroads, and factories provided jobs. The demand for goods and the growth of new industries, such as railroads and eventually automobiles, created more job opportunities.

New Worlds for Entrepreneurs The new industrial world was more open to change and innovation than the old rural world. Enterprising people opened new businesses and invented new products. The British potter Josiah Wedgwood, for example, was an entrepreneur who combined science and new industrial methods of production. Wedgwood experimented with new materials to improve the quality of his pottery. He set up a factory that gave each different job to a specially skilled worker. Wedgwood also used his pottery to spread ideas about social justice, especially the abolition of the slave trade. His factory cast

antislavery medallions, worn by many, that carried the image of a slave in chains with the words "Am I not a man and a brother?"

Social and Political Impact The Industrial Revolution opened new opportunities for success and increased **social mobility**, or the ability of individuals or groups to move up the social scale. In the past, birth determined a person's rank in society. Although birth still gave nobles their status, some families were able to move up the social ladder through successful enterprise. By the late 1800s, many people embraced the "rags to riches" idea, whereby a person could achieve great wealth and status through hard work and thrift.

With social mobility came greater political rights. As the middle class expanded, its members pushed for political influence. Gradually throughout the 1800s, working-class men gained the right to vote. From 1831 to 1885, the number of voters in England and Wales increased from 366,000 to almost 8 million. The growing number of voters gave the working class more power as politicians began to have to appeal to their concerns. Later, women also earned the right to vote. Labor unions won the right to bargain with employers for better wages, hours, and working conditions.

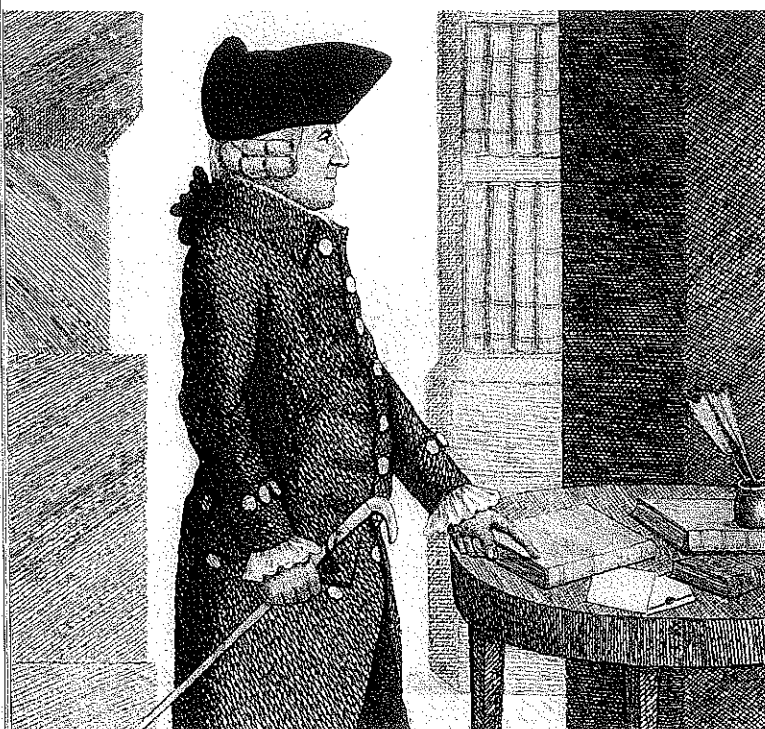
2 CHECK UNDERSTANDING Why was the Industrial Revolution seen as both a blessing and a curse?

Laissez-Faire Economics

Many thinkers and economists tried to understand the staggering changes taking place in the early Industrial Age. As heirs to the Enlightenment, these thinkers looked for natural laws to explain the world of business and economics. Their ideas would influence governments down to the present. Among the most influential schools of thought were laissez-faire economics, utilitarianism, and socialism.

Adam Smith and Laissez-Faire Economics During the Enlightenment, thinkers looked for natural laws that governed the world of business and economics. Physiocrats argued that natural laws should be allowed to operate without interference. As part of this philosophy, they believed that government should not interfere in the free operation of the economy. In the early 1800s, middle-class business leaders embraced this laissez-faire, or "hands-off," approach.

The main proponent of laissez-faire economics was Adam Smith, author of the bestseller *The Wealth of Nations*. Smith asserted that a **free market**, or unregulated exchange of goods and services, would



>> In *The Wealth of Nations*, Adam Smith proposed ideas about free market competition that are still applied today.

come to help everyone, not just the rich. The free market, Smith said, would produce more goods at lower prices, making them affordable to everyone. A growing economy would also encourage capitalists to reinvest profits in new ventures. Supporters of this free-enterprise capitalism pointed to the successes of the Industrial Age, in which government had played no part.

Malthus on Population Growth Like Smith, **Thomas Malthus** was a laissez-faire thinker whose writings influenced economic ideas for generations. In his 1798 book *An Essay on the Principle of Population*, he grimly predicted that poverty was unavoidable because the population was increasing faster than the food supply.

Malthus wrote: "The power of population is [far] greater than the power of the Earth to produce subsistence for man." He thought that the only checks on population growth were nature's "natural" methods of war, disease, and famine. As long as population kept increasing, he went on, the poor would suffer. He thus urged families to have fewer children and discouraged charitable handouts and vaccinations.

During the early 1800s, with industrial workers living and working in harsh conditions, many people accepted Malthus's bleak view. His view was proved wrong, however. Although the population boom did continue, the food supply grew even faster.

As the century progressed, living conditions in the Western world slowly improved, and people eventually did begin to have fewer children. By the 1900s, population growth was no longer a problem in the West, but it did continue to afflict many nations elsewhere.

Ricardo and the "Iron Law of Wages" Another influential British laissez-faire economist, David Ricardo, dedicated himself to economic studies after reading Smith's *The Wealth of Nations*. Like Malthus, Ricardo claimed that the poor had too many children and had little chance to escape poverty. In his "Iron Law of Wages," Ricardo noted that when wages were high, families had more children. But more children increased the supply of labor, which led to lower wages and higher unemployment. Because of such gloomy predictions, economics became known as the "dismal science."

Neither Malthus nor Ricardo was a cruel man. Still, both opposed any government help for the poor. In their view, the best cure for poverty was not government relief but the unrestricted "laws of the free market." They felt that individuals should be left to improve their



>> Laissez-faire thinker Thomas Malthus believed that the increasing population put too great a strain on the food supply. He suggested smaller family sizes as a solution to ending poverty.

lot through thrift, hard work, and limiting the size of their families.

IDENTIFY CAUSE AND EFFECT How did the ideas that Adam Smith discussed in *The Wealth of Nations* support the free enterprise system?

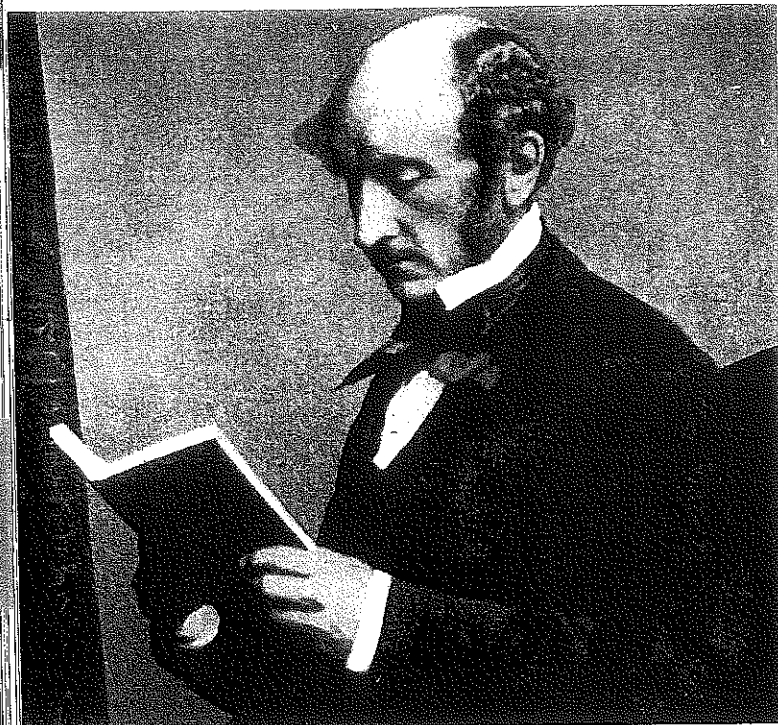
Utilitarians Support Limited Government

Other thinkers sought to modify laissez-faire doctrines to justify some government intervention. By 1800, British philosopher and economist **Jeremy Bentham** was advocating **utilitarianism**, or the idea that the goal of society should be "the greatest happiness for the greatest number" of its citizens. To Bentham, all laws or actions should be judged by their "utility." In other words, did they provide more pleasure or happiness than pain? Bentham strongly supported individual freedom, which he believed guaranteed happiness. Still, he saw the need for government to become involved under certain circumstances.

Bentham's ideas influenced the British philosopher and economist John Stuart Mill. Although he believed strongly in individual freedom, Mill wanted the

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>> Philosopher and economist John Stuart Mill supported extending suffrage. Mill believed that political power through voting could lead to necessary reforms.



>> Widespread poverty, as shown here, motivated socialists to seek a more equitable economic system.

government to step in to improve the hard lives of the working class.

"The only purpose for which power can be rightfully exercised over any member of a civilized community, against his will," Mill wrote, "is to prevent harm to others." Therefore, while middle-class business and factory owners were entitled to increase their own happiness, the government should prevent them from doing so in a manner that would harm workers.

Mill further called for giving the vote to workers and women. These groups could then use their political power to win reforms. Most middle-class people rejected Mill's ideas. Only in the later 1800s were his views slowly accepted. Today's democratic governments, however, have absorbed many ideas from Mill and the other utilitarians.

2 CHECK UNDERSTANDING What did John Stuart Mill see as the proper role of government?

Socialist Thought Emerges

While the champions of laissez-faire economics favored the free market and individual rights, other thinkers focused on social inequality and what they claimed were the evils of industrial capitalism. They argued that industrialization had created an unjust gulf between rich and poor.

The Socialist Point of View To end poverty and injustice, some thinkers offered a radical solution—socialism. Under **socialism**, the people as a whole rather than private individuals would own and operate the **means of production**—the farms, factories, railways, and other large businesses that produced and distributed goods. In practice, when socialist governments gained power in the 1900s, they tended to regulate the production and distribution of goods, which often proved inefficient.

Socialism grew out of the Enlightenment faith in progress and human nature and its concern for social justice. Socialist thinkers developed a number of different ideas about how to achieve their goals. The early experiments in socialism differed greatly from what later socialist governments would do.

Owen and Utopian Socialism A number of early socialists established communities in which all work was shared and all property was owned in common. When there was no difference between rich and poor, they said, fighting between people would disappear. These early socialists were called Utopians. To critics, the name implied that they were impractical dreamers.

One of these social reformers was **Robert Owen**. Owen himself was an industrial success story. He started life as a poor Welsh boy and became a successful mill owner. Unlike most industrialists at the time, Owen refused to use child labor. He campaigned vigorously for laws that limited child labor and encouraged the organization of labor unions.

Like other Utopians, Owen believed there was a way he could change society for the better. To prove his point, he set up a model community around a mill in New Lanark, Scotland, to put his own ideas into practice. At his factory in New Lanark, he built homes for workers, opened a school for children, and generally treated employees well. He wanted to show that an employer could offer decent living and working conditions and still run a profitable business.

2 IDENTIFY What were the characteristic beliefs of early socialists?

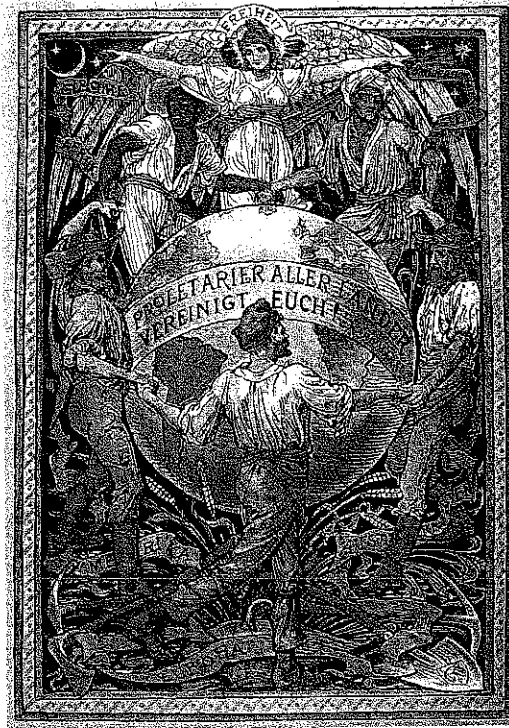
Marx and the Origins of Communism

In the 1840s, **Karl Marx**, a German philosopher, condemned the ideas of the Utopians as unrealistic idealism. He formulated a new theory, "scientific socialism," which he claimed was based on a scientific study of history. He teamed up with another German socialist, Friedrich Engels, whose father owned a textile factory in England.

Marxist Theory Marx and Engels wrote a pamphlet, *The Communist Manifesto*, which they published in 1848. "A spectre [ghost] is haunting Europe," it began, "the spectre of communism." According to Marx, **communism** would bring a classless society in which the means of production would be owned in common for the good of all.

In fact, wherever communism came to be practiced in the 1900s, it brought a system of government in which the state led by a small elite controlled all economic and political life and exercised authoritarian control over the people.

In *The Communist Manifesto*, Marx theorized that economics was the driving force in history. He argued that there was "the history of class struggles" between the "haves" and the "have-nots." The "haves" had always owned the means of production and thus controlled society and all its wealth. In industrialized Europe, Marx said, the "haves" were the bourgeoisie. The "have-nots" were the **proletariat**, or working class.



>> This well-known Marxist poster proclaims in German, "Workers of all countries, unite!" **Determine Point of View** Why should workers unite, according to Marx?

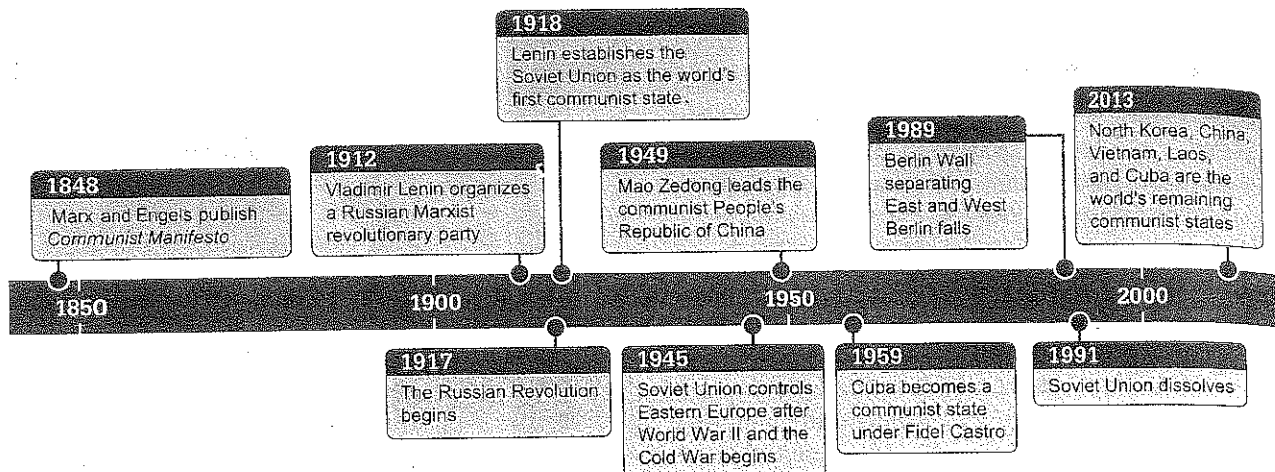
 **Interactive Chart**

According to Marx, the modern class struggle pitted the bourgeoisie against the proletariat. In the end, he predicted, the proletariat would be triumphant. Workers would then take control of the means of production and set up a classless, communist society. In such a society, the struggles of the past would end because wealth and power would be shared equally.

Marx despised capitalism. He believed it created prosperity for only a few and poverty for many. He called for an international struggle to bring about its downfall. "Workers of all countries," he urged, "unite!"

Marxism Finds Support At first, Marxist ideas had little impact. In time, however, they would gain supporters around the world. In western Europe, communist political parties emerged and promoted the goals of violent revolution to achieve a classless society. Marx's ideas would never be practiced exactly as he imagined. Even so, Karl Marx remains a key historic figure, not only in his lifetime but in the century to come.

In the 1860s, German socialists adapted Marx's beliefs to form **social democracy**, a political ideology in which there is a gradual transition from capitalism to socialism instead of a sudden violent overthrow of the system. By the late 1800s, a rift formed between strict



>> Since Marx's lifetime, communism has spread globally and then declined. **Analyze Charts** How much time elapsed between the Soviet Union's gaining control of Eastern Europe and the end of the Soviet Union?

Marxists, who believed in revolution to end capitalism, and social democrats, who believed in the possibility of peaceful reform.

In the late 1800s, Russian socialists embraced Marxism and formed a communist party to bring about revolution. In 1917, the Russian Revolution set up a communist government there that lasted until 1991. During the 1900s, revolutionaries in countries from China to Cuba adapted Marxist ideas to their own situations and needs. Independence leaders in Asia, Latin America, and Africa often experimented with Marxist ideas.

Marxism Loses Its Appeal Marx claimed that his ideas were based on scientific laws. However, many of his ideas turned out to be wrong. He predicted that the misery of the proletariat would touch off a world revolution. Instead, by 1900, the standard of living of the working class improved in industrially developed countries. He also predicted that workers would unite across national borders to wage class warfare.

Instead, people continued to feel stronger ties to their own countries than to any international workers' movement. Finally, by the late 1900s, the few nations that had experimented with communism were moving

away from government control of the economy and were adding elements of free-market capitalism.

2 CHECK UNDERSTANDING What did Marx predict was the future of the proletariat?

ASSESSMENT

- 1. Summarize** How did the middle class live during the Industrial Revolution?
- 2. Describe** What was life like for working-class women during the Industrial Revolution?
- 3. Cite Evidence** What key social and economic changes did industrialization bring about, both for the better and for the worse? Explain your answer with evidence from the text.
- 4. Identify Main Ideas** What were the historical origins and characteristics of the free enterprise system?
- 5. Identify Patterns** How did the Industrial Revolution impact the development of modern economic systems? In your answer, identify the economic systems that arose during that period.